An evaluation of the impact of a health and well-being module on selected health outcomes of undergraduate students

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An evaluation of the impact of the inclusion of a
“Health and Well Being Module”
in the
undergraduate curriculum
on selected
health outcomes of a group of students
by

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Abstract

The aim of this study was to evaluate the impact of a pilot intervention designed to improve physical activity, healthy eating and psychological well-being in a group of third level students in a rural college setting. The nature of the intervention was that of a curriculum based, educational, individual health behavioural change approach with first year undergraduate students using group motivational interviewing. The intervention was delivered in the form of a new module entitled Health and Well-being incorporated into the undergraduate nursing degree curriculum. The evaluation of this intervention employed a mixed methods approach including a quasi-experimental design to evaluate the impact and outcome of the intervention while a focus group was utilised to evaluate the process of the intervention. The study population consisted of a non-probability purposeful sample of 110 students divided into an intervention and a comparison group. Data collection tools included a health behaviour questionnaire incorporating a mixture of self-reported measures, objective measures and a focus group interview. Quantitative data was analysed by SPSS and thematic content analysis was utilised for the focus group. Findings indicated a significant increase in physical activity between pre and post intervention within the intervention group, however these increases were not maintained. The healthy eating element of this intervention was largely ineffective. Both groups gained weight between pre and post intervention however a statistically significant weight gain was found in the comparison group only. A statistically significant increase in psychological well-being in the intervention group between pre and post intervention indicated that this intervention improved psychological well-being in this group; on the other hand a large decrease in psychological well-being in the comparison group over the year may indicate that all students could benefit from a similar psychological well-being intervention. Findings from the focus group reinforced the stressful nature of student life and indicated that many students experience psychological distress. It is concluded that the stressful nature of this adjustment period renders first year college students unable to take on board any other form of health lifestyle behavioural change at this point.
CHAPTER ONE
INTRODUCTION

The Importance of Health and Well-Being in College Students
Much has been written of late with regard to the settings approach to health promotion and the third level college as a setting for the promotion of health (Dooris et al., 2012). The Ottawa Charter (WHO, 1986) states that health is created within the settings of people’s everyday lives, where they learn, work, play and love. Scriven and Hodgins (2012) suggest that the social milieu in which population groups live, work and play is, both a major determinant of health and the context in which health should be promoted. According to Dooris et al. (2012) higher education represents a key sector in and through which to invest for public health, offering enormous potential for positive impacts on the health and well-being of students, staff and the wider community. The focus of the current study is on students and the fact that such a large number of young people now attend third level education, making the college an ideal setting for the promotion of health and well-being within this population group. A number of the strategies outlined by the Ottawa Charter (WHO, 1986), discussed in more detail further on, will be utilised within the current study with the main emphasis being on the development of personal skills.

In keeping with the settings approach, the Obesity Strategy (2005) recommends that all third level colleges should be encouraged to adopt “the health promoting college” concept where-by colleges would become active in encouraging students to adopt more positive health behaviours, e.g. around healthy eating and physical activity. Similarly, recommendations from the Health Promotion in Third Level Settings
document (Devaney, 2005) urge institutions to explore opportunities for integrating health promotion into the curricula of both health and non-health professions.

In 2005, the WHO estimated that 1 billion people world-wide were overweight and 300 million were obese. Estimations suggest that 1.5 billion people will be overweight by 2015, (WHO, 2005). With increasing body mass comes increasing risks of diseases such as coronary heart disease, stroke, type 2 diabetes and cancer of the breast, colon, prostate and others. Chronic overweight also contributes to osteoarthritis (WHO, 2009).

According to the WHO (2009), mean BMI’s are increasing world-wide due to changes in diet and increasing physical inactivity. Interestingly this report highlights the fact that world-wide overweight and obesity cause more deaths than underweight. Biddle and Mutrie (2005) suggest that lifestyle changes particularity in the latter part of the 20th century have brought particular health problems which have been termed “hypokinetic diseases” (Kraus and Raab, 1961). Such diseases are as a result of lack of physical activity.

Physical inactivity has been increasingly recognised as an important risk factor associated with morbidity and mortality in adults (DHHS, 1996; CDC, 2003). Physical activity has also been found to reduce the risk for cardiovascular disease, some cancers and type 2 diabetes (WHO, 2009).

According to Busse et al. (2010) almost a third of all people in Europe are overweight or obese while Cavill et al. (2006) reported data from the European region which identified physical inactivity as a risk factor for cardiovascular disease, non-insulin dependent diabetes, hypertension, cancer, musculoskeletal disease and psychological disorders. Closer to home, The National Taskforce on Obesity (2005) points out that
the current obesity problem is becoming increasingly prevalent in younger people,
particularly among the 16-24 year old-age group. They go on to highlight the fact that
“insufficient physical activity” is one of the primary causes for the growth in obesity.
The increase in obesity levels and the reduction of physical activity present within the
wider society is also reflected within the population of college students.
Recent research suggests that approximately 35% of all college students are
overweight or obese, with many at risk for weight gain during the college years
(Ferrara, 2009). Studies have shown that the transition from second level to college is
a critical period in life where the risk of weight gain is significantly higher than at
other time periods (Hovell et al., 1985; Levitsky et al., 2004). Weight gain that occurs
in college is typically maintained (Gropper et al., 2009) or may even continue
throughout the college years (Lloyd-Richardson et al., 2009) and at this stage
permanent weight loss is unlikely (Kasparek et al., 2008).
Fielder-Jenks (2010) also found that when young adults begin college the new
environment may place them at increased risk of developing unhealthy eating habits
and adopting a more sedentary lifestyle. According to the American College Health
Association (ACHA) 2008, college students tend to engage in a number of unhealthy
eating behaviours including extreme dieting, skipping meals, high intake of fast foods,
low intake of fruits and vegetables and minimal consumption of dairy products.
Nelson et al. (2007) suggests that the first year of college is an adjustment period
which has being associated with a negative decline in vigorous physical activity, thus
poor nutrition and physical inactivity contribute to the increased risk of weight gain
and prevalence of overweight and obese individuals in the college student population
(Ferrara, 2009).
Adapting to college life is often seen as an extremely busy time and students are
forming relationships with peers and trying to fit in to college routines. It is often at this time that physical activity routines from the past may be abandoned and physical activity can become a low priority. With regard to healthy eating, many students often for the first time have to take responsibility for buying and cooking their own food. This often coincides with students learning how to manage and budget their finances. Thus, healthy eating may not be a particular priority for them at this time.

The first year of college has shown to be a particularly stressful time when students are required to make many major adjustments at the same time (Brougham et al., 2009; Steinhardt and Dolbier, 2008; Diehl et al., 1996; Ross et al., 1999). According to Brougham et al. (2009) past studies reported that 75% to 80% of college students are moderately stressed and 10 to 12% are severely stressed. This stress poses a threat to their psychological well-being as the link between stress and psychological well-being is widely recognised (O’ Reilly et al., 2010). Bewick et al. (2010) also reported heightened levels of psychological distress within the university student population. Steinhardt and Dolbier (2008), suggest that reports of psychological stress in the college student population are increasing steadily and result from a variety of sources such as intrapersonal, academic, interpersonal and environmental. It has been suggested that exposure to these stressors coupled with students developmental gaps at coping make this population particularly vulnerable to resultant psychological and physical health problems (Diehl et al., 1996). Studies indicate that a greater strain is placed on well-being once students start university compared to pre levels preceding entry (Andrews and Wilding, 2004; Cooke et al., 2006). Studies have reported first year students as being particularly vulnerable to stress (Giddan, 1988; Bray and Born, 2004; Bowman, 2010). Jones and Johnson (1997) reported a number of academic stressors for first year students which included lack of free time, long hours of study,
college response to student need and fear of failing.

Promoting the health and well-being of students is often a low priority as students and college staff alike cope with the administration and educational demands of a new college year.

However, from the above it is clear that college students are a vulnerable group with many risks for an unhealthy lifestyle. Thus it appears fitting to introduce a Health and Well Being module of study at this point when first year students are embarking on their college careers.

**The Intervention**

Ever since the Black Report (DHSS, 1980) it is well recognised that a social class gradient exists in health and health behaviours, in that the lower the socioeconomic position the worse the health (Commission on Social Determinants of Health (CSDH); WHO, 2008). Thus it may be expected that the health status of college students, as generally belonging to higher socio economic groups, would be better than their counterparts who don’t attend college and/or the general population. Evidence does not support this assumption.

Therefore in an attempt to explore ways of interrupting the progressive decline in activity levels, and halting the rise in obesity levels, all the while maintaining psychological well-being, the researcher proposes the current study. Using the third level college setting, the researcher sets out to ascertain whether the inclusion of a “Health and Well Being module” in the undergraduate curriculum will have an impact on students’ physical activity, healthy eating and psychological well-being.

**Aims and objectives**

Using a quasi-experimental survey design, the aim of this study was to evaluate the
impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health outcomes of a group of students. The selected health outcomes being, physical activity, healthy eating and psychological well-being.

The objectives were:

- To compare participants’ physical activity outcomes before and after completing a tailored educational programme on “Health and Well Being” by measuring self-reported physical activity levels, stage of change for physical activity (PA), self-efficacy for PA and social support for PA.
- To compare participants’ healthy eating outcomes before and after completing a tailored educational programme on “Health and Well Being” by measuring, BMI, self-reported eating behaviours, stage of change for healthy eating (HE), self-efficacy for HE and social support for HE.
- To compare how participants rate their psychological well-being both before and after completing a tailored educational programme on “Health and Well Being” by measuring psychological well-being.

The population group under study was that of first year undergraduate students in a college in Ireland. A non-probability purposeful sample of 110 students was chosen from one particular college setting. Main data collection sources involved a survey of health behaviours and a focus group. Data was collected prior to the intervention (delivery of the health and well-being module), after the intervention and one year following the intervention. Data was analysed by SPSS and thematic content analysis was utilised for focus group analysis.

Summary of Chapters
Following the introduction, chapter 2 provides an overview of the literature in this
area. Here, the background to the study with regard to where this study fits in the broader conceptual picture of health promotion will be outlined. The concept of health promotion and related concepts such as health and health education will also be discussed. Current issues in health promotion such as evidence based health promotion interventions and the importance of evaluation of such interventions will then be addressed. This will be followed by a discussion on different approaches to the promotion of health and well-being. Underlying theoretical frameworks will then be addressed such as the transtheoretical stages of change model and motivational interviewing. Psychological concepts such as empowerment, social support and self-efficacy will also be addressed. This will be followed by a discussion on the three health behaviours which were the focus of this study namely, physical activity, healthy eating and psychological well-being. The inter-relationship between all health behaviours will be addressed along with a discussion on multiple health behaviour change interventions. The third chapter will give an overview of the design of the intervention and provide detailed information on the content of the intervention and the rationale for same. Chapter 4 discusses the methodology including details of the sample and how access is negotiated. Data collection tools are described in detail along with the process and challenges of data collection. Data analysis and ethical concerns are also addressed in this chapter. Within Chapter 5 findings of the study will be presented. Following a description of the sample and their associated demographics, descriptive data on general health measures will be presented. Impact and outcomes of the study in the three main areas, namely physical activity, healthy eating and psychological well-being, will then be reported on in the form of quantitative data. Following this, process evaluation of the intervention will be presented in the form of qualitative data from the focus group. Within Chapter 6, key
findings from the study will be reviewed. Interrelatedness of health behaviours will also be presented as well as qualitative findings from the focus group which evaluated the process of the intervention. Findings will be examined in the context of existing knowledge in this area. Implications of these findings for practice, policy, education and research will then be discussed. Limitations of the study will then be presented. Recommendations for future research in this area will also be made.
2.1 Background and Context

2.1.1 Historical Context
In 1977, the World Health Organisation (WHO) outlined its primary goal of HFA (Health For All) by the year 2000. This was a WHO initiative aimed at improving the health of all individuals world-wide, by reducing existing inequalities in health which exist between countries and within countries. This goal was adopted by the European member states and operationalized in terms of 38 targets being set, towards the achievement of Health for All by the year 2000. The key emphasis in achieving this aim was to be an increased emphasis on health promotion and disease prevention. This was followed in 1978 by the Alma Ata Conference advocating primary health care, which was viewed as an important delivery system for achieving Health For All by the year 2000 (WHO, 1978). From the above, at a theoretical level at least, an international commitment to health promotion as a desirable concept has been apparent for a considerable period of time. The first most significant endorsement for health promotion was that of the Ottawa Charter for Health Promotion which was developed in 1986, at the first international health promotion conference in Ottawa, Canada (WHO, 1986). The Ottawa Charter pointed to five key areas which required development in order to support health promotion. These were building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and re-orientating the health services (WHO, 1986). As previously stated, the international goal of health for all was adopted by the European member states and operationalized in terms of 38 targets. European member states were then directed to develop national health policies specific to their country which
were reflective of these targets.

At national level, in 1994, the Irish government published “Shaping a Healthier Future: A Strategy for Effective Healthcare in the 1990’s” (DOH, 1994). This was followed by the first National Health Promotion Strategy in 1995 (DOH, 1995). The strategy suggested a review of the existing training and education procedures in order to prepare health professionals to meet changing demands as a result of an emphasis on primary health care and health promotion. Another five year Health Promotion Strategy was published in 2000. Within this strategy, it was acknowledged that external and structural factors can make it difficult for individuals to adopt a healthy lifestyle. The 2000 Health Promotion Strategy was subsequently reviewed in 2004. There has been no health promotion strategy document in operation since 2005. From 2005, the Health Service Executive (HSE) became responsible for service delivery of health. The HSE then published its first Health Promotion Strategic Framework in 2011 which sets out a strategy for promoting heath from 2011-2016. Unlike the 2005 health promotion strategy, this HSE framework approaches health promotion from the settings approach in recognition that many risk factors are interrelated and can be tackled through comprehensive integrated programmes in appropriate settings where people live, work and interact (Murphy, 2011). Within the framework three key settings are identified, namely health service, education and community. The framework sets out priority objectives in each area. With specific relevance to the current study, within the education setting, it is pointed out that there is a need for health promotion interventions from pre-school to third level settings. It also proposes the implementation of the nationally agreed health promotion model for the education setting (from pre-school, to third level and out-of-school) based on the existing Health Promoting Schools (HPS) approach.
Within the health service setting, the strategic framework points out that all aspects of its service should be reflective of health promotion including employee health and well-being (HSE, 2011). It also points out that provision should be made that all HSE staff have the relevant competencies to undertake health promotion interventions. It supports the implementation of a Health Promoting Health Service (HPHS) Model for the HSE based on existing approaches developed within the Irish Health Promoting Hospitals approach.

Thus, a commitment to health and health promotion started over thirty years ago. Since that time many developments and shifts in focus have occurred both internationally and nationally. Throughout this time, we have seen the focus of health promotion shift from that of a focus on the individual to that of a focus on more structural and environmental issues and more recently to a settings approach. The settings approach appears to represent a coming together of theory and policy in that the settings approach is advocated by health promotion theorists as well as health promotion policy makers.

2.1.2 The Concept of Health Promotion
The concept of health promotion has evolved over the years, particularly in relation to the shift from health education and an individual focus to health promotion and a social/environmental focus. Smith (1979) describes health education as intentional, planned, methodical teaching and information giving aimed at helping each individual citizen achieve and maintain an optimum state of complete physical, mental and social well-being, free from disease or infirmity. This definition reflects the individual approach to behaviour change which is characterized by specific education on a particular health issue to individuals, as opposed to the broader concept of health promotion. The Ottawa Charter of Health Promotion provides the most widely cited
definition of health promotion which is “the process of enabling people to increase control over, and to, improve their health” (WHO, 1986). Maben & Macleod Clark’s (1995) concept analysis on health promotion reflects this process of enabling as described within the Ottawa Charter in that health promotion is in itself an approach based on empowerment, equity, collaboration and participation and may involve social and environmental change. Health education is included as an integral and necessary prerequisite to health promotion within their concept analysis. In the past, an over emphasis on the individual as solely responsible for their own health has been criticised. Similar criticisms have been levelled at the concept of health education. Health education has been described as ineffective and unethical, blaming the victims for their health problems (Rodmell & Watt, 1986). The Health Promotion Strategy from the Department of Health (1995) and (2000) reflects the WHO’s definition cited earlier, stating that health promotion is broader than disease prevention and health education. It recognises that individuals who wish to adopt a healthy lifestyle may be prevented from doing so by environmental and socio-economic factors which are often beyond their individual control. Further support for the multifaceted nature of health and a multi-sectorial approach is contained within the HSE’s 2011 strategic framework for health promotion which endorses the settings approach. Tones and Tilford (2001), suggest that it is entirely logical to describe any measure which promotes health as health promotion. However they do go on to describe health promotion as any planned intervention that seeks to improve health and/or prevent disease by engaging with the four main domains comprising the health field concept. These domains are individual, behaviour and lifestyle, social and environmental determinants, health services and the genetic pre disposition. This definition is reflective of the Ottawa Charter strategies outlined earlier. The concept of health
education is embedded within the concept of “Developing Personal Skills” as set out within the Ottawa Charter and thus merely one part of the overall promotion of health. Douglas (2007) distinguishes between individual and structural approaches to health promotion suggesting that individual approaches focus on encouraging and empowering people to change behaviour and adopt a healthy lifestyle, whereas structural approaches focus on efforts to change the wider determinants of health, such as the physical, social and economic environment. Over the past fifteen years there has been a progressive shift from a narrow to a much broader interpretation of health promotion. The tensions between traditional health education and the more modern approach to health promotion are reflective of the shift in focus in health promotion from an individual “victim blaming” philosophy to a more structural, social and environmental approach. However at this point in the evolution of our understanding of health promotion, there is a well-accepted body of evidence that health education and thus an individual focus is an integral and essential part of the broader concept of health promotion. This makes an individual approach to behavioural change a worthy pursuit under the auspices of health promotion. Thus, for the purpose of the current study an individual behavioural change approach is taken to developing personal skills in a group of college students relevant to their health behaviours.

2.2 Evidence and Evaluation in Health Promotion

2.2.1 Evidenced Based Health Promotion
According to Thorogood and Britton (2003) health promotion needs a strong evidence base in order to gain credibility and more importantly to ensure accuracy and effectiveness of future interventions. The WHO urged members to adopt an evidenced based approach to health promotion policy and practice, using the full range of
quantitative and qualitative methodologies (WHO, 1998). According to Raphael (2000), evidence in health promotion is important because health promoters need justifications for the decisions they make. He also points out the evidence of effectiveness is particularly important in these times of economic rationalisation whereby health promoters have to justify their activities. Randomised Controlled Trials (RCT’s) are typically perceived as providing the most reliable and valid evidence (Speller et al., 1997), but their use in health promotion has been criticized. Thorogood and Britton (2003) suggest that the lack of RCT evidence should not be seen as a weakness in health promotion interventions and that well conducted, non-randomised studies (collaborated by other qualitative evidence) can provide a sound evidence base for health promotion. In a review of 26 case studies, Juneau et al. (2011) concluded that there is evidence that health promotion interventions change behaviours, attitudes and opinions in populations. According to Gold and Atkinson (2001) the health education field does not take advantage of the accumulated knowledge it has produced, and as such appears to have no institutional memory. They claim that the evidence that does exist is broad and practitioners use different strategies to adapt it for their particular situation. Juneau et al. (2011) suggests that in reality we do not have a real understanding of how evidence is being used in health promotion practice today. Juneau suggests that part of the reason for this is that, when writing up the results of the interventions, authors rarely report on how they used any available evidence to design their intervention. Therefore it appears that, what is required is more attention to detail and documentation of the evidence base which informed each step of the health promotion initiative’s implementation.
2.2.2 Evaluation
Evidence can only arise from careful monitoring and evaluating of health promotion initiatives. According to Pender et al. (2011), changes in the conceptualization of health have resulted in different approaches to promoting and evaluating wellness. Coombes and Thorogood (2003) claim that credible demonstrations of the value and effectiveness of health promotion activity has been hampered because of unresolved theoretical and practical issues concerning the evaluation of health promotion. They also point out that different health promotion activities require different forms of evaluation and that in the past, methods of evaluation have been borrowed uncritically from other more narrowly defined disciplines. As a result, health promotion has been evaluated by inappropriate tools leading to unsustainable conclusions (Speller et al., 1997). An over-reliance on the RCT as the gold standard for evaluating initiatives may have led to some of the difficulties health promotion practitioners experience when attempting to evaluate health promotion. In 1998, the WHO European Working Group on Health Promotion Evaluation concluded that to gain a better understanding of the impact of health promotion initiatives, evaluators need to utilise a wide range of quantitative and qualitative methods that extend beyond the narrow paradigm of the RCT (WHO, 1998). Coombes (2003) concurs with this view and suggests that there is a need for health promoters to utilise both quantitative and qualitative approaches to evaluation because of the unique nature of health promotion interventions. Mc Kinlay (1993) suggests that there is no right or wrong or best methodological approach, thus appropriateness to the purpose must be the central concern. Mc Kinlay (1993) suggests that quantitative methods tend to be used for evaluating downstream activities which have an individual focus whereas qualitative methods are often more appropriate for upstream activities where control is more difficult within the
socio-political environment. Some writers advocate the use of a number of different methods (Denzin, 1978). Eakin and Maclean (1992) point out that although this may increase the reliability and validity of results it is important not to assume that this is some form of ultimate or objective truth. As Coombes (2003) points out, health is a complex set of physiological, biological, emotional and behavioural factors and that there never will be a true picture. Thus what we are striving for in our evaluations is merely a better understanding of the situation.

**Outcome or Process**

Within health promotion evaluation, a distinction is made between evaluating the outcome and the process of an intervention. According to Wellings and Macdowall (2003) outcome evaluation focuses on the goals of the programme while process evaluation is important in providing insights into what factors may hinder or facilitate their achievement. Coombes (2003) suggests that quantitative methods can best evaluate whether there is a relationship between an intervention and a health outcome (the magnitude and the scale of the change in health status). On the other hand, qualitative methods are best placed to assess why the relationship exists by assessing the relationship of the intervention to the outcome, the context in which it takes places, and the process by which it occurs. They go on to say that process evaluation has a valuable potential in helping to uncover unintended consequences of the intervention. According to Barry and Jenkins (2007), process evaluation may be viewed as a feedback mechanism that provides data on the range and extent of programme delivery and whether key objectives are being achieved. This information helps identify areas working well and also areas where objectives are not being met. This information may also lead to modifications to the programme and thereby ensure continuous quality improvement as the programme progresses. Barry and Jenkins
(2007) suggest that a formal system of evaluation needs to be put in place in order to systematically assess programme inputs, process, impact and outcomes.

2.3 Changing Health Behaviours
Many different approaches to the classification of health promotion initiatives exist. A simple way of distinguishing different health promotion approaches is simply classifying the approach as either individual or community (Pender et al., 2011) or individual or societal (Thorogood and Britton, 2003). Back in 1975, Mc Kinlay coined the term “downstream” to describe interventions aimed at individuals, “midstream” to describe community based interventions and “upstream” to describe interventions aimed at policy and environmental changes. As Pender et al. (2011) points out, these interventions are interrelated and success is more likely to be achieved if all three are taken into consideration when planning and evaluating health promotion programmes. Similarly, Raphael (2000) describes different levels of health promotion according to the key focus namely individual, community or structural. Here, the individual focus includes biomedical and lifestyle aspects. The community focus involves social supports and connections and the structural focus involves community resources, policy decisions and distribution of economic resources. According to Jepson et al. (2010), all three levels are required to achieve changes in lifestyle as well as improving knowledge, and influencing attitudes towards positive health behaviours.

The Ottawa Charter
Another way of distinguishing various health promotion approaches is by using the five strategies laid down in the Ottawa Charter. As previously stated the Ottawa Charter pointed to five key areas which required development, in order to support health promotion. The strategies most relevant to the current study include
strengthening community action, developing personal skills and re-orientating the health services (WHO, 1986). According to Mittelmark et al. (2005) the Ottawa Charter strategies have been found to be effective tools for addressing a range of health issues. Hyndman (1998) examined the evidence for effectiveness of health promotion from the perspective of the Ottawa Charter strategies and concluded that there was substantial evidence that health promotion has contributed to maintaining and improving the health of individuals, communities and populations. He goes on to say that it is also clear that more substantial outcomes are likely to be achieved if more than one strategy is employed as the five strategies are synergistic and are more effective if used in combination.

Firstly, the development of personal skills is seen as particularly pertinent to the current study in that the intervention sets out to develop the personal skills of a group of undergraduate students in order to bring about improvements in their health behaviours. According to Barry and Jenkins (2007), developing personal skills such as self-awareness, improved self-esteem, sense of control and self-efficacy have been shown to improve mental health and to facilitate people to exercise more control over their life and environments. They cite other personal skills such as relationship and communication skills, problem solving and coping skills that also fall into this category. Many of the above personal skills are relevant to the current study.

Secondly, “strengthening community action” by developing this cohort of students within their own and wider college community. For the purpose of the current study the intervention group of undergraduate nursing students are seen as a community within a community (Jewkes, 2003), a community of first year undergraduate student nurses as well as part of the larger student body and college community. According to Vuori (1984), in addition to the benefits that may accrue from the
outcomes of the component activities, the process of participation in a health promotion initiative is in itself health generating. Jewkes and Murcott (1998) outline the benefits of community participation in particular, the empowering effect of participation on the participants which often results in participants developing skills and competencies which can be applied to all areas of their life and are not confined to the community development initiative. Thirdly, to a lesser extent “the reorientation of the health services” strategy could also be seen to be relevant to the current study, in that, as the particular group are undergraduate nursing students it is anticipated that the awareness and learning they develop with regard to their own health will also serve to enhance their developing role as health promoting health care professionals of the future. Thus the current study may also result in the development of an additional skills set not directly targeted by the intervention and thus not possible to measure. According to Jansink et al. (2009) the performance of health professionals in the field of health behaviour change has to date being suboptimal. The Ottawa Charter suggests that in reorientation of the health services, the role of the health sector must move increasingly in a health promotion direction, beyond its responsibility for providing clinical and curative services. Reorienting health services also requires stronger attention to health research as well as changes in professional education and training. Thus an intervention such as this one will not only serve to enhance participants’ knowledge and skills in managing their own health behaviours but will also provide them with a valuable base from which to develop their health promotion role. Thus, it is anticipated that the current study may contribute to the education and training of the participant nursing students to the extent that their knowledge and skills in their health promotion role will be enhanced.
The Settings Approach
Current health promotion literature and WHO publications strongly advocate the use of a settings approach to health promotion. The World Health Organisation (1998) defined settings as the context in which people engage in daily activities and in which environmental, organisational and personal factors interact to affect health and well-being. According to Scriven (2012), the healthy settings approach reflects a broad understanding of health and well-being and applies a whole system perspective aimed at creating healthy sustainable working, living and learning environments for students, staff and visitors. This approach also aims to increase the profile of health in teaching, research, knowledge exchange and contribute to the health and sustainability of the wider community. According to Dooris et al. (2012) higher education has an important role to play as a partner in health improvement, as a setting in and through which to promote health as a key contributor to citizen development and driver of societal change (Dooris et al., 2012, p.153). Dooris (2001) set out a conceptual framework for the university as a healthy setting. This social ecosystem model articulates the potential value of the healthy universities approach as an investment in the health and well-being of students and staff within and outside of university life. Dooris et al. (2012) highlights the potential of universities to increase understanding of health, wellbeing and sustainable development and encourage the development of value based perspectives that students and staff will take in to their future lives. While it is not possible to state with certainty that the settings approach is more successful in college and university settings then one-off activities, the evidence points in that direction (Dooris et al., 2012). However, Dooris (2009) points out that planned comprehensive and multi-sectorial settings approaches to health promotion action are not well established and are an essential component of 21st century health promotion. Hancock (1999) suggests that the settings approach is one of the most successful
strategies to emerge out of the Ottawa Charter but argues that a major drawback to this approach is the lack of evaluation leading to uneven and underdeveloped evidence base (Dooris et al., 2007). Thus, many ways of classifying ways of promoting health exist from an individual to a community to a societal perspective. From the above it would appear desirable to integrate all three different approaches to health promotion to bring about behavioural change. However, this is not always possible and may prove difficult to measure. As already discussed there has been a shift towards a settings based approach to health promotion in acknowledgement of the wider socio-economic and environmental effects on health. From the literature it appears that the university and or college environment is a prime setting for the development of current and future health promotion initiatives. However further work on embedding this concept within higher education is needed along with an in built evidenced based evaluation approach to monitoring such initiatives. For the purpose of the current study an individual behavioural change approach is taken to developing personal skills on health behaviours in a group of college students in a college setting.

2.4 Models of Behavioural Change

Introduction:
Individual theoretical models of health behaviour focus on attitudes, beliefs or other characteristics within the individual that are amenable to change (Pender et al., 2011). Thus, individual health promotion interventions are designed to promote a change in attitudes, knowledge and ultimately individual health behaviours. In the planning of this health promotion intervention, an exploration of the evidenced based literature took place. This involved exploring various psychological, sociological and health promotion literature in order to be informed of the best available evidence to guide such an intervention. It became apparent that much overlap existed within various
models and that sometimes a model had one or two elements significant to the current intervention and another model contained other elements. As the intervention was designed, a conceptual framework was formed which contained core elements significant to the planned intervention (see Appendix 2.1).

Noar et al. (2008) suggest that theories and models of health behaviour are attempts to explain why individuals do or do not engage in health behaviours and how individuals change negative behaviours. According to Tones and Tilford (2001), there is no shortage of models that seek to provide insight into human health and illness behaviour. For the purpose of the current study an overview of background models which influenced the planning of this intervention will be given. This will then be followed by a more detailed explanation of the Transtheoretical model (TTM) and motivational interviewing (MI) which are key to directing this intervention. Other salient psychological constructs concepts central to behaviour change will also be presented and applied to the present study.

One of the first models used to explain how our behaviour is influenced by our knowledge and attitudes is that of the Knowledge Attitudes Behaviour (KAB) model. According to social psychology, people’s behaviour is partly influenced by their attitude to that behaviour. An individual’s attitude is in turn influenced by his knowledge, beliefs and his motivation which comes from the person’s values, attitudes and drives which are influenced by social norms (Naidoo and Wills, 2009). Thus the knowledge and information provided within this intervention is intended to provide cognitive support for engaging in associated positive health behaviours.

Social learning theory (Bandura, 1991) focuses on reciprocal interactions between environmental, personal and behavioural factors. According to Pender et al. (2011) environmental events, personal factors and behaviour act as reciprocal determinants of
each other in social cognitive theory. In 2004 Bandura proposed the socio-cognitive model which basically was the social learning theory with self-efficacy added as a central focus.

The Theory of Reasoned Action (Ajzen, 1985) assumes that an individual considers the consequences of the behaviour before performing the particular behaviour. Thus an intention to perform the behaviour is based on whether the individual considers the consequence of that behaviour as either good or bad. The individual also considers how society would view the behaviour. Thus personal attitude and social pressure contribute to the intention to perform a given behaviour or a change in behaviour. As a follow up to this the theory of planned behaviour states that likelihood of behaviour performance is proportional to the amount of control an individual possesses over the behaviour and the strength of the individuals intention to perform the behaviour. Thus in the current study, evidence based information and knowledge is provided within lectures to inform participants beliefs around healthy eating and physical activity. This provides participants with cognitive support for adopting health behaviours. This is followed up by group motivational interviewing (GMI) workshops, whereby participants are facilitated to explore and clarify their attitudes and verbalize their reasons for adopting health behaviours in these areas. Within the group based motivational interviewing workshops, social support is promoted and self-efficacy is facilitated. Thus, equipped with evidenced based knowledge and a positive attitude to healthy eating and physical activity, it is anticipated that it is more likely that positive health behaviours will be adopted.

2.4.1 Transtheoretical Model (TTM)/Stages of Change
As can be seen from the previous discussion many social cognitive models exist to explain how individuals change behaviour. Although the transtheoretical model also
informs us on how people change, it outlines how this change progresses through a
series of stages. According to Weinstein et al. (1998) stage models have four major
principles which are, firstly a category system to define stages, secondly an ordering
of stages, thirdly common barriers people face at the same stage and fourthly different
barriers people face at different stages. The best known stages model is that of the
Trans Theoretical Model of change (TTM). According to Proschaska and Diclemente
(1983) health related behaviour change progresses through five stages regardless of
whether an individual is trying to quit a health damaging behaviour e.g. smoking or
adopt healthy behaviour e.g. increase physical activity. This model is important in
showing that any change we make is not final but part of an on-going cycle of change.
Within the context of this study the stages of change theory in conjunction with
motivational interviewing theory is used to inform a central feature of the intervention,
the group motivational interviewing workshops (GMI). The model consists of three
core components namely, stages of change, processes of change, and decisional
balance. The concept of self-efficacy (discussed later) is also seen as an essential
component to the model. The stage of change component is made up of five stages
each representing a different level of progression along a behaviour change
continuum. Firstly pre-contemplation is the stage in which people are not intending to
take action in the foreseeable future, usually measured as the next six months.
Secondly, the contemplation stage is where people are intending to change in the next
six months. Thirdly, the preparation stage is where people are intending to take action
in the immediate future, usually measured as the next month. Fourthly, the action
stage is where people have made specific overt modifications in their lifestyle within
the past 6 months. Since action is observable behaviour, change often has been
equated with action. And finally the fifth stage is that of maintenance, here the new
behaviour is sustained and the person moves into a healthier lifestyle. For some people maintaining a new behaviour is difficult and the person may revert or relapse back to any of the previous stages. Prochaska et al. (1992) argue that whilst few people go through each stage in an orderly way they will go through each stage.

The second component of the TTM model is that of the processes of change, the activities individuals use to progress through each of the five stages. Originally Prochaska and Di Clemente identified ten processes of change. Marcus and Forsyth (2009), adopted Prochaska and Diclemente’s stages of change model and called it the “motivational readiness for change model” to emphasise that the model focuses on motivation to change along with actual behaviour change. They have adapted the processes of change somewhat for utilisation within a physical activity promotion context. Thus, they have identified five behavioural and five cognitive processes that individuals use throughout the change process. The cognitive processes are more aligned to the preparation stage and include firstly increasing knowledge, secondly being aware of risks, thirdly caring about consequences to others, fourthly comprehending benefits and fifthly increasing healthy opportunities. On the other hand, the behavioural processes peak at the action stages and involve substituting alternatives, enlisting social support, rewarding yourself, committing yourself and reminding yourself of your desired behavioural change goal. Much has being written about the importance of matching interventions to the particular stage of change the individual is at, at a particular time. Aveyard et al. (2009) points out that those who are ready to change respond more to stage matched interventions than those who are not ready. Also Kreuter et al. (2004) points out that targeted messages are considered more effective than generic communication in terms of engaging individuals, building self-efficacy and improving health behaviours. Although the current study involved
groups as opposed to individuals, cognisance was taken of assessing stages of change and utilising processes according to stage when exploring possible mechanisms to enhance behavioural change with individuals in a group setting.

The third component of the Trans theoretical model is that of decisional balance. The concept of decisional balance has being integrated into the model from Janis and Mann’s (1977) decision making model. The decision making model assumes that sound decision making involves weighing up the pros and cons, and that behaviour change will occur when potential gains outweigh the losses. Prochaska (2005) states that the pros and cons must cross over for people to be prepared to take action.

The concept of self-efficacy is also seen as an essential component of the Trans theoretical model. This concept was integrated from Bandura’s social cognitive theory. Within the context of the group motivational interviewing (GMI) workshops this is promoted by using the key motivational interviewing (MI) principles which involves supporting self-efficacy and utilising key motivational interviewing (MI) communication skills such as affirmations, selective reflection and summarising. In 2009, Prochaska added another core concept which is that of “temptation” or the intensity of urges to engage in a specific behaviour in the midst of a difficult situation (Prochaska et al., 2009). Examples of common temptations are emotional distress, positive social situations and cravings. The task here is to be prepared for temptations and have a coping plan in place to maintain adherence and prevent relapse.

The TTM model has been utilised in a large number of physical activity and dietary change interventions (Buckworth and Wallace, 2002; Ronda et al., 2001; Woods et al., 2002). Spencer et al. (2006) reviewed one hundred and fifty studies where the TTM model was utilized to increase physical activity. Results indicated preliminary support for the use of stage-matched exercise interventions. In 2007, Spencer
published a review of applications of the TTM to dietary behaviour and found that the evidence for using stage-based interventions is rated as suggestive in the areas of fruit and vegetable consumption and dietary fat reduction.

2.4.2 Motivational Interviewing
Motivational interviewing (MI) evolved from the work of Miller and Rollnick (2002). While it was initially developed for the field of addictions it is applicable to a broad range of areas requiring some form of behavioural change and in the treatment of diseases that are influenced by behaviour (Rubak et al., 2005). The essence of MI is grounded within the humanistic principles as described by Carl Rogers (1951). Here, each person is seen to have the right, the resource and the responsibility to make various behavioural lifestyle changes that will allow them to live a psychologically more healthy existence (Tierney et al., 2011).

Motivational interviewing (MI) is defined by Rollnick and Miller (1995) as ‘a directive, client-centred counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence.’ The resolution of ambivalence is the goal of motivational interviewing; and motivation to change is elicited from the person, not imposed upon them. It is evident that providing information on what to do in order to improve health lifestyles is no longer enough. People also need help with stimulating them towards health changes as well as help in adhering to health changes.

A report from the Nutrition and Health Foundation (2005) found that while many people understood the components of a healthy lifestyle, they appeared to lack the motivation to put this into practice.

Similar to the stages of change, the concept of motivational interviewing also consists of a number of different elements. Firstly, there is the spirit of motivational interviewing (MI). Miller and Rollnick (2002) point out that when carrying out MI it is
fundamentally important that it is done so in a way that captures the spirit of MI which is a way of being and experiencing the human nature that gives rise to that way of being. In order to convey the spirit of MI, the MI facilitator communicates the fundamental approach of MI which is characterised by collaboration, evocation and autonomy. Thus, the MI facilitator communicates a partnership-like relationship where a positive interpersonal atmosphere is created which is conducive but not cohesive to change. Evocation involves finding intrinsic motivation for change within the client themselves and facilitating its expression. Autonomy is where the facilitator respects that the ownership for change lies with the client and it is their choice.

Secondly Miller and Rollnick (2002) outline four general guiding principles that underlie motivational interviewing. These guiding principles are expressing empathy, developing discrepancy, rolling with resistance and supporting self-efficacy. Miller and Rollnick suggest that “expressing empathy” is captured in the art of reflective listening and acceptance. They suggest that by accepting people as they are paradoxically frees them up to consider change. It is this attitude of acceptance and respect which builds the therapeutic alliance and supports the client’s self-esteem which further promotes change.

Miller and Rollnick (2002) describe “developing discrepancy” as the second guiding principle of MI. In this case the facilitator’s role is to create and amplify a discrepancy between the client’s present behaviour and their broader goals or values. Thus when a person’s behaviour is in conflict with his personal goals, change is more likely to occur.

The concept of “rolling with resistance” is the third MI guiding principle set out by Miller and Rollnick. This is where the facilitator does not fight against resistance when they encounter it; rather the facilitator rolls with it and avoids confrontation. In
this situation Miller and Rollnick point out that argumentation is counterproductive. Miller and Rollnick suggest that resistance may be a signal to the facilitator to shift approach.

Supporting self-efficacy is the fourth guiding principle as set out by Miller and Rollnick which they define as a person’s belief in his or her own ability to carry out and succeed with a specific task. Miller and Rollnick suggest that self-efficacy is a key element in motivation to change and is a good predictor of treatment outcome. A general goal of MI is to enhance the client’s confidence in his or her capability to succeed in bringing about the desired change. Miller and Rollnick point out that the counsellor/facilitator has a powerful role in enhancing an individual’s self-efficacy in that if they expect a client to succeed, this can act as a self-fulfilling prophecy and boost the client’s confidence in their own abilities.

MI tools make up the third element of motivational interviewing and are designed to facilitate change. Throughout the process of MI, tools are used to assist the client in exploring their relationship to the health behaviour change in question. These tools serve to help the client develop insight into how they feel about the change, how important it is to them, how ready they are to make the change and their perception of their ability to succeed in bringing about the desired change. Thus at different times throughout the process, clients are asked to rate on a scale from 0-10 how important it is for them to make this change, how ready they are to make the change and how confident they are in their ability to do so. These scaling questions give the facilitator an opportunity to see where the most input is required. For some people it may be extremely important for them and their health to give up smoking and they may score a 9/10 on the importance ruler. However, if they feel it is too difficult to do or they have tried and failed in the past they may score a 4/10 on the confidence scale. This
indicates to the facilitator that they need to focus the session on building the clients confidence/self-efficacy and there is no need to make a case for how bad smoking is for them. Also fourthly within motivational interviewing “Decisional balance” is a technique whereby the facilitator gets the client to look at the pros and cons of changing the behaviour and also the pros and cons of not changing behaviour. If the pros and cons are equal this reflects an ambivalent picture, thus the facilitator needs to focus the session on eliciting from the client ways to increase the pros for change and decrease the pros for not changing to ensure the client is convinced that change is a good idea.

Key communication skills utilised within motivational interviewing involve, open-ended questioning, positive affirmations, reflective listening and summarizing.

The concept of MI has much in common with health promotion. Like health promotion, MI seeks to empower individuals towards promoting health behavior change. Expressing empathy with client difficulties with the change process is an important aspect of MI which is reflective of a non-victim blaming culture of modern day health promotion. Thus both concepts have in common an empowering collaborative approach to bringing about improvement in health.

A review and meta-analysis by Rubak et al. (2005) of 72 randomised controlled trials in a variety of settings reported that MI had a significant and clinically relevant effect in approximately three out of four studies in the areas of BMI and Cholesterol reductions along with other health related issues. These findings lead the authors to conclude that MI outperforms traditional advice giving in the treatment of a broad range of behavioural problems and diseases. Similarly a review by Knight et al. (2006) of motivational interviewing in physical health care areas such as Diabetes, Asthma, Hypertension and Heart disease showed overall positive results. They found that the
majority of studies found positive results for effects of MI on psychological, physiological, and life-style change outcomes.

Thus, motivational interviewing seeks to motivate behavioural change through the spirit of MI using key guiding principles and key communication skills. MI scaling tools as well as the decisional balance quadrant are also utilised to motivate clients towards behavioural change.

**Group Motivational Interviewing**
As a group motivational interviewing (GMI) approach is taken within the current study, it is important to explore this particular approach to motivational interviewing. Walters (2002) points out reasons why MI may be particularly suited to individuals in a group setting. Firstly the interpersonal pressure of the majority may have a pull on those less ready for change and draw them towards a shared public commitment to change under the guidance of a skilled facilitator. Secondly, the presence of the group provides a powerful support system which shows the individual that he is not alone with the tasks ahead. Thirdly group diffusion may operate to minimize resistance. They point out that the group automatically wins any debate by virtue of its numbers. Thus, if a vocal group member argues against change, this may serve to highlight the discrepancy between the negativity of the outspoken member to the desired change and the positive empathic motivational style of the facilitator. Walters (2002) suggest that demands for answers in the group setting should be used as opportunities for group comment and reflection so that solutions arise from the group rather than the facilitator. Walters (2002) warns of the possible problems with GMI firstly the risk that discrepancy diffusion may arise whereby any discomfort any member is experiencing due to a discrepancy between the problem behavior and values may be diffused and diluted in the group setting whereby others are minimizing the problem
behavior. As a result the individual member may become more comfortable with his status quo and be less inclined to change. Also there is a risk for non-participation, or social loafing, assuming that other members of the group will comment for them. Finally the risk for group resistance and collective argument can make it very difficult for a facilitator to maintain change talk. Amrhein et al. (2004) suggest that behavior change is initiated by increasingly strong change statements elicited during MI.

Walters (2002) points out that because of the limited talk time available for each group member in the GMI session; this may be a negative factor in that not all members may have an opportunity to speak. Thus the GMI facilitators within the present study will remain alert to the pitfalls of GMI outlined above and rehearse ways of dealing with such problems prior to the workshops.

2.4.3 Psychological Constructs Central to Behavioural Change

**Empowerment**
Within the health promotion literature the concept of empowerment is seen as an extremely important ingredient for health promotion at any level. Woodall and South (2012) suggest that empowerment has become a flagship value for health promotion. Also, Rissel (1994) viewed empowerment as the holy grail or raison d’etre of health promotion. Tones and Tilford (2001) define individual or self-empowerment as a set of competencies and capabilities which together with certain related personality characteristics contribute to a relatively high degree of actual control over a given individual’s life and health. It is associated with a relatively high realistically based self-esteem together with a repertoire of life skills that contribute to the exercise of power over individuals’ life and health. (Tones and Tilford, 2001, p.40). A reciprocal relationship is deemed to exist between community empowerment and individual or self-empowerment. Thus an empowered community will most likely produce
individuals who are self-empowered. Likewise empowered individuals within a community may well empower that community. Tones and Tilford (2001) suggest that an active participating community is the sum of the empowered individuals it contains. Tones and Tilford (2001) also point out that people’s actual power and status in a given social system can actually influence their self-esteem and sense of control. As Tones and Tilford (2001) point out it is worth noting that the emphasis is on perceived locus of control, i.e. a belief in the capacity to control rather than actual ability to control. Tones and Tilford point out that the locus of control construct merits a central place in an empowerment model of health education. They argue that the state of empowerment is fundamentally healthy and therefore worth pursuing in its own right. Within the context of the current study, the GMI workshops seek to empower individuals to take control of their own health behaviours and by building self-efficacy their autonomy is reinforced.

**Self-Efficacy**

Self-efficacy has been described as belief in one’s own capabilities in relation to how confident they are in bringing about a particular behaviour change. Confidence in the ability to change is termed self-efficacy and is central to motivation to change (Bandura, 1994; Burke et al, 2003; Prochaska, 2005). The self-efficacy construct has been found to be one of the most important predictors of behaviour (Pender et al., 2011). Self-efficacy expectations develop through mastery experiences, (accomplishments), vicarious learning (models), verbal persuasion and somatic responses to particular situations to build competencies and confidence (Pender et al, 2011). The greater the perceived efficacy the more vigorously and persistently individuals will engage in a behaviour even in the face of obstacles and aversive experiences (Bandura, 1997, 2004). Self-efficacy beliefs are measured in terms of
their parameters: magnitude, strength and generality (Connor and Norman, 1998). Magnitude refers to the level of difficulty of the behaviour as assessed by the individual and based on his perceived capability of performance level. Strength refers to the individual’s confidence in performing the behaviour and generality refers to the generalizability of expectations across situations. Individual self-efficacy is informed by perception of various abilities in different situations. The judgements one makes with regard to one’s own abilities are very important and need to be realistically based. As Bandura (1982) points out, accurate appraisal of one’s own capabilities has considerable functional value. Adverse consequences can be the result if one misjudges one’s capabilities. Thus over estimation of one’s ability may result in failure and if repeated will lead to further damage and lower self-esteem (Tones and Tilford, 2001). Under-estimations on the other hand will generally limit the potential for learning and personal growth. Thus it is important for individuals to develop a realistic and accurate perception of their own ability and thus will approach challenges from this perspective. The stronger the perceived self-efficacy the greater the level of perseverance and typically, according to Tones and Tilford, the greater the feeling of control. On the other hand lower perceptions of self-efficacy are likely to produce negative evaluations leading to lower self-esteem (Tones and Tilford, 2001) and possibly lowered sense of control. Thus from a health promotion perspective it is important to develop self-empowerment, feelings of control and self-efficacy. On the other hand it could be viewed as unethical to promote self-efficacy without accompanying this with knowledge and skills necessary for achieving the desired behaviour. Thus within the current study, the module includes input aimed at increasing participants’ knowledge, attitudes and skills on particular health behaviours. This will form a cognitive structure for the motivational aspect of the
intervention which is designed to build self-efficacy and empower participants to bring about positive health behaviour changes.

**Social Support**
According to Pender et al. (2011) social support can be defined as a network of interpersonal relationships that provide psychological and material resources intended to benefit an individual’s ability to cope. Social support is perceived (emotional support) and tangible (supportive acts). Shumaker and Brownell (1984) defined social support as “an exchange of resources between two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient.”

Tones and Tilford (2001) point out that social support has been consistently associated with not only empowered communities but also with better health. The concept of social interest is related to social support and Adler suggested that social interest in others is a hallmark of mental health (Dinkmeyer et al., 1987). This involves the individual’s cognitive, behavioural and affective capacities for maintaining optimal relationships with others. Cohen and Wills (1985) suggest that one’s social network can protect an individual from the harmful effects of life’s demands.

The concept of social support is common to the two key models underpinning this intervention. Within the stages of change model, enlisting social support is identified as a behavioral process of change usually associated with the action stage of change. Also within group motivational interviewing, the presence of the group provides participants with additional opportunities for gaining social support (Walters, 2002).
2.5. Evidenced Based Rationale for Intervention

2.5.1 The Need for the Intervention
As discussed previously, the college has become increasingly recognised as a setting in which to promote health. Ferrara (2009), suggests that colleges and universities are potentially important settings for the promotion of regular exercise and weight maintenance strategies.

The WHO *Global Health Risks Report* of 2009 highlights the fact that world-wide overweight and obesity cause more deaths than underweight. Mathers and Loncar (2005) report that the proportion of deaths world-wide caused by non-communicable diseases is expected to rise from 59% in 2002 to 69% in 2030. The WHO have identified a number of lifestyle risk factors associated with such diseases which include physical inactivity, diet related factors and obesity (WHO, 2002). An urgent need to discover how to address this situation is apparent. Physical activity has being found to reduce the risk of cardiovascular disease, some cancers, and type 2 diabetes (WHO, 2009). It can also improve musculoskeletal health, body weight and reduce symptoms of depression. According to Artinian et al. (2010) even modest sustained lifestyle changes can substantially reduce cardiovascular disease morbidity and mortality. They go on to say that there is considerable published data to strongly support the benefits of PA and dietary changes as a means of decreasing morbidity and mortality from CVD and stroke.

The first year of college has been associated with a negative decline in vigorous physical activity (Bray and Born, 2004; Nelson et al., 2007). This decrease in physical activity during the college years has been linked to the weight gain that commonly occurs on college commencement (Jung et al., 2008; Kasperek et al., 2008; Racette et al., 2005). The new environment may place students at increased risk of developing unhealthy eating habits and adopting a more sedentary lifestyle (Fielder-Jenks, 2010).
Concern has been expressed that these poor health choices and their resultant negative consequences could in turn lead to impaired psychological well-being (Silberstein et al., 1988). The start of college has also been characterized as a major life change that can cause significant stress (Mc Namera, 2000; Nguyen-Michel et al., 2006). Rates of psychological distress in college students have been found to be higher than in the general population (Adlaf et al., 2001; Bewick et al., 2010). Increases in stress have also been associated with decreases in PA in college students (Ng and Jeffery, 2003; Nguyen-Michel et al., 2006) as well as higher consumption of “junk food” (Hudd et al., 2000).

Thus it is clear that there exists a need to investigate ways of promoting physical activity, healthy eating and psychological well-being in the student population. If an intervention could improve physical activity levels and promote healthy eating along with improving psychological well-being and reduce stress, it may make a significant difference to the quality of the student experience and potential longer term health gain.

2.5.2 Evidence Based Rationale for Individual Approach
The current study makes use of a curricular based educational approach to individual health behavioural change. It draws on the concept of “Developing Personal Skills” from the Ottawa Charter’s Strategy for Health Promotion. As previously discussed, historically a shift has taken place within health promotion away from an individual approach to a structural approach in acknowledgement that behaviour change is not up to the individual alone. Despite this, evidence continues to exist in support of the individual approach as a necessary component of health promotion.

In justification of the use of an individual approach to health behaviour change, Godin
et al., (2010) states it is usually difficult and sometimes impossible to modify social structural factors. According to the Godin et al. (2010) the most important predictor of behaviour is the person’s decision or intention to engage in it. Intentions will be changed into behaviour provided the individual has actual control over the behaviour and intentions remain stable. Godin et al. (2010) suggest that the findings from their study indicates that the assumptions made by social cognition models that social structural factors no longer influence behaviour once relevant health cognitions have been formed is accurate. This appears to be in contrast with much of the health promotion theory which emphasise the importance of social structural and environmental factors in behaviour change. There is no doubt that these factors are important, however, in some cases, the most important task for health promoters is to get the individual in the right frame of mind to bring about health behavioural change. When an individual is in the right mind set, structural and environmental factors are less significant. This argument lends support to an individual approach to health promotion whereby developing personal skills of individuals with regard to increasing knowledge, developing health awareness and motivating towards health behaviour change appears to be a worthy pursuit.

In their report designed to provide evidenced based direction to those involved in the implementation of physical activity and dietary interventions, Artinian et al. (2010) distinguished four general approaches to interventions and reviewed the evidence on these areas. These approaches were, the group based approach, the individual approach, the computer/technology based approach and the multicomponent approach. For the purpose of this review, only approaches relevant to the current study will be addressed. Firstly the group based approach intervention is described which they claim provides an opportunity for social interaction, social support, role
modelling and positive observational learning. In a meta-analysis by Conn et al. (2002) of studies aimed at increasing PA, group based interventions proved more effective than individualised based interventions. Interestingly the review found that commercial group based weight loss programmes were more effective than self-help approaches. However, Artinian et al. (2010) found the use of an individual focused approach successful in bringing about behavioural change at least in the short term. Based on a number of systematic reviews and observational studies, Brug et al. (2006) suggest that the modest effects of health education have induced a shift in focus from personal to environmental correlates of eating and physical activity behaviours, however very little evidence for an association between environmental factors and weight-related behaviours exist. Thus they concluded that individual strategies for health promotion in the field of obesity prevention warrant continued use.

The focus of the current intervention is primarily on individual behaviour change, however the intervention is delivered in a group setting, and as can be seen from the above, evidence for use of both these approaches is in existence. The social support that participants receive within a group setting is well recognised as an important aspect of any behavioural change and an important component of the group motivational interviewing process (Walters, 2002). In concluding their review, Artinian et al. (2010) state that although further research is needed on several aspects of individual and group based interventions to improve diet and PA, a sufficient evidence base now exists to incorporate several of these strategies into clinical practice.

Artinian et al. (2010) also reviewed the use of multicomponent delivery and point out that the majority of multicomponent studies utilise a variety of behavioural strategies including goal setting, self-monitoring, feedback, social support, problem solving and
motivational interviewing. Artinian et al. (2010) reported that all multicomponent intervention trials that they reviewed demonstrated positive dietary and PA outcomes. The current intervention is made up of a number of different components such as information giving designed to increase knowledge, fitness assessment, group motivational interviewing, and a psychological well-being workshop. Within the motivational interviewing process, goal setting, self-monitoring and social support are all promoted.

As well as providing evidence on the approaches to behavioural change, the review by Artinian et al. (2010) also provided specific evidenced based direction to those involved in the implementation of physical activity and dietary interventions. Within the report, evidence was classified as level A or level B depending on how well substantiated the evidence was. They found that with regard to interventions aimed at increasing physical activity and modifying dietary intake, Level A evidence existed for the use of cognitive behavioural strategies such as specific goal setting around the desired behavioural change. Evidence also existed for the use of self-monitoring, frequent and prolonged contact, feedback and reinforcement, self-efficacy enhancement, relapse prevention and motivational interviewing. Within the current intervention, a number of level A strategies are applied such as motivational interviewing and within the GMI workshops, goal setting, self-monitoring and self-efficacy enhancement are facilitated. During the group motivational interviewing workshops, participants are provided with a workbook that contains a step by step approach to behavioural change. Participants are requested to document their health behaviour change goals in the workbook provided. This workbook provides a record for them to monitor their progress and compare behaviour against goals set. A certain level of behavioural management skills also takes place, in that as participants are
guided through the motivational interviewing framework (see Appendix 3.4 and 3.5.)
they are encouraged to explore what obstacles they may encounter in achieving their
behaviour change goals and are facilitated to explore ways of managing these
obstacles to prevent relapse. Also, within the psychological well-being workshops,
participants are facilitated to identify stressors and explore ways of managing and
coping in stressful situations.

With regard to targeting single or multiple behaviours (discussed in more detail later)
Artinian et al. (2010) reported most studies where dietary behaviour and PA were
targeted together reported positive results.

With specific reference to physical activity interventions, Kahn et al. (2002) set out to
evaluate the effectiveness of various approaches to increasing physical activity (PA).
They distinguished three categories of interventions. Firstly, informational approaches
to change knowledge and attitudes about the benefits of and opportunities for PA.
Secondly, behavioural and social interventions to teach people the behavioural
management skills necessary both for successful adoption and maintenance of
behaviour change and for creating social environments that facilitate and enhance
behavioural change. The third area identified involved environment and policy. Kahn
et al. (2002) found evidence for the effectiveness of two informational interventions
and three behavioural/social interventions. The informational interventions included
“point to point” prompts and “community wide” interventions (e.g. media
advertisements) neither of which are utilised within the current study. With regard to
the behavioural/social interventions, strong evidence existed for inclusion of “school
based PA” (e.g. modified curricula to increase the amount of time spent in PA). There
was also strong evidence to support the effectiveness of “social support” in
community settings e.g. buddy system. The third effective behavioural/social
intervention was that of “individually adapted behaviour change” (e.g. adapted to the individual’s stage of change). Within the current study, as an integral part of the GMI process, social support within this community of first year students is promoted by the facilitator within workshops. Also within the GMI workshops, participants are requested to assess their stage of change in relation to their healthy eating or physical activity goal in the group setting. Thus, although not a stage matched intervention per se, the facilitator utilises strategies relevant to the individual’s stage of change, as he or she guides the individual through the GMI process within the group setting. Behavioural and cognitive processes of change relevant to contemplation or action stages are included in the facilitator’s motivational interviewing pack (see Appendix 3.6). Although the facilitator doesn’t work on a one-to-one basis with each individual group member, as they guide one participant through the MI protocol, other participants are requested to relate to the process from their own perspective.

Interestingly, the team found insufficient evidence to evaluate the effectiveness of classroom based health education focusing on information provision to increase physical activity due to inconsistent results among studies. There was also insufficient evidence available to assess the effectiveness of curricular based PE in the college setting. The current intervention utilises a classroom based approach to providing knowledge on PA, HE and PWB. Although Kahn et al. (2002) do not find sufficient evidence to support this type of intervention, it is important to note that they found insufficient evidence to evaluate the effectiveness of this type of intervention as opposed to finding evidence that it did not work. Also the current intervention involves having physical activity as part of the intervention embedded in the curriculum within a college setting. Although the reviewers found evidence for its use in a school based setting, they did not find sufficient evidence to assess the
effectiveness of this type of intervention in the college setting. Perhaps this is related to the fact that although physical activity is well established in primary and secondary education, there is little evidence of its existence from a curriculum perspective at third level and thus very little studies exist to assess its effectiveness.

Jepson et al. (2010) published a paper on the findings from a review of reviews on behavioural change interventions to reduce unhealthy behaviours or promote healthy behaviours. This report was commissioned by the U.K’s National Institute for Clinical Excellence (NICE). The review examined studies which addressed behavioural change in six different areas including healthy eating and physical activity. They looked at twenty four reviews where the intervention was designed to promote physical activity. Six of these reviews focused on physical activity promotion and young people. They found that there was moderate evidence of effectiveness for curriculum based activities. The most effective school based physical activity interventions included printed educational material and a curriculum which supported physical activity throughout the day. In relation to the present study, it is worth noting that this review reports evidence for incorporating physical activity interventions into the curriculum and providing supporting printed educational materials. As previously stated the current study involves the incorporation of a particular module into the curriculum designed to promote healthy behaviours. It also makes use of a motivational interviewing workbook which all participants are provided with and printed material on the evidence base for healthy eating and physical activity are also provided. All lecture notes are also provided in hand-out form. Jepson et al. (2010) found inconclusive evidence for the effectiveness of physical activity interventions such as brief motivational interviewing interventions based on the stages of change in increasing physical activity, both of which are utilised within the current intervention.
This indicates the need for further exploration of the effectiveness of such strategies within an intervention study such as that which is included within the present study. Therefore, it would appear wise to explore their value further before a conclusion can be reached. Other researchers in the area have found evidence for the use of motivational interviewing (Rubak et al., 2005; Knight et al., 2006) and stages of change (Woods et al., 1999; Ronda et al., 2001; Buckworth et al., 2002). With such mixed evidence available on the use of these approaches, further research is warranted.

With regard to promoting psychological well-being in the student population, no interventions have addressed this specifically; however some studies have addressed interventions to assist in decreasing stress in this population. Steinhardt and Dolbier (2008), report that many researchers have evaluated the effectiveness of stress management programmes for college students. They go on to say that interventions aimed at reducing stress and improving health have significantly decreased symptoms of anxiety (Decro et al., 2002; Dziegielewski et al., 2004; Shapiro et al., 1998; Rickinson, 1997) and depression (Rickinson, 1997). Steinhardt and Dolbier (2008) showed that a resilience enhancement intervention was effective in enhancing student resilience and in developing more effective coping strategies.

Galbraith and Brown (2010) published a systematic review on identifying types of interventions that were effective in reducing stress in student nurses. Findings here indicated that interventions providing coping skills for stressful situations and also skills for changing maladaptive cognitions were effective. Skills to reduce the intensity or numbers of stressors were also successful.

In summary the current intervention involves a curriculum based educational individual health behavioural change approach with a population of undergraduate
students. As can be seen from the above review, mixed evidence exists with regard to the effectiveness of such an approach. Therefore, it is anticipated that this study will add to the body of knowledge in this area. The intervention is designed to promote physical activity, healthy eating and psychological well-being within this group. In keeping with a general theme of promoting health lifestyles within college students, it was anticipated that the integration of the promotion of psychological well-being would in itself promote health and well-being and would also provide the participants with a positive frame of mind from which to engage in healthy eating and physical activity.

2.6 Physical Activity, Healthy Eating and Psychological Well Being

2.6.1 Physical Activity
Within the following section physical activity and its related concepts such as exercise will be defined. This will be followed by a discussion on the benefits of physical activity and current guidelines for achieving minimum physical activity recommendations. The causes and consequences of inactivity will be discussed along with national and international statistics on activity levels particularly with regard to young adults and college students. The transition to college and its effects on physical activity levels will be addressed. This will be followed by a discussion on the possible barriers and facilitators for engagement in physical activity within a college student population. A brief overview of descriptive studies will be given; this will then be followed by a review of pertinent intervention studies that have been completed in this area.

Definition of Terms:
Physical activity (PA) is defined as bodily movement produced by the contraction of
the skeletal muscle that increases energy expenditure above the basal level. Physical activity can be classified in various ways such as intensity and purpose (Caspersen et al., 1985). The energy expenditure on PA is dependent on the duration; intensity and frequency of the PA and the interaction of these three factors determine the overall effects of PA on health (Keating et al., 2005). Exercise on the other hand, is generally defined as “physical activity that is planned, structured, repetitive and purposive in the sense that improvement or maintenance of one or more components of physical fitness is the objective”. (The President’s Council on Physical Fitness, U.S.A. 2000).

The term Health-Enhancing Physical Activity (HEPA) is frequently used in relation to the health benefits gained from physical activity. According to the European Framework to Promote Physical Activity, it should be understood as any form of physical activity that benefits health and functional capacity without undue harm or risk (WHO, 2007).

Edwards (2006) suggests physical exercise may be defined as a subset of physical activities that are planned and purposeful attempts to improve health and well-being. He also concludes that regular moderate intensity exercise interventions seem particularly valuable in promoting health and well-being where the type intensity and duration of the exercise programme are targeted to suit the particular individuals (Edwards, 2006).

**Health Benefits of Physical Activity and Causes and Consequences of Inactivity**

According to the U.S. Physical Activity Guidelines Advisory Committee, (2008) regular physical activity reduces the risk of chronic diseases, such as heart disease, type 2 diabetes, stroke, cancer, osteoporosis and depression. High impact exercise is necessary to improve skeletal integrity, muscular performance and dynamic balance in pre-menopausal women in the fight against osteoporosis (Nikander et al., 2005). The
European Framework to Promote PA (WHO, 2007) suggests there is now strong evidence showing that physical activity has beneficial effects on the pathogenesis of all important metabolic syndrome-specific disorders, i.e. insulin resistance type 2 diabetes, dyslipidaemia, hypertension, obesity, heart and vascular diseases such as coronary heart disease, chronic heart failure, intermittent claudication and osteoporosis. There is also strong or moderate evidence illustrating the positive health effects on the disease-specific symptoms of all these diseases and those of chronic obstructive pulmonary disease, osteoarthritis, fibromyalgia, chronic fatigue syndrome, certain types of cancer and depression. Additionally, in virtually all disease states, there exists strong or moderate evidence to show that physical activity improves functional capacity and quality of life. The report also states regular physical activity is a protective factor against unhealthy weight gain. The role of physical activity in the management of overweight and obesity is threefold, firstly it prevents weight gain, secondly it prevents the health consequences of obesity and thirdly it assists in weight reduction (A European Framework to Promote PA, (WHO, 2007).

Silberstein et al. (1988) suggest that regular physical activity offers several health benefits including increased muscle and bone strength, increased lean muscle, decreased body fat, and enhanced psychological well-being and possible decreases in the risk of developing depression, symptoms of depression and anxiety and improvement in mood. A systematic review of physical activity and health related quality of life in adults found a positive effect of physical activity on health related quality of life (Bize, Johnson and Plotnikoff, 2007). According to the National Guidelines on Physical Activity for Ireland (2009), there are also financial benefits to be gained from increasing physical activity participation rates. They cite an Australian study which suggests that savings of 1.5 billion a year in costs related to CHD, stroke,
diabetes, cancer depression and falls could be made if people became more active for 30 minutes per day. (Medibank, 2007). The report points out that as inactivity rates here are even higher than that of Australia, cost savings here may be even more pronounced. Thus, clear evidence exists that physical activity is beneficial to health both physically and psychologically.

Biddle and Mutrie (2008) suggest that lifestyle changes particularly in the latter part of the 20th century have brought particular health problems which have been termed “hypokinetic diseases” (Kraus and Raab, 1961). They explain that hypokinetic diseases are as a result of lack of physical activity. Examples of hypokinetic diseases are given and include diseases such as CHD, obesity, low back pain, osteoporosis, hypertension, diabetes and cancers. Biddle and Mutrie (2008) go on to suggest that owing to the decline in the amount of physical activity most people have to perform in their work and the increase in motorised transport, individuals have to consciously choose to engage in physical activity in their leisure time in order to accrue the necessary health benefits. Therefore, the individual has to make a conscious effort to integrate physical activity into their daily routines. Biddle and Mutrie (2008) suggest that this in itself is sufficient to justify the increasing importance of studying psychological processes, such as motivation and decision making in PA. Reasons for the drop in physical activity within the college student population in particular have been attributed to students’ experiencing more barriers (outlined later) to participating in physical activity as they progress through the educational system.

According to the European Framework to Promote Physical Activity document (WHO, 2007) epidemiological research has shown that 15–20% of the overall risk for coronary heart disease, type 2 diabetes, colon cancer, breast cancer and fractured hips in the elderly is attributable to physical inactivity. The report also points out that the
overall disease burden in the European Region caused by physical inactivity is estimated to be 3.5%. In The World Health Report of 2002, the proportion of deaths attributable to physical inactivity in the European Region was estimated to be 5–10%.

A Danish study shows that physically inactive people can expect between 8 and 10 fewer life years without a major disease than physically active people.

From a financial perspective, it is calculated that 3.1 million extra days of sick leave each year are attributable to physical inactivity in a population of 5.5 million people. (A European framework to promote PA, WHO, 2007). Two European studies have calculated that physical activity can cost about 150-300 euro per citizen per year (Martin et al., 2001 and the U.K Department of Health, 2001). A report by the WHO (2006) suggests that increasing current levels of physical activity could significantly reduce the cost to society and even maintaining them can result in savings (Cavill et al., 2006).

**Minimum levels of Physical Activity Recommended for Health Benefits**

From a national perspective, the National Physical Activity Guidelines for Ireland published in 2009 recommend that all adults should undertake moderate activity for a minimum of 30 minutes a day on 5 days a week (or 150 minutes a week). They also recommend the inclusion of muscle-strengthening, flexibility and bone-strengthening exercises 3 times a week. They state that children and young people should be active for at least 60 minutes every day. The Obesity Strategy (2005), points out that 45 -60 minutes of moderate-intensity exercise most days is required to prevent the transition to overweight or obesity and 60-90 minutes per day is required for weight loss or weight loss maintenance.

From a European perspective, The European Framework to Promote Physical Activity for Health published by the WHO (2007) also suggests 30 minutes or more of
moderate-intensity physical activity on most days of the week. In addition, they point out that the recommended duration of 30 minutes can be split up into shorter periods, ideally no less than 10 minutes but even shorter bouts contribute to substantial health benefits. This is supported by O Donovon et al. (2010) who state that research has shown that 10 minute bouts of moderately intense activity accumulated throughout the day can be just as effective as 30 minutes straight.

According to Haskell et al. (2007) updated recommendations for adults from the American College of Sports Medicine and the American Heart Association, recommend that adults should accumulate 30 minutes of moderate intensity physical activity on five days of the week or 20 minutes of vigorous intensity exercise on three days each week. They also recommend that adults engage in strength and endurance exercise at least twice each week to maintain muscle strength. According to scientists at Canada's McMaster University, there is growing evidence for the benefits of short term high-intensity interval training (HIT) as a time-efficient but safe alternative to traditional types of moderate long term exercise (Little et al., 2010). HIT means doing a number of short bursts of intense exercise with short recovery breaks in between. Here, scientists claim that doing 10 one-minute sprints on a standard stationary bike with about one minute of rest in between, three times a week, works as well in improving muscle as many hours of conventional less vigorous exercise, (Little et al, 2010). The concept of doing less exercise and still achieving all the health benefits associated with longer durations is very appealing particularly as many studies cite lack of time as major barrier for exercise participation.

Although research continues into what type, intensity and duration of activity is the most beneficial, the majority of expert opinion from a national to an international
perspective agree that a minimum of 30 minutes of moderate physical activity per day on a minimum of 5 days per week is necessary for minimum health benefits.

**Current Participation Rates of PA in College Students and Gender Differences Therein:**

**International**

The World Health Organisation estimates that, worldwide, more than 60 per cent of adults do not engage in the minimum recommended levels of physical activity and a significant minority of adults approximately 20-25 per cent are completely inactive. (Fahey et al, 2004). According to the United States Department of Health and Human Science (USDHHS), the highest rate of decline in physical activity occurs in the early adulthood period between 18-24 (USDHHS, 2000). From an extensive review of the related literature, Ferrara (2009) reports that recent studies have found that only 40% of college students participate in any kind of regular physical activity, with 30% or more of all students not participating in any exercise at all on a weekly basis (Huang et al., 2003; Racette et al., 2005; Keating et al., 2005;). Thus, this suggests that internationally more than half of college students do not meet the minimum physical activity recommendations (30 minutes on 5 or more days per week or 150 minutes of moderate physical activity per week).

**National**

From an Irish perspective, the Economic Social Research Institute (ESRI) (Fahey et al, 2004), found that from a sporting or recreational walking perspective, 22% of Irish people were inactive. Of the remaining 78% who engaged in some degree of physical activity, only 40% did so regularly enough and with enough intensity to meet minimum recommended levels. Within the National Survey of Lifestyles Attitudes and Nutrition (SLAN) report, findings suggested that, overall 55% of Irish adults reported some form of physical activity compared with 51% in 2002 and 52% in 1998.
Men were more likely to be strenuously active than women and the most strenuously active were males in the 18-35 category. Numbers of those reporting not partaking in any activity at all increased from 23% in 1998 to 28% in 2002 but decreased to 22% in the 2006 report (Morgan et al., 2008).

Within the Health Behaviour School aged Children (HBSC) report (Kelly et al. 2008) a clear reduction in physical activity participation rates was evident as children got older and closer to adulthood. Within the 2007 National Survey of Health Behaviour in School Children (HBSC) report, vigorous exercise four or more times per week was found in 62% of 10-11 year olds, 54% of 12-14 year olds and 41% in the 15-17 year old group. This downward trend with increasing age was also evident in the 1998 and 2002 HBSC reports.

Thus activity levels decline as children get older which would lead one to assume the decline in physical activity will be even more pronounced in the 18-24 year old age group.

This assumption is borne out in the relevant international literature on activity levels in college students (Bray and Born, 2004). According to the Centre for Disease Control and Prevention (CDC, 2006) in the U.S., the most rapid decline in physical activity happens during late adolescence and early adulthood. Thus by college age, the number of young people participating in regular physical activity drops considerably to 36.6 %, (CDC, 2006). Some of the reasons put forward for this decline in PA on commencing college include changes in lifestyle patterns such as social environments (Nahas et al., 2003), greater time constraints (Grubbs and Carter, 2002; Silliman et al., 2004), a decrease in access to fitness centres (Humpel et al., 2002) and a decrease in opportunities to participate in organised team sports (Nelson et al., 2007; Sallis et al., 2000).
This decline in activity levels with increasing age is not so evident in the small number of Irish studies in this area. Findings from the College Lifestyles and Nutrition Survey (CLAN, 2005) in Ireland showed that that almost 70% of students (78% males and 64% females) described themselves as fairly to very physically active. These findings from the CLAN study suggest that, as a group, Irish college students were generally more active than that of the general public and indeed adolescents a few years younger than them. However, Devaney (2005) in a study designed to investigate Health Promotion in Irish colleges found that only 40% of college students (62.3% males and 36.3% females) self-reported that they were physically active on campus. However, Devaney (2005) points out that as the study did not investigate overall levels and frequency of physical activity (students simply answered yes or no to whether they participated in PA on campus), comparisons to the national population cannot be made. Also this survey included four colleges only and with a response rate of 33% which included both students and staff it is not possible to generalise these results to the population of Irish college students. The Woods et al. (2007) “Take Part” study measured activity levels in Irish teenagers and indicated that 60% of 15 – 17 year olds do not meet current recommendations for physical activity. Of that 60%, 71% of females and 49% of males were not meeting minimum physical activity recommendations. As can be seen from above, the findings from the CLAN study conflict with those of the “Part Two” study (Woods et al., 2007). However, this may be a reflection on differences in analysis and in particular different criteria for determining adequate physical activity levels as opposed to any other causes. On closer inspection the 70% regularly active rates of the CLAN study are based on 20 minutes 3 or more times per week which would not qualify as physically active if compared to current recommendations of 30 minutes per day.
levels of physical activity adequacy are based on 60 minutes 4 or more times per week in the “Take Part Study. These stark differences between both measures of physical activity adequacy make it impossible to draw comparisons between these two studies. Interestingly the researchers within the Woods et al. study set the recommended physical activity level at “At least 60 minutes of moderate or vigorous activity on 4 or more days per week”. And they point out that had they increased this to 5 days per week it would result in 78% of the sample not meeting minimum physical activity requirements. It’s important to point that in this population of young adults the recommendations suggest 60 minutes of exercise on five or more days per week. This figure of 78% may be more realistic particularly in view of current recommendations as set out within the Obesity Strategy, 2005 and the National Physical Activity guidelines, 2009, which states that children should be involved in at least 60 minutes per day of moderate physical activity per day.

As the majority of the sample within the current study are female, a closer inspection of the impact of gender on participation rates is warranted. Studies show conflicting findings with regard to difference in physical activity participation rates by gender. According to some researchers, gender differences do not exist (Calfas et al., 1994; Pinto and Marcus, 1995; Behrens and Dinger, 2003; and Stock et al., 2001). However other studies suggest that male students participated in more vigorous PA then their female counterparts (Leslie et al., 1999; Martin et al, 2000; Huang et al., 2003; Ferrara, 2009; Artinian et al. 2010). Researchers also determined PA preferences by gender and found that men tended to like weight lifting and team sports whereas women were more interested in aerobics, dance, and yoga (Pinto and Marcus, 1995; Leslie et al.; 1999, Stone et al., 2002). Buckworth and Nigg (2004) found that male students increased their PA levels over time whereas their female counterparts
demonstrated the opposite trend. Sparling and Snow (2002) suggested that the discrepancies in vigorous PA diminish over time and begin to level out. Kasparek et al. (2008) also found significant associations between male and female college students physical activity levels in that more men than women engaged in strength training, and more women than men engaged in light intensity physical activity. Similar gender disparities are evident in our own national studies such as SLAN, HBSC and CLAN. There appears to be unanimous agreement that participation rates decrease as children reach adolescents, and proceed to young adulthood and further into adulthood with claims suggesting that the greatest reduction in participation rates is seen within the 18-24 year old group. Although opinions vary on gender disparity in participation across the life span, it appears that within the college student age group, gender differences in participation rates is a reality with males engaging in more vigorous exercise more regularly than their female counterparts.

**Barriers and Facilitators to Physical Activity Participation in College Students:**
Studies in this area show that barriers to physical activity participation involve lack of time (La Caille et al., 2011) high workload (Gyuresik et al., 2006), lack of interest or motivation (La Caille et al., 2011), lack of social support - particularly from family in the case of females (Leslie et al., 1999; Wallace et al., 2000; Kahn et al., 2000), belonging to a lower socio-economic group (Fahey et al., 2004; Kelly et al. 2008), lack of specific sports teams to join (Gyuresik et al., 2006) and a lack of facilities or lack of transport to facilities (Gyuresik et al., 2006). On the other hand, facilitators to physical activity participation included a positive history of physical activity (Wallace et al. 2000), knowledge about physical activity (Rimal, 2001), competence in performance (Hildebrand and Johnson, 2001), having fun while participating (more motivating for males than females) (Braitewaithe et al., 2003; Calfas et al., 1994),
desire to control weight (Lowry et al., 2000), social support (Kahn et al., 2000; La Caille et al., 2011), being in a higher socio economic grouping (Fahey et al., 2004) and having an academic incentive (De Vahl 2005).

**Pertinent Studies in Physical Activity and College Students**
As the current study involves an intervention, it was decided to concentrate mainly on reviewing other intervention studies in the area. Therefore an overview of the descriptive studies in this area will be presented and this will then be followed by a more comprehensive review of relevant intervention studies.

**Descriptive Studies:**
Descriptive studies in the area of physical activity in college students found that approximately 40% and 60% of college students were physically inactive (Leslie et al., 2000; Pinto and Marcus, 1995; Wallace et al., 2000; Stone et al., 2002; Dinger, 1999; Keating et al., 2005). Findings also suggest that students who are inactive at college are at risk of remaining so after graduation (Sparling and Snow, 2002). In a meta-analysis of college students' physical activity behaviours, Keating et al. (2005) found social support (particularly from family in the case of females), enjoyment, and self-motivation were all found to be significant factors in the facilitation of physical activity participation. Other significant facilitating factors included self-efficacy (Von Ah et al., 2004; Burke et al., 1997), extroversion (Buckworth et al., 2002), conscientiousness (Burke et al., 1997), academic incentive (De Vahl et al., 2005) and the proximity of exercise facilities (Reed and Phillips, 2005; Keating et al., 2005).

Studies examining motivation found that motivation for sport was of an intrinsic nature (e.g. enjoyment) while motivation for exercise was more extrinsic (e.g. appearance focused) (Kilpatrick et al., 2005). Studies also found that gender differences existed with regard to male and female motivations for physical activity in
that males were motivated to increase muscle tone whereas females were motivated by weight loss or maintenance (Leslie et al., 1999; Lowry et al., 2000). Studies also found correlations with self-efficacy and those who were higher along the stages of change towards achieving their physical activity goals (Reed and Phillips, 2005).

**Intervention Studies**

Ferrara (2009) reviewed studies which examined whether participation in a physical activity-related course during college resulted in adoption and maintenance of regular physical activity after graduation from college. Some of the studies reviewed included a retrospective study by Slava et al. (1984) who found that those who had participated in a physical activity education course in college were more likely to continue to choose an active lifestyle three to five years following graduation. The idea of the course was that those students would learn about the benefits of exercise and how to start their own individual exercise programme. Also, Adams and Brynteson (1992) found a positive relationship between the numbers of classes attended and perceived knowledge about the benefits of exercise and the participants’ attitude towards exercise. D’Alonzo et al. (2004) also observed significant improvements in physical activity levels, PA self-efficacy, aerobic fitness, flexibility, strength and body fat in college women who had high attendance in a 16-wk exercise program.

Ferrara (2009) concludes from their review of studies in this area that interventions designed to increase physical activity can be effective in the college student population. However, unfortunately, the success of these interventions appears to be limited to the duration of the intervention, with increases in physical activity not maintained after completion of the interventions. According to Keating et al. (2005) there have only been three quasi experimental intervention studies to date that have focused on college students’ PA levels. The first study is that of Project GRAD
Calfas et al. (2000) reported on this quantitative study which aimed to evaluate a generalizable intervention (Project Grad) to promote adoption and maintenance of PA among young adults making the transition from university to adult roles. 338 university seniors participated in either a cognitive-behavioural intervention course (experimental group) or knowledge orientated general health course (control group) during the semester before graduation. Both courses received course credits. Behaviourally orientated phone and mail follow up were delivered to the intervention group for 18 months. PA outcomes and mediating variables were assessed at baseline, 1 and 2 years. The cognitive behavioural intervention consisted of fifty minute lectures on a weekly basis over one term. Participants also undertook a practical lab session on a weekly basis in groups of fifteen led by “peer health facilitators”. Course Assessment was in the form of a term paper in which students anticipated their lifestyles and barriers to PA three years after graduation. After completion of the intervention, there were no significant intervention effects on physical activity outcomes at 2 years for either men or women however processes of change were significantly improved for intervention women over two years. Calfas et al. (2000) concluded that despite excellent participation in a theoretically based, well-attended intervention, few long-term effects on physical activity or its mediators were found.

The second intervention study that Keating et al. (2005) reported on was an initiative entitled Project Teaching Exercise/Activity Maintenance (TEAM) which is an example of a study where interventions were stage matched, (Keating et al., 2005). Project team commenced in 1998 in a large Midwestern U.S. University and was guided by social cognitive theory and the TTM model and lasted 3 years. It involved a two unit one semester course consisting of lectures and lab work focusing on the
adoption and maintenance of initiated PA behaviours that provided students with knowledge of fitness and health (lecturers) and opportunities for PA (labs). Project Team employed follow up strategies every 6 months for 2 years. According to Buckworth (2001) preliminary results from Project TEAM indicated the value of classifying participants into exercise stages of change during a physical activity class and to predict exercise adherence. According to Ferrara (2009) who also reviewed project TEAM, results from project team indicates that changes in the amount of physical activity are associated with the individual’s “readiness” to start or maintain an exercise programme. Thus, higher levels of physical activity are observed in individuals who are planning to start exercising on a regular basis (preparation stage). However Ferrara (2009) also points out that evaluation of the effect of Project TEAM on long-term maintenance of physical activity has not yet been reported. The third study that Keating et al (2005) reports on is Project ARTEC, an 8-week Active Recreation on Tertiary Education Campuses (ARTEC) initiative in an Australian college. Leslie et al. (2001) also reported higher levels of self-reported physical activity in college students after an 8-week Active Recreation on Tertiary Education Campuses (ARTEC) initiative at a single Australian college campus. This study included students from 4 different campuses, focused on the initiation of PA behaviours and only lasted for 8 weeks. Interventions included offering students a free activity class of their choice, fitness assessments, swimming vouchers for a nearby facility and on campus media promotion. Leslie et al. (2001) reported a significant increase in the proportion of students reporting high levels of physical activity following this initiative. Keating et al. (2005) points out that all studies were of a quasi-experimental design and only project GRAD had a control group. However it is important to point out that
the other quasi experimental studies had comparison groups which is common practice in situations where it is not possible to randomly distribute participants due to course requirements. Keating et al (2005) points out that it is important to note that the intervention strategies in the above studies focused only on personal level, i.e. students were responsible for their own PA behaviours. There were no studies that tested institutional and organisational interventions. Specifically, researchers have not considered changing PA policies on campus or physical education requirements. Keating et al. (2005) concludes that results on PA interventions are not encouraging. Researchers observed only a moderate improvement in PA levels in Project ARTEC and information on long term effects remain unknown. Although Project Grad found significant positive effects in women, the programme failed to demonstrate positive long term effects in both genders. According to Keating et al. (2005) problems with previous studies on college students centre around the fact that there are no available studies on tracking students PA over the 4 years so it is unclear what the change in PA patterns is over the entire period of tertiary education. They also claim that more experimental and intervention studies are needed as opposed to descriptive studies. They note that no data is available to show that the interventions established habitual PA patterns and according to Kretchmar (2001) habits play an important role in exercise adherence. Thus, interventions did not give enough attention to maintenance and without habitual participation in PA; students cannot accrue the health benefits of PA. They also point out that variables used to measure PA were inconsistent which made comparison across studies difficult. For example, some studies measured total weekly time of PA (Leslie et al., 1999; Malina, 2001) whereas others used weekly time of participation in strengthening, flexibility and aerobic activities separately (Buckworth and Nigg,
2004; Dinger, 1999; Bray and Born, 2004). Thus according to Keating et al. (2005) there is an urgent need to standardise PA measures to help researchers better understand PA. They suggest that health and PA experts need to reach a consensus of measures of PA and standards for being physically active. They also point out that over the past few years minimum PA standards for accruing health benefits changed several times and this may have confused the public (USDHHS, 2000; USDHHS, 1996). In 1997 Loughlan and Mutrie undertook a comparative study of three interventions designed to promote physical activity. The interventions included fitness assessment, exercise counselling and information provision. The sample was made up of 179 health service staff who were either pre-contemplators or preparers. Participants were randomly assigned to one of three groups, (1) fitness assessment, (2) exercise consultation (3) information booklet. Findings indicated that those who underwent an exercise consultation showed trends to sustain exercise activity more so than those who underwent fitness assessment or those who were given an information booklet. However, there was evidence to suggest that on-going support was needed to maintain initial increases in PA. The authors also suggested that when people are ready even simple and cheap interventions are effective at providing a stimulus to change.

Lowther, Mutrie and Scott (1999b) undertook a quantitative randomised control trial (RCT) to compare the effectiveness of fitness assessment and exercise consultation in increasing physical activity levels in a socially and economically deprived community. The sample was divided into three groups, namely the control group and two experimental groups, i.e. Exp. group 1 (n=225) fitness assessment and Exp. group 2 (n=145) exercise consultation. The control groups received information on physical activity (PA) and the experimental groups received either a fitness assessment and a
three-month follow up or an exercise consultation with a three month follow up. Measurements were in the form of stages and processes of change and the 7 day re-call measure of PA. Results indicated that at three months all of the groups had increased PA levels. At 6 months both experimental groups had maintained their improved PA levels while the control groups had lapsed back to their base line levels. At 12 months only the exercise consultation group reported significantly more PA than at baseline. Thus it appears that the above findings support the view, that the cognitive behavioural skills which were the focus of the consultation process may have the best long term effects in increasing PA in individuals.

In response to decreasing activity levels in college students, Dougall et al. (2011) reported on a study designed to identify effective ways of halting this decline of PA in college students with one hundred and forty six first year college students. The study hypothesised that overall participants would decrease their level of PA throughout the semester but that those in group 2 (who had participated in demonstration on PA in the college fitness centre) and group 3 (who had received a presentation on PA) would arrest or reverse this decline. Results showed that an expected decrease in intentions to perform PA and use of the fitness facilities occurred over the semester following the general trend of declining PA among college students as well as a decline in the use of fitness facilities. The interventions depicted above did not significantly alter this decline. Although not statistically significant some participants who said they were influenced by the study said the interventions had a positive influence on their PA. They either maintained or increased their current PA levels. This was only the case where participants were in an early stage of change and had a low level of perceived stress. Those who were not influenced by the study continued the general decline in PA and use of fitness facilities. Furthermore some participants in the later stages of
change for PA responded to perceived high stress levels by increasing their levels of PA. According to Dougall et al. (2011), this highlights the well documented literature on the ability and importance of using PA to manage stress levels and indicates that individuals employ this mechanism without being instructed to do so (Edenfield and Blumenthal, 2011). With regard to the different interventions employed within their study Dougall et al. (2011) reported that classroom presentation and fitness centre demonstrations were no more effective that simply distributing brochures containing contact information on fitness facilities and PA recommendations.

As previously mentioned the TTM has been widely used and researched within the behavioural change literature. In a quantitative postal intervention study, Woods, Mutrie and Scott (1999) set out to encourage sedentary undergraduate students to become more active. Methods involved an initial baseline study on 2943 students, then all contemplators and pre-contemplators (n=459) were randomly assigned into an experimental (229) group or a control (230) group. Following baseline data collection, the experimental group were sent stage matched materials at 2 and 4 months that were designed to encourage participation in active living and or in the university’s structured exercise programmes. At 7 months, more of the experimental group (80%) than control group (68%) had increased stage of change and at 19 months more of experimental group (42%) than control, group (27%) were in action and maintenance stages. The most frequently used processes of change utilised by those who improved their stage of change were self-revaluation, self-liberation and reward management. Importance of the role of social determinants and self-empowerment were highlighted from the focus groups in the maintenance of activity levels. Interestingly the processes of change utilised reflect the importance of belief in one’s ability as well as the concept of self-empowerment. A major limitation of the study would appear to be the
lack of actual PA measurement in that although results showed positive progression along the stages of change, results would be much more useful if such progression was reflective of actual increases in PA participation levels.

Sailors et al. (2010) undertook a study to expose college students to exercise. It was called the Training Interventions and Genetics of Exercise Response (TIGER) study. It was designed to introduce sedentary college students to regular physical activity and identify genetic factors that influence response to exercise. The 1,567 students who participated in the study underwent 30 weeks of exercise training 3 days per week (40 minutes duration each time) across two semesters. The study also included an educational component and students received college credit for each semester in which they enrolled. An online activity monitoring programme available to all participants supplied them with immediate feedback in estimated calorie expenditure as well as daily and weekly activity levels. Although the researchers report on baseline overweight and obesity levels, they do not report on how these changed after the 30 week programme. The main focus of the study was on introducing students to the knowledge and skills necessary to utilise exercise as a means towards weight control now and in the future. The researchers noted that higher exercise intensity was associated with higher exercise adherence. However, they point out that standards for determining the level of adherence vary greatly and no consensus for defining adherence currently exists (Dishman and Gettman, 1980; Gale et al, 1984; Vlachopoulos and Neikou, 2007). Interestingly those with higher rates of exercise adherence tended to be those who exercised intensively and thus were probably enjoying it more, felt more confident about their performance and thus were more motivated. The in-built formal class for credit system appears to be a motivating factor in maintaining adherence to the study protocol. They also point out that a substantial
proportion of participants persisted with the programme despite barriers such as
finance, time and other obligations. They also suggest that by participating in the study,
students may have developed enhanced feelings of self-efficacy since a
non-judgemental approach was used in the study to teach students how to exercise.
Sailors et al. (2010) conclude that this was an efficacious strategy for introducing
college aged individuals to aerobic exercise. Sailors et al. (2010) also suggest that
participating in the study also provided a social context for the students in the form of
group membership and positive reinforcement from research staff and graphical
display feedback on workout summaries. The researchers suggest that a combination
of all of these factors can be used to in college campuses to afford students an
opportunity to incorporate physical activity and healthy behaviours at a critical phase
in young adulthood. The main drawback with this large study appears to be the fact
that no control or comparison group existed.
Thus, in summary intervention studies in this area indicate that a physical activity
education course at college level can improve physical activity participation at least in
the short term. Increased knowledge about benefits of PA was also shown to be
beneficial in enhancing participation rates. Educational programmes designed to
increase PA in college students had mixed results e.g. Project Grad proved effective in
the short term at increasing PA levels in women, however, increased activity levels
were not maintained. Project Team staged matched interventions based on the stages
of change and overall this method was shown to be an effective strategy. Findings
indicated that once “Readiness to Change” (preparation stage) existed, small
interventions (cues to action) were sufficient to bring about the desired change.
Habit formation also was seen to be important in bringing about longer term adherence
to the desired behavioural change. Researchers highlighted areas of difficulty in
comparing studies in that different measuring criteria were utilised to determine physical activity adequacy. It is also pointed out that different criteria for what constitutes recommended PA levels has also changed over time which may have led to certain confusion. A consensus of opinion of PA adequacy and consistent measuring tools and methods in this area is called for. Within the TIGER study, Sailors et al. (2010) showed how that an introduction to exercise could prove useful in managing weight in college students. Students appeared to benefit from the programme and positive reinforcement was provided by an in built class credit system. Adherence to the programme was high despite existence of barriers and in particular high intensity exercisers tended to show high adherence levels. Sailors et al. (2010) also attributed the success of the programme to the social context it provided, self-efficacy development and the non-judgemental introduction to exercise.

2.6.2 Healthy Eating
Within this section healthy eating and its related concepts will be defined. This will be followed by a discussion on the benefits of healthy eating and current recommendations and guidelines for healthy eating. The causes and consequences of unhealthy eating and recent statistics on increasing rates of obesity both nationally and internationally will then be addressed. The possible barriers and facilitators to healthy eating will also be discussed. Following an overview of relevant descriptive studies, pertinent intervention studies on the area of promoting healthy eating will then be discussed.

Definition of Healthy Eating and Its Related Concepts
According to House (2006) healthful eating is difficult to define and measure because multiple factors can affect it and because various population groups have different
perceptions of it. Povey et al. (1998) suggests that a healthful diet should provide a balanced intake of energy and essential nutrients to maintain and improve health. La Caille et al. (2011) undertook a study to identify factors that college students perceived as contributing to healthy and unhealthy eating patterns. Participants listed whole fruits and vegetables and milk as specific examples of healthy foods and cited eating a variety of foods, eating regularly and eating foods high in vitamins and minerals as examples of healthy eating. House (2006) also carried out a study to identify definitions of healthy eating in university students. Here, results indicated that participants described healthy eating as consuming all food groups of the national food guide to healthy eating (Canada’s food guide to healthy eating), and eating with moderation and balance. However it is important to point out that a major limitation of the study was the small and specific sample, i.e. fifteen students, nine of whom were students of dietetics in Canada. The food pyramid has served as Ireland’s healthy eating guidelines since 1993 and is currently under review. It is anticipated that these guidelines will be revised and updated in line with the aim of achieving maximum nutritional benefits without excess calories. In preparation for the publication of the new guidelines, the FSAI (2011) put forward a summary of guidelines for healthy eating. The revised guidelines are similar to the original food pyramid in that advice is to limit fat, salt and sugar and increase intake of wholegrains, fruit and vegetables and water and monitor portion sizes.

A diet high in “junk food” is generally referred to as one containing foods or drinks that are somewhat un-healthful because of their low nutritional density, their high energy content or their high fat, sugar or sodium content (Anderson et al., 2005). Pereira et al. (2005) suggest that an important contributory factor to the rise in obesity is that of fast food which is defined as convenience food purchased in self-service or
carry out places. Brunt et al. (2008) reported that students frequently have a diet of limited variety (Evans et al., 2000), snack (Silliman et al., 2004) and consume fast food (Thomson et al., 2004). Pereira et al. (2005) report that several factors associated with fast food create a positive energy balance and thereby increases the risk for obesity and diabetes. These factors include excessive portion size, with large meals often approaching or exceeding individual daily energy requirements, palatability emphasising primordial taste preferences for sugar, salt and fat high energy density and high glycaemic load. Spanos and Hankey (2009) report that examples of unhealthy dietary patterns that have become increasingly prevalent worldwide include irregular meals (Farshchi et al., 2004) and frequent unhealthy snacks dominating eating habits (Ovaskainen et al., 2006). Within the Le Caille et al. (2011) study, students identified eating high fat, high calorie processed and convenience foods, binging and meal skipping as specific examples of unhealthy eating behaviours. Studies in this area reveal that college students typically consume a diet lacking in fruit, vegetables and dairy products (Grace, 1997; Brevard and Ricketts, 1996; Anding et al., 2001; Dinger and Waigandt, 1997; Haberman and Luffey, 1998) and high in sodium and sugar (Harnack et al., 1999; Hendricks et al., 2004). Cason et al. (2002) suggest that students typically consume high intake of total fat, saturated fat and cholesterol and little fibre. DeBate et al. (2001) found that students may develop a habit of skipping meals to control weight. According to Roche et al. (1994) predictive values of adolescent BMI for adult obesity are excellent at age 18 years, which is the most common age for first year students. Thus within the literature, there is evidence that the typical diet of a college student is far from healthy and may pose a risk to their health.
The Benefits of Healthy Eating
According to the Food Safety Authority of Ireland (FSAI) (Flynn et al., 2011), good nutrition coupled with an active lifestyle plays a crucial role in the prevention of chronic conditions such as obesity, cardiovascular disease (heart disease and stroke) diabetes, osteoporosis and some cancers. House (2006) found the benefits of healthy eating for university students to be, maintaining a healthy weight, good physical appearance, feeling better, preventing disease, and achieving personal satisfaction. Shepherd et al. (2006) suggests that healthy eating contributes to an overall sense of well-being and is the cornerstone in the prevention of a number of conditions, including heart disease, diabetes, high blood pressure, stroke, cancer, dental caries and asthma.

Current Recommendations Regarding Healthy Eating
As previously stated, in 2011, the food safety authority of Ireland published scientific recommendations for healthy eating guidelines in Ireland. Within its foreword, Dr. Flynn (2011) states this publication was in response to growing obesity levels in Ireland and also in response to other countries having completely revised their guidelines on healthy eating. Therefore, the aim of these new recommendations is to provide guidance on gaining optimum nutrition within the limits of calorie requirements for a healthy weight. In 2005, Ireland’s National Taskforce on Obesity called for a revision of the food pyramid and recommended that Ireland’s food guide should be updated to provide an optimum level of nutrients without excessive energy (calories) (DOH&C, 2005). According to the FSAI (2011), there are two issues to consider when revising guidelines, one is the healthy eating advice devised by nutritionists and dieticians and the other is the graphical model. Their scientific recommendations dealt primarily with the first issue and guidelines on the graphical model are to follow when finalised. Key issues with original food pyramid were
reported. In general, results showed that the food pyramid tended to provide excess calories particularly for sedentary adults. Almost all of the food patterns looked at (food patterns were developed for different ages and genders) provided excess saturated fat and almost three quarters provided excessive total fats. However none of the patterns provided enough Vitamin D or enough fibre. One of the most significant findings from its review was that of variation in calorie content provided by the bread, cereal and potato food group. The guidelines present the food stuffs as interchangeable yet some food servings in the group contain up to three times more calories than others. In response to the key issues identified with the existing food pyramid, the FSAI (2011) guidelines recommend specific dietary guidelines be produced for different age groups, guidelines to incorporate specific needs of those on low incomes in view of less healthy food being found to be more affordable, revision of graphical food pyramid model and supplementation of vitamin D. Thus the challenge is to provide enough nutrients to satisfy the need for optimal intake and for disease prevention without providing excess calories.

**Current Rates of Overweight and Obesity in College Students:**
Most recent data on rates of obesity in Ireland come from the National Adult Nutrition Survey involving 1500 adults (Walton et al., 2011) carried out by the Irish Universities Nutrition Alliance (IUNA). Findings from this report indicated that 61% of Irish adults were either overweight or obese, 37% were overweight while 24% were obese. When data was divided by gender, 70% of men were either overweight or obese while 52% of women were either overweight or obese. A much larger representative national survey is that of the Survey of Lifestyle, Attitudes and Nutrition (SLAN) (2007) which presents both self-reported and researcher measured data. Findings from this report also show that 61% of Irish adults are either overweight or obese with 38%
being overweight and 23% obese. This report showed that 62% of men were overweight while 47% of women were either overweight or obese. Overall figures from both studies are surprisingly similar and if one simply looks at the sub sample of the SLAN, the sample size here is comparable to that of the IUNA study. The SLAN study broke data down into age groups of which the young adult group is of particular interest to the current study. Findings here from objective measurements by researchers revealed that 38% of all 18-29 year olds were either overweight or obese with 27% overweight and 11% obese. Self-reported measures within the same population revealed 23% reported themselves as being overweight and 6% reported themselves as being obese. Despite the questionable accuracy of these self-reported measures, an upward trend is visible from this data. According to Morgan et al. (2008) based on the SLAN (2007) figures, the prevalence of overweight and obesity in Ireland is broadly similar to that reported from England (2006) and Scotland (2003) and approximately 5% lower than the U.S. In comparison to other (Organisation for Economic Co Operation and Development) (OECD) countries, Ireland is ranked in the middle with regard to obesity levels (OECD, 2010). However it’s important to note that this figure of 15% is based on self-reported data. Measured data from the same SLAN report showed a 23% obesity figure. Thus Ireland’s ranking may be closer to the higher end of the OECD comparison table if based on objectively measured data. The OECD (2011) report stated that the progression of the epidemic has effectively come to a halt in the past ten years in countries like Korea (where obesity rates have stabilised to 2-3%) Switzerland (7-8%) Italy (8-9%) Hungary (17-18%) and England (22-23%). They point out that although stabilisation may have occurred; there is no evidence of retrenchment in any country. Other countries have shown modest increases over the past decade in in the region of 2-3% i.e. Spain and France, while
other countries such as Ireland, Canada and the United states have shown larger increases in the region of 4-5%. In the U.S. A. Roehrig et al. (2008) report that rates of overweight and obesity are at epidemic proportions and 65.7% of adult Americans are overweight or obese while almost a third of adults are obese (Hedley et al, 2004; Wadden et al., 2002). If Irish levels of obesity continue to increase at this rate we may soon be facing an obesity epidemic on a US scale.

Much international evidence now exists of the growth in overweight and obesity levels in college students; however the majority of these studies are American based. As previously stated, SLAN 2007 found that 38% of young people aged between 18-29 were overweight or obese. In that study no distinction was made between college students and non-college students. Thus, at present, there exists very little specific information on overweight and obesity levels in Irish students. On the other hand it is estimated that 30% to 35% of American college students are either overweight or obese (Keown et al., 2009; Furia et al, 2009) with the ACHA putting the figure at 38% (ACHA, 2008). Mokdad et al. (2001) reported that college students appear to be even more prone to weight gain than those who do not attend college. Vella-Zarb and Elgar (2009) reported on a meta- analysis to estimate the amount of weight gained by first year college students. Based on pooled sample of over 3000 cases, mean weight gain was 3.86 lbs. Weight gain for those classified as overweight or obese by a BMI > 25 was nearly twice that of students with a normal BMI (Kasparek et al., 2008). Students with a low frequency baseline physical activity level were twice as likely to be overweight. As Ireland’s obesity levels continue to increase in the general population, it is highly likely that this increase will be reflected in Irish college students.
Causes and Consequences of Unhealthy Eating

Gortmaker et al. (2011) state that obesity is caused by a chronic energy imbalance involving both dietary intake and physical activity patterns. Thus, from a simplistic point of view, weight gain is due to energy intake exceeding energy expenditure. Whilst recognising the role of personal responsibility, it is widely believed that the causes of obesity are complex and influences on obesity are multifaceted with a great deal of the literature focussing on environmental as well as individual factors (DOH&C, 2005). Some of the complex causes of obesity relate to such factors such as increasing availability of foods high in sugar fat and salt (Gortmaker et al., 2011), the global food industry (Walker, 2011), an obesogenic environment (HSE, 2008), increased automation and a decrease in physical activity (IHF, 2010). From the perspective of college students, Le Caille et al. (2011) claim that few studies have examined changes in calorie consumption during this transitional period, thus it is not clear whether increased eating is the cause of weight gain in this population. However they do suggest that both decreases in physical activity and increases in calorie intake may account for the weight gain found in college students. According to Ferrara (2009), physical inactivity, poor dietary choices, increased caloric intake, increased stress and disturbed sleep patterns, in addition to many other factors, contribute to the increased weight gain and obesity in college-aged young adults (C.D.C, 1997; Macht et al., 2005; Serlachius et al., 2007; Patel and Hu, 2008). While acknowledging that the causes of obesity are multifaceted and complex, the focus of the current review will primarily be on the effects of unhealthy eating and the promotion of healthy eating.

Obesity is often regarded as the most obvious and visible consequence of unhealthy eating. Data from 200 countries between 1980 and 2008 suggest steadily increasing
obesity prevalence in every region of the world, including in most countries of low and middle incomes with the steepest rises in higher income countries (Finucane et al., 2011). According to Gortmaker et al. (2011) studies have shown that worldwide, rises in obesity prevalence along with excess mortality attributed to obesity have led to forecasts of lowered future life expectancy. Also studies have projected detrimental economic outcomes such as large increases in short term and long term health care expenditures. Among others, Neumark-Sztainer et al. (2004) states that obesity is associated with a number of negative health consequences including heart disease, diabetes, stroke, hypertension, osteoarthritis, sleep apnoea and certain types of cancer (Sarwer et al., 2004) as well as psychological difficulties including body dissatisfaction, low self-esteem and weight related stigmatization. Thus an intervention aimed at preventing obesity appears a worthwhile pursuit.

Metabolic Syndrome:
A possible consequence of unhealthy eating is that of metabolic syndrome which has being defined as a clustering of interrelated metabolic abnormalities including but not limited to obesity, insulin resistance, dyslipidaemia and hypertension (Fernandes and Lofgren, 2011). The syndrome has being found to be a precursor for the development of CVD (Hu et al, 2006) and diabetes (Reaven, 2006; NCEP, 2002). Keown et al (2009) states that an estimated 30% to 35% of American college students are either overweight or obese which places them at increased risk for metabolic dysfunction. Huang et al (2004) examined the relationship between weight status and components of the metabolic syndrome in a sample of 163 students at the University of Kansas and found that 27% were classified as high risk for the development of metabolic syndrome. Fernandes and Lofgren et al. (2011) undertook a study to determine the prevalence of metabolic syndrome in a group of 189 first year students. Overall
prevalence in this population was 3.7%; however 28% met at least one of the criteria while 7.4% met two of the criteria. Interestingly, the study showed no difference between under/normal weight subjects and overweight subjects in regard to the number of metabolic syndrome criteria found. Fernandes and Lofgren et al. (2011) point out that students who have a healthy BMI often perceive themselves as healthy, yet as seen in this study metabolic syndrome criteria is often present despite a healthy weight. Although within the current study screening for metabolic syndrome does not take place, providing students with information on metabolic syndrome and how it can occur despite being a healthy weight may increase their knowledge in this area and raise their awareness to the fact that healthy eating and physical activity is important for other health reasons as opposed to merely preventing obesity. Generally speaking, individuals tend to believe that they are at risk of developing obesity related conditions such as CVD or diabetes only if they are actually overweight or obese. Thus, some who are within normal weight parameters may be lulled into a false sense of security, when in actual fact they may already contain some criteria of metabolic syndrome e.g. increased HDL or triglycerides. These hidden risk factors can both be addressed through the intervention of the present study with regard to the promotion of healthy eating and physical activity.

Social Consequences of Obesity:
According to the OECD report (2012), poor health goes hand and hand with poor job prospects for many obese people. Employers prefer normal weight over obese candidates partly due to expectations of lower productivity. More than 40% of severely obese women are out of work compared to 30% for all women. Also obese people were shown to earn up to 18% less that people of normal weight. In Northern European countries, obese people are more than three times more likely than others to
receive a disability pension and in the US they are 76% more likely to suffer short term
disability. The OECD update (2012) also points out that an obese person incurs 25%
higher health expenditure than a person of normal weight in any given year. Obesity is
responsible for 1-3% of total health expenditure in most OECD countries and 5-10%
in the US. Barron et al. (2009) claims the financial burden upon the services in Ireland
and throughout Europe due to the rise in overweight and obese children cannot be
truly estimated. The total direct and indirect annual cost of obesity in 2002, in the 15
countries of the EU was estimated to be 32.8 billion (Fry and Finley, 2005).

Prejudice
According to O’ Connell et al. (2012), obese individuals are highly stigmatised and
face multiple forms of prejudice and discrimination because of their weight. This is in
keeping with social ideology which views obesity as a voluntary condition, resultant
from a person’s inability to control their food cravings, (Striegel-Moore and Franko,
2002). According to Stunkard and Sobal (1995), the disparagement of obese
individuals has being described as the last socially acceptable form of prejudice.
According to O’ Connell et al. (2012), a number of studies have confirmed that health
care professionals possess negative attitudes toward obese patients, including beliefs
that they are lazy, non-compliant, undisciplined and have low will power (Puhl and
Brownell, 2001). Chang et al. (2004) suggests the stigma of being overweight results
in feelings of inferiority, self-doubt, and hurt and that the optimal goal for body weight
was to be as slim as possible.

Disordered Eating
It is not possible to discuss healthy eating in a predominantly female population
that most women are dissatisfied with their body shape. Also Chang (2002) suggests
that the proliferation of weight reduction campaigns in the beauty industry and mass media has contributed to the belief that thinness equals beauty. They go on to suggest that young adult women building self-identity and seeking social approval based on these influences often engage in unhealthy weight control practices. Trew et al. (2005) found that body image concerns appeared to be entirely independent from a healthy diet with adolescents prioritizing their desire for social acceptability attractiveness above any nutritional concerns. Trew et al. (2005) suggests that adolescents view healthy eating as a quick fix weight control solution and not as a commitment to a healthy lifestyle. One of the few Irish studies in this area with female adolescents found that high levels of body dissatisfaction existed and dieting was found to be prevalent (Mooney et al. 2009). Roehrig et al. (2008) reports that studies have found that although full syndrome eating disorders are quite rare, sub threshold disordered eating symptoms have been found to be relatively common in adolescents and adults. The HBSC study of 2010 (Walker et al. 2013) showed similar results and concluded that overall 13% of children were dieting. A slim body image was deemed important for peer acceptance; hence 'crash' dieting was a common practice. Although the above study is associated with adolescents and not directly related to the college student population, it is reasonable to assume that attitudes and behaviors formed in adolescence continue to influence the young adult transitioning from second level to third level education. A concern is that some young women appear to value appearance more highly than health and to attain a socially desirable slim appearance, these young women are willing to put their health at risk. The other issue to be highlighted is in the realm of motivation, it is clear that by and large young women are not particularly motivated to become “healthier” per se but are motivated to have a slim socially desirable appearance. Thus, perhaps health promoters planning
interventions to enhance healthy eating and physical activity within young women need to promote the improvement of physical appearance as a motivator along with improvements in health. Thus in a study such as this there is a need to be cognisant that in a predominantly female student sample such as the one included in the present study that there is a distinct possibility that one or more of the participants may indeed have an eating disorder or may exhibit some signs of sub threshold disordered eating. Thus, caution and balance needs to be exercised with regard to weight and dieting issues in this population of adolescences and young adults. Evidence shows that overweight and obesity are real issues. And, thus weight loss interventions are necessary and appropriate in this context. On the other hand, disordered eating and body image issues in relation to weight are also real issues which need to be handled sensitively and with attention to psychological needs of individual students.

**Smoking and Weight Control**

Although smoking behaviors are not the subject of the current study, it was felt important to include this as another consequence of unhealthy eating in that much of the literature point to a relationship between negative health behaviors. Thus negative health behavior in one area such as smoking may also lead to negative health behaviors in another area such as eating and/or exercise. Among adolescents, studies have shown that smoking initiation is higher in girls who, diet (French and Perry, 1994), express anxiety about their weight (Honjo et al., 2003; French and Perry, 1996) and are overweight (Camp et al., 1993). Crisp et al. (1998) also found that adolescent girls reported using cigarettes to control binge eating and believed that smoking helps limit weight gain. Filozof et al. (2004) point out that associations between smoking cessation, increased food intake and decreased metabolism have been shown. Carroll et al. (2006) investigated whether college smoking was associated with trying to lose
weight and other weight loss behaviors in a sample of 300 students at the University of Kansas. Findings indicated that compared to non-smokers, current smoking was associated with higher body mass and fat and the intention to lose weight. Current smoking was also associated with a number of poor health behaviors including eating at restaurants serving high calorie foods, eating in front of the television and decreased use of university facilities. Many of the unhealthy behaviors increased with increased smoking. Thus from the above it appears that instead of assisting in weight loss or maintenance, smoking behavior tends to be associated with general unhealthy lifestyle behavior all round. Thus as can be seen the causes and consequences of unhealthy eating are varied and complex.

**Barriers and Facilitators to Healthy Eating**

Barriers to healthy eating in a college student population have been identified as lack of time for healthy food preparation, lack of choice, taste preferences (don’t like the taste of healthy food), and cost (Artinian et al., 2010). Other barriers have also being identified such as lack of healthy options, lack of convenience, alcohol (La Caille et al., 2011) and “all you can eat” dining facilities on college campuses (La Caille et al., 2011; Peterson et al., 2010). Interestingly, alcohol was viewed as a barrier by both genders, as a contributor to weight gain in itself and also for co-occurring unhealthy behaviour (tendency to eat unhealthy foods due to alcohol effect on self-regulation) (La Caille et al., 2011). Peterson et al. (2010) suggests that college dining halls with food presented in a self-service “all you can eat” manner may not be conducive to healthy eating as students need guidance on making healthful food choices. Many writers in this area suggest that the transition to college itself may have a negative influence on eating behaviours and as such is construed as a barrier to healthy eating. La Caille et al. (2011) found that the overall dietary quality tends to decline in the
transition from adolescence to adulthood (Demory-Luce et al., 2004) and the vast majority of students are not meeting dietary recommendations (Butler et al., 2004). According to Grace (1987), on commencement of college, most students are transitioning to independent living and are thus making their own food choices which often results in poor eating habits. On the other hand, facilitators to healthy eating include social support (Shepherd et al., 2006; La Caille et al., 2011), wider choice of food, desire to look after one’s appearance, will power (Shepherd et al., 2006) self-regulatory processes, self-control and effective time management skills (La Caille et al., 2011). Women in particular identified social support as a facilitator for healthy eating. Women discussed how family and friends were positive influences in healthy eating. They identified that eating with friends who ate healthily encouraged them to do likewise as did having roommates willing to share healthy food items. Living off campus and cooking for oneself was viewed as both a barrier and a facilitator (La Caille et al., 2011) in that for some, having control over shopping and preparing meals translated into eating healthier. For others, off campus living meant purchasing fast/convenience food. Interestingly, findings from this study indicated that the “all-you-can-eat” nature of the cafeteria on campus contributed significantly to unhealthy eating. The unlimited availability of so many good tasting foods resulted in decreased self-control. This appears a crucially important factor in the associated weight gain of students in that being introduced to this nature of eating at a time when they are undergoing a huge transition and developing their autonomy leaves it more difficult for them to develop self-regulatory skills. This nature of campus eating appears to be particular to U.S. colleges and does not appear to be a feature of many Irish or European colleges which may account in some way for the higher rates of overweight and obesity we see in American students.
Pertinent Studies Related to Healthy Eating in College Students
Many studies have been undertaken in the area of healthy eating and college students. Most focus on describing dietary habits in this group while others describe some interventions in this area designed to promote healthy eating in this population group. Due to a shortage of Irish and indeed UK studies in this area, the majority of studies presented are from an American context. Similarly to the physical activity section, a condensed summary of descriptive studies in this area will be presented and a more comprehensive look at intervention studies in the area will then take place.

Overview of Descriptive Studies:
Findings from a review of descriptive studies in the area of diet and healthy eating suggest that many students tend to rate themselves as overweight when they are of normal weight or indeed underweight (Haberman, 1989). This in turn may result in students employing unhealthy weight loss strategies in an effort to comply with an idealised model- like image as is portrayed in the media (Lin, 1995; Chang et al., 2004; Mooney et al., 2009). Evidence also exists that many college students have unhealthy eating patterns with low consumptions of fruit and vegetables (Silliman et al., 2004; Brunt et al., 2008). Snacking is very popular and some researchers suggest that there is no evidence to suggest that this behaviour is responsible for overweight and obesity (Brunt et al., 2008; Spanos and Hankey, 2009). On the other hand Pereira et al. (2005) concluded from a 15 year prospective analysis (the CARDIA study), that fast food habits have strong positive and independent associations with weight gain and other adverse health outcomes. Concern has been expressed within the literature as to the increased consumption of sugar sweetened soft drinks in this population (Eun-Jeong et al., 2009) whereby available research evidence links these soft drinks to adverse nutritional and health consequences such as obesity (Bray et al., 2004). There
is also a concern that soft drinks have replaced milk and thus calcium intake (Gurthrie and Morton, 2000; Rampersaud et al., 2003) which is a concern in that sufficient intake of calcium especially during adolescence and young adulthood is important to maximise peak bone mass in this population (Eun-Jeong et al., 2009). Kvaavik et al. (2005) suggest that a reduction in soft drink consumption may reflect an increase in overall dietary quality. Within the next section, a number of intervention studies examining different methods of promoting healthy eating and preventing obesity will be presented.

Intervention Studies
Matvienko et al. (2001) examined changes in dietary behaviours and weight gain in first year college women. The study consisted of an intervention and a control group. Participants were randomly assigned to the intervention group (a one semester nutrition science course) or a control group. Results indicated that participants within the nutrition course showed lower fat, protein, and carbohydrate intakes particularly in women with a high BMI (>24 kg/m2) compared to women with a high BMI in the control group. In addition, the dietary changes were associated with maintenance of baseline body weight in the women with a high BMI in the intervention group in contrast to a weight gain in the women with a high BMI in the control group. Within the above intervention, it appears that the nutrition course within the above was particularly effective for those with a high BMI at baseline. Thus this group may already have being aware that they had a need to address their overweight situation and prevent it from developing into obesity. Skinner et al. (1991), reported on changes in dietary behaviours of college men and women following a semester long nutrition course. Findings suggested that participation in the nutrition course resulted in a significant decrease in total calories (1732+43 vs. 1581+36 kcals, p<0.05) and fat
intake (69+2 vs. 63+2 g, p<0.05) in female participants but not in their male counterparts. This may be an indication of the fact that often females are more interested in elements of nutrition and dietary options and thus are more willing to take on the information within the nutrition programme and apply it within their own lives. Hudiburgh (1984) described an intervention involving a semester long nutrition and exercise class for twenty overweight college women. The intervention involved lectures on proper nutrition and sound dieting practices along with three hours of exercise per week. Results indicated that the average weight loss was 4.7 kg. However at one year follow up, only eight of the original twenty participants attended. Six out of eight had maintained the weight loss or lost additional weight while seven were still exercising on a regular basis. Within the above study all participants were overweight to start with and thus were motivated to do something to change this. Therefore it may be the case that a weight reduction intervention is more specific than simply trying to promote healthy eating in a diverse population when you have a mixture of normal and overweight people. Levitsky et al. (2006) showed how providing weekly feedback to college women within their first semester on changes in body weight significantly reduced weight gain compared to a control group. Ferrara (2009) suggests that these results suggest that having female students weigh themselves on a daily basis may be an easy and cost effective way to reduce weight gain during the college years. In addition, this system may be an effective means to achieve and maintain optimal body weight after graduation from college and in other groups at risk for overweight and obesity. However Ferrara (2009) puts forward a note of caution, in that although frequent weighing may be an effective way to prevent weight gain in female college students, it may also contribute to a preoccupation with weight and food and an increased risk of disordered eating in female college students at risk of eating
disorders (Neumark-Sztainer et al., 2006). Hawks et al. (2008) carried out an exploratory study with a convenience sample of 29 self-selected women. The women undertook an instructional design course based on the HBM. The purpose of the study was to evaluate the impact of an elective college course on dieting levels, eating styles and body image among college women. Measuring tools involved scales on intuitive eating, cognitive behavioural diets scale, self-esteem scale, body esteem scale, and an emotional eating scale. The study concluded that a theory driven elective course implemented within a college setting may improve women’s eating styles and body image. A comparison of pre and post test scores on these measures identified significant improvements for most measures.

Eun-Jeong et al. (2009) undertook a study to assess soft drinks and milk consumption and to evaluate the effects of a 15 week class based nutrition intervention in changing beverage choices among 80 U.S. students. Dietary records were collected before and after intervention. Class lectures emphasised the importance of nutrition related to prevention of chronic illness, increasing consumption of fruit, vegetables and whole grains, encouraging low fat dairy consumption, discouraging over reliance on dietary supplements and the promotion of an active lifestyle. Hands on activities included students keeping a “Happy body log” where they listed anything good they did for their bodies on a daily basis. Students also got to compare their dietary intake with the government recommendations (My Pyramid).

Results indicated that class based nutritional intervention combining traditional lectures with interactive activities was successful in decreasing soft drink consumption, and total milk consumption, especially fat free, increased in all students. The researchers urged a word of caution in saying that even after the intervention although milk and calcium intake had increased it was still below recommended
levels. They go on to say that this highlights the need for nutritional intervention specifically designed to increase calcium intake in college students. The researchers concluded that a class based nutrition education was a viable mechanism to use to help college students make positive changes in soft drink consumption. They make the point that some other studies in this area were successful in increasing nutritional knowledge but did not result in dietary behavioural changes (Skinner, 1991; Amstutz, 1986).

Peterson et al. (2010) undertook a study to determine the effects of a short term multifaceted point of selection intervention on American college student’s healthy eating perceptions and behaviours. It involved 10 targeted healthy foods in a university dining hall and involved large signs, colourful photographs, flyers and health based benefit messages promoting the targeted food stuffs. The intervention lasted 3 weeks and pre and post data was collected on 14 eating behaviours from 272 students via email. Results indicated that 7 out of 14 eating behaviours had significant changes in the desired direction, e.g. increased fruit consumption. Increased awareness of healthful foods was the top reason for self-reported changes in overall eating behaviours. Peterson et al. concluded that point of selection marketing of healthful foods in university dining halls may be beneficial for improving college students’ perceptions and selections of healthful foods and improve overall eating behaviours of college students. Holdsworth and Haslam (1988) states that nutritional labelling at the point of food selection is considered a type of social marketing and has been used to promote healthful eating in various settings. Intervention studies showed how nutrition based lectures and instruction courses assisted in improving dietary knowledge and behaviours in a number of studies. Studies also showed how social marketing such as healthy eating messages at “Point of Selection” was effective in
improving dietary choices. Application of self-monitoring skills and promotion of self-efficacy were also seen to be effective components in promoting healthy eating within this population group.

2.6.3 Psychological Well Being
Within this section, the concept of psychological well-being will be examined. This includes a definition of psychological well-being and related concepts, current psychological well-being rates in the population in general and in the student population in particular and the transition to college and its effects on psychological well-being. This will be followed by a discussion on barriers and facilitators to good psychological well-being, current recommendations regarding studies related to psychological well-being and an overview of descriptive studies in the area. This will be followed by a review of intervention studies related to the area.

Definition of Psychological Well-Being and Related Concepts
For the purpose of the current study, psychological well-being is defined as positive feelings and positive functioning in life (Keyes, 2002) and consisting of the dimensions of self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth (Ryff, 1989). Here, psychological well-being is viewed as a positive component of mental health in keeping with Edwards (2006) view, where well-being in general can be conceptualised as a positive component of optimal health and psychological well-being conceptualised as a positive component of mental health. Thus, amenable to improvement by mental health promotion. The WHO states that positive mental health has been conceptualised as a positive emotion or affect such as a subjective sense of well-being and feelings of happiness, a personality trait encompassing
concepts of self-esteem and sense of control and resilience in the face of adversity and the capacity to cope with life stressors (WHO, 2004). The concept of positive mental health is similar to the concept of positive functioning (Keyes, 2002). Thus within the present study the promotion of psychological well-being is facilitated in the psychological well-being workshops (discussed fully elsewhere). Cowen (2000) puts forward the importance of competence, empowerment and resilience as exemplar concepts in the promotion of psychological well-being. Thus workshops involved empowering participants to actively participate in the promotion of their own psychological well-being and positive mental health.

Benefits of Good Psychological Well Being
According to Keyes (2002), adults with complete mental health are flourishing in life with high levels of wellbeing. Keyes suggests that to be flourishing is to be filled with positive emotion and to be functioning well psychologically. Keyes claims that flourishing is the epitome of mentally healthy adults having high levels of emotional well-being; they are happy and satisfied; they tend to see their lives as having a purpose; they feel some degree of mastery and accept all parts of themselves; they have a sense of personal growth in the sense that they are always growing, evolving, and changing; finally, they have a sense of autonomy and an internal locus of control, they chose their fate in life instead of being victims of fate. Thus, Keyes (2005) operationalized the concept of flourishing as elevated emotional, psychological and social well-being. She goes on to describe adults with incomplete mental health as languishing in life with low well-being. Languishing is described as emptiness and stagnation, constituting a life of quiet despair that parallels accounts of individuals who describe themselves as hollow empty, a shell or a void (Keyes 2002). Thus,
Keyes (2002) describes the combination of positive feelings with positive functioning as ‘Flourishing’ and the opposite of flourishing i.e. having low psychological well-being as ‘languishing’. Keyes (2002), points out that mental health and mental illness are not opposite ends of a single measure continuum. Thus, the presence of mental illness does not mean that someone cannot experience positive mental health or that someone without a mental illness continually experiences positive mental health. Positive mental health and mental illness are two distinct but related concepts that can co-exist.

**Current Rates of Psychological Well-Being**

Past studies reported that 75% to 80% of college students are moderately stressed (Brougham et al., 2009). Woolfson (1997) reported that 40% of university students surveyed had depression as a major concern and 29% experienced anxiety phobias and panic attacks. In 2007, the American College Health Association National College Health Assessment surveyed over 20,000 students on factors which impacted on their academic performance, 32.9% identified stress and 15.5% identified depression or anxiety. Mitchell et al. (2008) found that at least 25% of first year students had high levels of adverse well-being. Andrews and Wilding (2004) points out that the number from higher education presenting with mental illness has increased. Yet according to the Royal College of Psychiatrists (RCP) only 3-4% of college students avail of college counselling services each year (RCP, 2003). There is evidence to suggest that rates of psychological distress in college students are higher than in the general population (Adlaf et al., 2001; Bewick et al., 2010). Roberts and Zelenyanski (2002) found that the well-being of first year students was poorer than in the general population. Also evidence exists to suggest that first year students reported the highest
levels of psychological distress than any other undergraduate year (Adlaf et al., 2001; Roberts and Zelenyanski, 2002; Cooke et al., 2006). Cooke et al. (2006) found that anxiety increases on joining university and Lowe and Cooke (2003) found that a significant amount of students have problems adjusting to university life. Past research has also reported higher levels of stress in college women as opposed to college men (Brougham et al., 2009; Misra et al., 2000). Pulido-Martos et al. (2012) also found that levels of stress are higher in health professionals than for other workers while Beck et al. (1997) found that nursing students experience higher levels of psychological symptoms than students in other health related disciplines. Thus, it is clear that psychological well-being is a problem in college students particularly in first year. This may be particularly manifested in college women and in particular nursing students.

**Causes and Consequences of Poor Psychological Well-Being in College Students**

The opposite of psychological well-being is psychological distress or adverse psychological well-being. This is manifested in various different forms such as stress, depression and anxiety all of which adversely affect psychological well-being. Galatzer-Levy et al. (2012) suggest that a growing body of knowledge has drawn attention to the stressful nature of modern college life; while Wells et al. (1987) claim that there is mounting evidence that college students are having difficulty coping with this increasing stress.

Evidence within the literature point to a number of reasons for student psychological distress. Based on previous research, sources of stress were classified as academic, financial, family, social and daily hassles (Abouerise, 1994; Blanksteinet al., 1991; Crespi and Becker, 1999; Frazier and Schauben, 1994; Larson, 2006; Printz et al.,
1999; Ross et al., 1999). Pillay and Ngcobo (2010) found that academic work and fear of failing were the most prominent stressors for third level students. Ross, Neibling and Heckert (1999) put forward a number of explanations for increased stress levels in college students. Firstly, students have to make significant adjustments to college life and secondly, the pressure of studies places a strain on interpersonal relations. Thirdly, they suggest that housing arrangements and changes in lifestyle contribute to stress experienced by college students. Topman and Moller (2011) concur suggesting that as the first year in university is a time of adjustment student well-being is as likely to be linked to social, domestic and financial concerns as opposed to academic challenges alone.

Dziegielwski et al. (2004) found that those enrolled in a curriculum of a caring profession appeared to experience additional stresses related to their clinical placements. This has particular significance in the current study. Lim et al. (2010) undertook a systematic review of stress and coping in Australian nurses. They identified the main stressors as work overload, role conflicts and experiences of aggression. The coping strategies they utilised included seeking support, problem solving and self-control. According to Edwards et al. (2010) the clinical stressors identified by research studies for nursing students in their first year involved lack of practical skills, negative attitudes of ward staff and misunderstanding of super-numery status (Hamil, 1995). In 2012, Pulido-Martos et al. published a systematic review of the main sources of stress experienced by undergraduate nursing students and found that the most common sources of stress related to academic demands e.g. workload, studying etc. Other sources of stress related to clinical sources (e.g. fear of unknown, mistakes with patients etc.). An Irish study by Evans and Kelly (2004) which examined stress in nursing students found that factors such as exams, intense amount
of work, difficulty of academic work and studying were the main sources of educational stress. Differences between ideal practices learned in college and real situations in the healthcare environment, aloofness from more senior staff and an unfriendly environment in hospital wards, were some of the clinical factors that caused stress within this population. Others included being reprimanded in front of staff and patients and being left on the ward without any trained staff for short periods of time. Within this study, students reported being exhausted, being under pressure, upset, worrying about what might happen, rundown, frustrated and worried. An English study by Pryjmachuk and Richards (2007) identified three main sources of stress in student nurses. Firstly academic stress which they described as fear of failure, testing and evaluation and workload problems. Secondly clinical stressors which were described as work fear of making mistakes, negative responses to the death or suffering of patients, and relationships with other staff in the clinical area. Thirdly personal/social stressors which were described as economic problems, imbalance between housework and college work etc. Thus it can be seen that student nurses are subject to the same academic stresses as other college students however, they also have an added dimension of clinical stressors to cope with.

**The Effect of Transition to College on Psychological Well Being**

The transition to college has been highlighted as a particularly stressful time for young people as they adjust to college life. Hicks and Heastie (2008) suggests that life transitions such as moving away from home to college can create valuable opportunities for growth and change while also potentially heightening self-doubt and disappointment and even encouraging self-defeating habits (Compas et al., 1986). Sasaki and Yamasaki (2007) point out that studies have shown that although university campus life provides students many opportunities for growth it can also be
associated with serious psychological distress (Aspinwall and Taylor, 1992; Leong, Bonz and Zachar, 1997). Bray and Born (2004) suggests that the transition to college or university represents a process characterized by change and ambiguity across a number of previously salient life domains. They suggest that the changes first year students encounter can be academic, social, physical, emotional and even cultural in nature. Gall et al. (2000) suggests that the disruption to established behaviour patterns coupled with the added dimension (for many) of living away from home for the first time often results in ambiguity and loss of reference points previously considered central to one’s identity. Students routinely face such challenges as changes in their environment, loss or diminishment of previous social networks, new and increased academic pressures, need to create new peer relationships and increases in personal responsibility in housing and money management (Vaez and La Flamme, 2008).

Bowman (2010) suggests that many students are living away from home for the first time and they must depend on themselves more for managing academic workloads, socialising and other aspects of their lives. Some studies have examined whether stress levels are different throughout the educational programme over a four year period. Giddan (1988) suggests that the first year in college is the most difficult period of adjustment a student faces. Lo (2002) also found that students in their first year of study experienced the most stress, with the majority of students reporting their studies as the main stressor (81.2%), followed by financial (61.4%), family (48.5%) and health (36.6%) stressors. By contrast Lindop (1991) reported difference in stressors by academic year and found that they were more intense in the final year. On the other hand, Edwards et al (2010) found that stress remained stable regardless of academic year. Regardless of the level and intensity of the stress, it is clear from the above that, adjustment to college represents a stressful time in the life of a young adult.
With regard to the consequences of such psychological distress, Steinhardt and Dolbier (2008) suggests that stress in college students can lead to deterioration in psychological functioning which may result in depression, anxiety, and physical symptomatology. Gerdes and Mallinckrodt (1994) found that during the transition from high school to college, students often experience personal and emotional problems, global psychological distress, somatic distress, anxiety, low self-esteem and depression. Baker and Berenbaum’s (2008), research also showed that stress in the student population has been associated with numerous negative outcomes, including psychopathology, decreased relationship satisfaction and physical illness. Sawatzky (1998) found stress to be a psychological factor that influences the academic performance and welfare of nursing students. There is substantial evidence that stress can lead to various negative consequences for students including somatic diseases, mental health disorders or feelings of exhaustion (Edwards et al., 2010).

**Barriers and Facilitators to Psychological Well-Being**
Moodie and Jenkins (2005) found a culture of cooperation and tolerance, a sense of belonging and strong social relationships to be protective of mental health. Barry (2009) also states that supportive social relationships and social engagement serve to protect and enhance mental health and have an important role in maintaining resilience in the face of adversity. Aspects of their social network have received increasing attention in studies of psychological functioning among college students (Galatzer-Levy et al., 2012). The loss or diminishment of previous social networks and the need to establish new ones have long being considered a major stressor with potential deleterious effects (Vaez and LaFlamme, 2008). Although college administrators have made attempts to address this through community building
activities, according to Morosanu et al. (2010) these initiatives have little impact when compared to the ways in which college students informally organise themselves. Wilcox et al. (2005) suggests that there is significant evidence that students rely heavily on informal social support networks and the utilisation of these networks strongly predicts psychological adjustment. Pierce et al. (1991) found that college friends’ support was the most consistent predictor of self-reported loneliness while Langston and Cantor (1989) found that many students who experience the transition to college from high school as painful reported disappointment in the domain of social interactions and friendships. There is no doubt that the existence of social support is an important factor in adjusting to college life. However it also appears that informal social support networks that students form themselves are more effective than formal support networks provided by college administration.

Lazarus & Folkman (1984) point out that self-esteem which is the extent to which individuals value themselves (Reber and Reber, 2001) has long being identified as an important predictor of adjustment to stress. Edwards et al. (2010) point out that it has been suggested that self-esteem acts as a buffer against stress. Mruk (1999) suggested that when encountering stress those with higher self-esteem have a higher sense of personal worth which acts as a shield against the negative impact of stress. Epstein (1979) reported that when self-esteem is low then feelings of unhappiness, anger, threat, weariness, withdrawal, nervousness, disorganisation, conflict, restraint and self-consciousness are high. Epstein (1980) states that two experiences in adult life have the potential to affect self-esteem most directly. These are experiences involving “success-failure “and experiences involving “acceptance and rejection”. It could be said that the adjustment to college is a time where students are eager to fit in and acceptance and rejection issues may be activated at this point. Also as students
progress through the college year and cope with workload and exam stress, the concept of “success-failure” is constantly present. A study by Edwards et al. (2010) found that student nurses who had lower self-esteem had higher stress levels. They also found that stress levels were at their highest at the beginning of third year and self-esteem was at its lowest at the end of the course. Lees and Ellis (1990) found that self-esteem and self-confidence levels were at their highest at the beginning of the programme and decreased with subsequent years. Similarly, Randell (2003) found that self-esteem levels fell dramatically by end of programme. Randell found that although the majority of students commenced their nurse training with average levels of self-esteem, by the time they had finished their education; their self-esteem had fallen to the point that 95% of the students perceived themselves as anxious, depressed and unhappy. Other studies have reported low self-esteem within nursing students (Olsen et al, 1984; Begley and Glacken, 2004). From the above, it is concerning to see that the process of nurse education appears to heighten stress and lower self-esteem. Being a traditional or non-traditional student can be both a barrier and a facilitator to psychological well-being. Dill and Henly (1988) found that sources of stress varied between traditional versus non-traditional college students in that traditional students were younger and reported stressors associated with their peers, and stress related social college activities. On the other hand, non-traditional students were older and reported stress related to family issues due to multiple roles within the family setting. Jacobi (1987) found that non-traditional college students had considerably more time and role conflicts than did traditional college students. However, non-traditional students displayed significantly lower levels of academic stress and reported being more satisfied with their academic experience. Dill and Henley (1998) found that non-traditional students possess a greater desire to learn as evidenced by more often
completing homework and viewing it more desirably. On the other hand, traditional students reported worrying more about their academic performance and viewed homework as less desirable than the non-traditional students. Overall regardless of whether they were traditional or non-traditional, Phinney and Haas (2003) found that students, who had strong social support congruent with their educational goals, experienced more feelings of self-efficacy, self-confidence and self-determination and coped better with the demands of college life. According to Skowron et al. (2009), research has shown that young adults who report greater emotional and interpersonal well-being are more likely to successfully navigate the transition to college and enjoy greater academic success. By contrast young adults who report greater psychological distress and interpersonal problems struggle more in meeting academic expectations and adjusting successfully to college life and place higher demands on counselling services (Crespi and Becker, 1999).

Current Recommendations
This section will now address current recommendations for maintaining and promoting mental health and psychological well-being. The opposite of psychological well-being is psychological distress which can manifest itself in various ways such as stress, anxiety and even depression. The promotion of positive mental health promotes psychological well-being and in this way serves to prevent psychological distress. According to Barry (2009) mental health promotion is concerned with achieving positive mental health and well-being in the general population and addressing the needs of those at risk from or experiencing mental health problems. In relation to mental health promotion, Jane-Lopis and Barry (2005), state that findings from systematic reviews indicate that there is sufficient knowledge to move evidence into
practice. According to Barry (2009) the psychosocial determinants of mental health at the individual level are addressed by interventions designed to promote cognitive and emotional resources such as self-esteem, identity, self-efficacy and resilience and to enhance coping skills and behaviours that protect and promote mental health. She goes on to point out that these skills are relevant across the lifespan and particularly during periods of transition. From the perspective of the current study, the first year in college is undoubtedly a time of great change and adjustment and thus an opportune time for such skill development. Community level determinants focus on attention to social participation, social inclusion, civic engagement and the impact of the local environment (Barry 2009). As previously mentioned although the current study involves primarily individual level intervention, there is also a community focus, in that the participants all belong to the community of first year student nurses in the college. Feinstein et al. (2003) suggest that educational opportunities throughout life are associated with improved mental health outcomes. Also Dooris (2001) describes the third level college as a setting for mental health promotion. When reviewing models for the promotion of mental health, Barry and Jenkins (2007) describe two main approaches namely the risk reduction model and the competence enhancement model. While the risk reduction model focuses on reduction of risk factors for general as well as specific mental disorders, the competence enhancement model focuses on enhancing competence and positive mental health. The competence enhancement model focuses on enhancing potential rather than focusing on reducing disorders. The competence enhancement model seems particularly relevant within the following intervention in that students embarking on college life for the first time face much change and challenges and are required to acquire many new skills and adjust to a new environment in a short space of time. A similar approach is advocated by Steinhardt
and Dolbier (2008) who recommend the use of the protective factor model of resilience. According to this model, a protective factor interacts with a stressor to reduce the likelihood of negative outcomes (O, Leary, 1998). Researchers have identified a number of protective factors such as hardiness, self-esteem, social support, optimism and positive affect (Steinhardt and Dolbier, 2008). Barry and Jenkins (2007), suggest that there is a compelling case for focusing on interventions that promote psychological strengths and competence. They claim that it is more productive to focus on enhancing protective factors with the goal of developing competence to promote well-being as opposed to preventing symptoms at the onset of disorders. Four key concepts are proposed to guide the pathway towards psychological wellness. These involve competence, resilience, social system modification and empowerment (Barry and Jenkins, 2007). Many studies have highlighted the need for interventions to address psychological needs of college students. Garlow et al. (2008) emphasised the need to provide mental health support for this group while there has also been calls for stress management seminars which teach effective ways to reduce stress and develop coping skills in the student population (Dziegielwski et al., 2004; Hall, 2005; Pryjmachuk and Richards, 2007). In particular to student nurses, Lim et al (2010) suggests that initial education should assist nursing students in preparing themselves for academic and clinical demands by encouraging effective methods of coping such as plan-full problem solving and providing easy access for social support. Bowman (2010) suggests that students require positive psychological functioning, otherwise known as psychological well-being (PWB) in coping with the transition to college life. Thus an intervention designed to promote psychological well-being such as the one suggested within the current study may go some way in assisting with the overall adjustment to college life.
Improving Psychological Well-Being in College Students
Although some descriptive studies exist with regard to current levels of psychological well-being, there appears to be a dearth of available literature on interventions designed to enhance psychological well-being in the student population. In the absence of a systematic review in this area, an overview of descriptive studies on psychological well-being, mental health and stress and coping in college students will be described. This will be followed by an outline of intervention studies relevant to this area.

An overview of Descriptive Studies in this area:
Attributes such as being female, of traditional college student age and having the ability to form meaningful relationships with other students have found to be positively correlated with good psychological well-being in college students. (Bowman, 2010). Studies in this area have shown that commencement of college places a strain on students’ psychological well (Cooke et al., 2006; Pritchard et al., 2007). The first semester in particular is seen as a time of particular psychological strain and heightened anxiety (Bewick et al., 2010). Cooke et al. (2006) suggests that the commencement of college is a time of heightened anxiety but not a particularly depressing time. Lazarus and Folkman (1984) suggest that coping strategies may decrease the effect of stress on well-being and different types of coping have also being described. In general, problem focused coping is seen to be more effective than emotion focused coping (Dunkley et al., 2000; Sasaki and Yamasaki, 2007). Optimism (Seligman, 1998;, Burris et al., 2009), self-efficacy (Lightsey, 1996) and social interest (Dinkmeyer et al., 1987) were all found to have a positive correlation with student psychological well-being.
Psychological well-being was found to be related to stress and coping, in that, stress and negative coping was associated with poorer well-being whereas social support and
positive coping was associated with better well being (Luo and Wang, 2009). According to some studies, college women reported greater levels of overall stress and use of emotion focused coping (self-help and self-punishment) (Eaton and Bradley, 2008;, Ptacek et al.,1994;, Stanton et al., 2000;, Brougham et al.,2009). Conflicting evidence exists for the relationship of academic achievement and psychological well-being with Topman and Moller (2011) finding no statistical significance between well-being as assessed at the commencement of the first year and compared with academic achievement at the end of the first year. On the other hand Howell et al. (2009) found that overall well-being was systematically associated with indicators of successful academic self-regulation including higher self-reported grades. Thus, there appears no doubt that the transition to college for many students is a stressful time and the need for them to develop appropriate coping strategies is identified. The following section describes a number of intervention studies designed to counteract the negative effects of such stress in college students.

**Intervention Studies:**
As previously stated few studies exist in this area and in the absence of a systematic review, related studies will be presented. Baker and Berenbaum (2008) examined the effectiveness of two adjustment to college interventions, namely problem focused interventions versus emotional focused interventions. Results indicated that participants low in attention to their emotions benefited most from the emotional approach intervention dimensions whereas those high in attention to their emotions benefited more from a problem solving intervention. Baker and Berenbaum (2007) suggest that their findings are consistent with previous research such as that by Langens and Schuler (2005) who found that individuals who had difficulty communicating their emotions benefited from emotional coping interventions but
only if they communicated their emotions to others in a supportive rather than a punitive environment. This is reflective of work demonstrating the importance of social support highlighted earlier. Also, there is some evidence suggesting that simply disclosing ones problems to others may result in a decrease in negative affect (Lutgendorf and Antoni, 1999). Steinhardt and Dolbier (2008) developed an intervention which involved a four week programme designed to enhance resilience, coping strategies and protective factors along with reduce symptoms of stress during a period of increased academic stress in college students. This was a quasi-experimental study involving 57 students divided between an experimental and control group. The title of the intervention was “transforming lives through resilience education” and consisted of four two hour sessions over four weeks each with a separate theme. Themes included “Transforming Stress into Resilience”, “Taking Responsibility”, “Empowering Interpretations” and “Creating Meaningful Connections”. Findings indicated that, compared to the control group, the experimental group had significantly higher scores on resilience, and more effective coping strategies. Also the experimental group had higher scores on protective factors of self-esteem, self-leadership, and positive effect and lower symptomatology scores. The authors acknowledge the small sample size as well as other limitations of the study, however suggest that findings such as these indicate that a resilience enhancement programme such as this may prove useful in managing and reducing stress in college students. The above resilience enhancement programme appears to have been successful and equipped students with much needed awareness of their own stress responses and coping resources required. However, although the content appears extremely relevant and appropriate, the challenge of covering that amount of content within four two hour sessions appears somewhat unrealistic. Also as student’s attendance was not
compulsory, there was no way of knowing that a programme such as this was reaching those who may have needed it most.

An initiative aimed at promoting mental health in students is described by Mitchell et al (2012). Here they describe an initiative entitled “curriculum infusion” to increase faculty involvement in suicide prevention and mental health promotion within the college student population. Curriculum infusion is an educational approach by which content is drawn from several subject areas to focus on a particular topic or theme (McBrien and Brandt, 1997). Mitchell et al (2012) defined curriculum infusion in the context of their initiative as developing class activities and assignments that introduce faculty and students to mental health topics such as depression, anxiety, eating disorders or suicide while at the same time focusing on academic content.

Counsellors, health educators and medical providers recruited faculty from a variety of disciplines to develop mental health promotion programmes in their courses. Results indicated that faculty had a deeper understanding of mental health issues and resources on campus and an appreciation of the opportunity to collaborate in novel ways. After such curriculum infusion was introduced on campus, faculty referrals to counselling did not increase but faculty involvement in mental health promotion increased. Yearwood and Riley (2010) described a similar curriculum infusion initiative aimed at nursing students and wellness issues. Its goal was to use the academic classroom and campus community to engage students actively in self-reflection on a variety of common college student health and well-being issues. The findings revealed that students experienced isolation, stress, anger and needed time to adjust before they could value the supports available to them. Isolation referred to being physically apart from others and being disconnected from thinking about certain issues. When statistics about college mental health were shared in class, some
expressed anger about the amount of stress that college and society places on students. Taking time involved moving from a stage of being unaware to beginning to notice, hear and see others and things occurring around them on campus. Valuing encompassed viewing the campus as a community, realizing that educators can be a source of support and acknowledging the importance of self-care. Yearwood and Riley (2010) concluded that it is important for educators to be aware of the health related effects of stress and isolation on students. They also made the point that educators managed to provide a safe classroom environment, decreased the distance between educators and students and helped the students realize that, in addition to being concerned about academic content educators were committed to a relationship with students that valued their self-care. With increasing shortage of staff and increase in lecturer student ratios, the practicality of providing such individual care may prove extremely challenging.

It appears from the above that interventions that focus on developing coping resilience in students and various other coping strategies are effective in reducing the stress experienced by this population group. Concepts such as self-esteem, social support and empowerment are reflected in the findings above as important aspects of this process.

2.7 The Synergistic Approach
This section of the literature review will examine how all three health behaviours interrelate and influence each other which lead us to a discussion on the concept of multiple health behaviour change interventions. The concept of adherence will then be addressed with regard to maintenance of the behavioural change.

According to Barry (2008) there is growing evidence of the relationship between
physical and mental health. Evidence from systematic reviews show moderate to strong prospective associations between depression, anxiety and coronary heart disease, Type II diabetes, and fatal and non-fatal stroke (Prince et al., 2007). Barry (2009) and other researchers in the field, state that indicators of positive mental health have been found to be associated with better physical health, fewer limitations in daily living, higher educational attainment, employment and earnings, better quality of life, relationships and health behaviours. Obesity has also been shown to impact on psychological well-being in that, according to the National Taskforce on Obesity Report, prejudice against obese people seems to border on the socially acceptable in Ireland. Bowman (2010) suggests that it is important to point out that PWB contributes to a range of critical outcomes in adult life, including increased social support, greater life satisfaction, and improved physical health (Bowman and Kitayama, 2009; Ryff and Singer, 2008). Ryff and Singer (2008) found that PWB was associated with improvements in numerous health outcomes over a ten year period. They also found that PWB in particular was positively and consistently associated with measures of physical health, whereas other forms of well-being have weak relationships with health (Ryff et al., 2006). Edwards (2006) suggests that the concept of psychological well-being has much potential value in interventions for promoting general and mental health, in particular through its positive emphasis on survival, health and strength, managing stress, coping with crisis, developing resilience, along with other skills and resources. Many studies since the 1950s support the idea that medically ill patients with negative attitudes have worse outcomes than those with more positive attitudes (Giltay et al., 2004). According to Rosenberg et al. (1995) self-esteem is an important factor in an individual’s overall psychological well-being and suggests that psychological factors such as depression, neurosis and

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psychosomatic symptoms of anxiety often accompany low self-esteem. According to the WHO (2003) physical activity interacts positively with strategies to improve diet, discourages the use of tobacco, alcohol and drugs, helps reduce violence, enhances functional capacity and promotes social interaction and integration. Dougall et al. (2011), claim that there exists well documented literature on the ability and importance of using PA to manage stress levels. Tsatsoulis and Fountoulakis (2006) concur suggesting that adopting a healthy lifestyle may help college students to reduce their risk of obesity-related disorders and to deal more effectively and positively with daily stressors.

Edwards (2006), states that many studies have clearly demonstrated the effectiveness of physical exercise in reducing stress, anxiety and depression (Fox, 2000; Morris and Summers, 1995; Scully et al., 1998; Weinberg and Gould 1999). Edwards (2010) points out that physical exercise, particularly of the regular balanced moderate enjoyable type, promotes mental health and well-being. Roth and Holmes (1987) also indicated that physical fitness moderates the stress illness relationship and that increasing fitness through aerobic training decreases the experience of stressful life events. Randolfi (2002) put forward possible reasons as to why exercise was so beneficial in improving psychological well-being and coping with stress. These reasons involve detoxification of stress related components, outlet for anger and hostility, a form of moving meditation, enhanced feelings of self-esteem and self-efficacy, periodic solitude and introspection, opportunities for social support, the power of human touch, reduction of muscular tension, increased endorphins, increased somatic awareness, training for competition, improvement in sleep and rest and enhanced fitness to fight stress and disease. In the study by Edwards (2006) two primary factors were highlighted, particularly “the feel good” factor and “social
support”. Scully et al. (1998) argue that the role of exercise is probably best described as preventative rather than corrective when associated with illness. Other researchers have found that physical activity appears to promote psychological well-being and reduce feelings of mild to moderate depression and anxiety (Silberstein et al., 1988). According to Bray and Born (2004) regular vigorous physical activity is related to psychological well-being with established links to lower levels of anxiety (Petruzella et al., 1991) depression (North et al., 1990), stress (Crews and Landers, 1987) and negative mood and to higher levels of positive mood (McDonald and Hodgson, 1991) as well as numerous indices of cognitive functioning (Etnier et al., 1997). Bray and Born (2004) undertook a study to investigate vigorous physical activity and psychological well-being during transition from high school to university in a sample of 145 Canadian students. They found that students who remained active during transition reported higher levels of vigour, lower levels of fatigue and lower levels of tension than those who were not sufficiently active. Hudd et al. (2000) found that college students, who reported higher levels of stress also consumed more “junk food”, were less likely to exercise, and less likely to obtain adequate amounts of sleep. Academic performance was also found to be impaired for students who reported higher levels of stress (Lumley and Provenzano, 2003). Hall (2011) explored the relationship between student adjustment and college student health behaviours and found that by being physically active and involved in healthy eating students can reduce the psychological impact of transition to college and thus respond to this transition in a positive way. Bray and Born (2004) make the point that given the positive and mental benefits of regular physical activity, first year students may have much to gain by staying active in terms of their health and well-being. Buckworth et al. (2002) concur suggesting that first year students need interventions
that will maintain or increase their physical activity. Within these interventions they need knowledge about personal, social and environmental factors that are associated with physical activity. Sailors et al. (2010) suggest that an exercise programme presented at the transition from home to university life may be a critical mechanism to deter the expected progression from an overweight adolescent to obese adult and intervene with young people at a crucial time when they are beginning to feel empowered by independence.

As can be seen from the above all three health behaviours have the potential to impact on each other either negatively or positively and negative behaviours in one area of health may lead to negative behaviours in other areas. On the other hand, positive health behaviour change in one area may also stimulate positive behaviour change in another area. This leads us to our next discussion on the concept of multiple health behaviour change initiatives.

### 2.7.1 Multiple Health Behaviour Change

Prochaska and Prochaska (2008) define multiple health behaviour change (MHBC) interventions as efforts to treat two or more health behaviours effectively within a limited time period simultaneously or sequentially. The health behaviours include any actions in which individuals engage which have either a negative or positive impact on health. Prochaska and Prochaska (2011) suggest that multiple health behaviour change (MHBC) interventions represent a new paradigm to facilitate integrated interventions which can maximize the impact on a variety of lifestyle behaviours which represent the highest risk and highest cost within the population. As such, health behaviour change may serve as a gateway to an overall healthy lifestyle. Prochaska and Prochaska (2011) make the case for MHBC interventions in that the change process
for different health behaviours is similar, thus it may be efficient to intervene on multiple behaviours at the same time. In this way individuals can learn transferable skills which they can apply to different areas e.g. increasing physical activity, increasing healthy eating, fruit and vegetable consumption etc. According to Fine et al. (2004), most individuals at some point engage in unhealthy behaviours that put them at increased risk for disease, disability and premature death. Such lifestyle behavioural risk factors include poor diet, sedentary behaviour, tobacco use, stress and distress, unsafe sexual practices and heavy alcohol intake or use of illicit drugs (Prochaska and Prochaska, 2011). Many writers highlight negative health behaviour in college students while Brevard and Ricketts (1996) found that college students consumed higher than recommended quantities of total fat, saturated fat, cholesterol and sodium, ate inadequate amounts of fruit and vegetables and had poor exercise habits. According to Prochaska and Prochaska (2011), the presence of multiple risk behaviours has been shown to have a synergistic negative influence, thus one negative behaviour compounds another and they almost gain support from each other. De Vries et al. (2008) suggest that an advantage of a lifestyle approach to behavioural change lies in the fact that some individuals might be interested in improving their health by changing their dietary behaviour while others might be more inclined to increase their physical activity. They go on to say that offering a target group the possibility of choosing which health behaviour to improve constitutes an attractive feature for intervention designers. Also De Vries et al. (2008) points out that as motivational stages and cognitive factors are found to cluster across health behaviours, a positive change in intrapersonal determinants of one behaviour may induce changes in the related construct for another clustered behaviour. For example, if an individual experiences success in meeting physical activity goals and thus has an improved
self-efficacy in this area, this may give them the confidence to introduce an element of healthy eating into their lifestyles in order to complement their physical activity routine. Prochaska and Prochaska (2011) explains this, in that, success in one area of behaviour change has the potential to build an individual’s confidence or self-efficacy to improve health behaviours in another area of their lives where they may have low motivation. Thus, success breeds success. Also Prochaska and Prochaska (2011) make the point that one behaviour may serve as a stimulus for another (e.g. engaging in sedentary behaviour by sitting down watching a favourite TV soap may stimulate the consumption of a high fat bag of Doritos or a glass of wine) and/or as a coping strategy for another (e.g. comfort eating when stressed or distressed).

A large body of evidence exists that shows that behaviours such as non-smoking, physical activity and healthy nutrition have proved to be associated with each other (De Vries et al., 2008). Prochaska and Di Clemente (1983) have also found that readiness to reduce dietary fat intake as well as readiness to eat more fruit and vegetables were associated with readiness to engage in physical activity. Thus on the one hand, negative health behaviours in one area tend to lead to negative health behaviours in another area. However, on a more positive note readiness to change health behaviour in one area may also be reflective of a readiness to change behaviour in another area. Prochaska (2011) claims that there is growing recognition that fragmentation is a major disorder within health care and warns that fragmenting lifestyle medicine into specialties on each separate behaviour is a prescription for failure.

According to Fox-Rushby et al. (2006) practitioner interventions focusing on dietary change, smoking cessation and increasing levels of physical activity have the potential to save the health service substantial amounts of money in the short and long term.
Prochaska (2011) suggests that targeting multiple risk behaviours at the same time has the potential for increased health benefits and reduced health care costs. A further point put forward by Prochaska and Prochaska (2011) is that, as there are limited opportunities within primary health care for health promotion, it would be ideal and efficient if the one intervention could simultaneously improve multiple risk behaviours relevant to an individual’s health profile. MHBC interventions would appear to increase value for money which would be a welcome news story in the present economically challenged health care environment.

In 2011, Prochaska and Prochaska published a review of multiple health behaviour change (MHBC) interventions for primary prevention. The review included 150 studies carried out between January 2005 and December 2009. The review clustered behaviours into three categories, firstly the energy balance behaviours, secondly addictive behaviours and thirdly disease related behaviours. From the perspective of the present study, particular attention is given to the first cluster dealing with physical activity and diet. A Cochrane review by Summerbell (2005) containing fourteen studies focusing on obesity prevention by targeting PA and diet in young adults was included. Results indicated that only one out of the fourteen studies showed significant changes in both dietary and physical activity behaviours and these findings were confined to girls. Prochaska and Prochaska (2011) conclude that results have been disappointing with diet and physical activity within this cluster and state that only three out of twenty three studies produced significant MHBC. However, they point out, that if looking at BMI alone, the results appear more positive, with 9 of 31 producing some significant reductions, but only five out of thirty one showing reductions across genders. Prochaska and Prochaska (2011) acknowledge that the literature on youth physical activity and dietary interventions is growing and studies to
date have shown some significant effects in some subgroups which they say is suggestive that the full potential for MHBC intervention has not yet been realized. In keeping with the first cluster, with regard to adult physical activity and dietary behaviour interventions, Prochaska and Prochaska (2011) point out that many of the studies here focus on weight loss in those who are overweight or obese. They report on two reviews which came to the same conclusion in that combined diet and physical activity interventions resulted in significantly greater weight loss at all-time points up to 36 months relative to advice alone (Avenell et al., 2004; Franz et al., 2007). According to Prochaska and Prochaska (2011) out of six reviews published between 2001 and 2009, most (57%) reported significant effects in at least one of the targeted behaviours, and a minority (37%) reported significant changes in both behaviours. Prochaska and Prochaska (2011) conclude from their review that the evidence for PA and dietary interventions with adults appears stronger for secondary than for primary prevention. Perhaps participants who were already classified as overweight/obese or sedentary, where potential health risks were already present were more motivated to reverse these risk factors. Sweet and Fortier (2009) within their meta synthesis on PA and dietary interventions with adults concluded that single interventions (those directed at PA alone or diet alone) were more effective in increasing these behaviours than MHCB interventions. Fleming and Goodwin (2008) carried out a review on lifestyle interventions aimed at preventing cardiovascular disease (CVD) in low risk adults. They identified seven studies in this area, four of the studies targeted multiple risks, two studies targeted diet alone and one study targeted physical activity only. Out of the four which targeted multiple risks, three showed significant positive effects on the outcomes. The review also concluded that lifestyle counselling interventions for primary prevention of CVD appeared to be of marginal benefit.
Although smoking is not the subject of the current study, it is important to mention that in some cases one health behaviour will have a simultaneous positive or negative effect on another. Taylor et al. (2007) have shown how physical activity has been found to reduce tobacco related cravings, negative affect and withdrawal symptoms. Prochaska et al. (2008) published a trial which involved 407 adult smokers who underwent an eleven week relapse prevention programme which contained a physical activity element and found that intervention participants significantly increased their moderate to vigorous physical activity. This increased physical activity was associated with increased vigour and decreased perceived difficulty with staying abstinent. Interestingly since 2000 physical activity promotion is recommended as a smoking cessation strategy within the US Clinical Practice guidelines for treating tobacco dependence (Fiore et al., 2008).

Just as one behaviour can impact another either positively or negatively so too can the processes of change. Some of the processes of change outlined within the stages of change model. e.g. the behavioural process of “substituting alternatives” may well transcend health behaviours. Thus in the above instance as a coping method for dealing with tobacco cravings. Similarly in the case of physical activity and healthy eating, an individual may substitute getting up and going for a walk when she he/she is coping with a desire to snack on a high fat product while watching the soaps.

A study by De Vries et al. (2008) in the Netherlands evaluated the effectiveness of targeted versus generic feedback sent in letters to 2827 participants. Findings indicated that at nine months post-test, the targeted letters resulted in significantly greater changes in dietary fat, fruit and vegetable consumption and physical activity behaviours than the generic letters. This study by De Vries et al. (2008) investigated the clustering of behaviours, determinants and stages of change among Dutch adults.
for the lifestyle factors of physical activity, consumption of fruit, vegetables and fat and smoking. Results showed that only 3% of the sample met recommended guidelines for all five behaviours. With respect to diet and physical activity, respondents in the preparation stage for one behaviour were more likely to also be in the preparation stage for another behaviour. This would appear to lend weight to the possible benefits of targeting healthy eating and physical activity together. The study by De Vries also found in common with previous studies, that females and older adults met more of the recommended guidelines than did males and younger adults. By contrast to other study De Vries found no correlation with educational level and health behaviours. Overall they found the strength of association between various behaviours to be generally low. However behaviour specific cognitions such as social support showed stronger associations. Social support from a partner showed the highest correlation with engagement in positive behaviours. De Vries points out that if a partner is supportive about one specific health behaviour, he or she will be generally supportive for different types of health behaviours. They also found that the probability of being in the same pre action stage for two behaviours was largest for the preparation stage. De Vries (2008) conclude that the results indicate that targeting multiple behaviours in a single intervention may be helpful in health education and promotion programmes. Also a study by Smeets et al. (2007) showed that tailored advice about the five behaviours listed above was effective for dietary changes and physical activity but not for smoking. The review by Prochaska and Prochaska (2011) reports on a study by Prochaska et al. (in press) which targets weight management, smoking, stress, and inactivity in 1400 university employees demonstrated significant results at six months follow up for repeated stage based expert system intervention or three motivational interviewing telephone counselling sessions relative to health risk
assessment with brief feedback. Prochaska and Prochaska (2011) conclude that the findings in relation to MHBC interventions are encouraging and that this focus may be particularly motivating for people attempting to reduce multiple risk factors. A number of other studies have also addressed two or more health behaviours at the same time but have not necessarily been labelled MHBC interventions. Pawloski and Davidson (2003) conducted a longitudinal intervention study involving 30 student nurses aged between 20-53 from a University in the USA. The aim of the study was to examine the outcomes of a targeted intervention aimed at increasing physical activity (PA) levels and improving overall body composition and decreasing risk factors for obesity. Results indicated improvement in overall body composition including a reduction in % body fat and a decrease in BMI’s. Students also showed increased PA levels. The writers concluded that since nurses need to counsel clients on primary prevention issues such as PA and maintaining ideal body weight, the importance of positive health behaviours for nursing students cannot be stressed enough. Abu Moghli et al. (2010) describe a study which explored the health practices of university students. The health practices included type of diet, nutritional habits and physical activity. The study consisted of an experimental (n=46) and a comparison group (n=84). The intervention group took part in a workshop consisting of a five day educational programme on healthy lifestyles (eating breakfast, water intake per day, exercise and relaxation). The programme was designed to help students make self-directed and autonomous health decisions and also consisted of group discussions and role play. The results reflected slightly positive health practices related to the three behavioural categories with the type of diet being the highest and physical activity being the lowest. Overall the difference in the scores of the experimental and comparison group were significant in relation to type of diet and nutritional habit but
not for physical activity. Interestingly students with lower BMI’s scored higher on nutritional habits, however students’ BMI’s did not seem to be related to physical activity as students with high BMI’s scored higher on physical activity than those with lower BMI’s. However an overall positive influence of training on improving health behaviours of university students related to the three behavioural categories were observed, thus leading the researcher to suggest that a similar course should be included as a university elective module that students could elect to do from a selection of other modules.

**Simultaneous versus Sequential**

Prochaska and Prochaska (2011), point out that when there is concern about multiple interventions interference a sequential treatment approach may be taken. Spring et al. (2004) compared dietary intervention introduced simultaneously with the smoking cessation intervention and a dietary intervention introduced after a smoking cessation intervention (sequentially) with 315 women. The study also had a control group who did not receive any dietary intervention. The findings showed no difference in smoking cessation rates across the groups; however it did show some advantage in weight gain in the sequential dietary intervention group. Also Sallis et al. (2009) studied the impact of a 12 week CBT weight control intervention on eating and smoking behaviours in 216 smokers who were not yet ready to give up. Results at nine month follow up showed that, compared to the control group, participants in the intervention group had significant improvements in weight loss, BMI and diet quality and a decrease in number of cigarettes smoked. They also showed a positive move in the stages of change towards smoking cessation. This would appear to point that there is a positive value in facilitating individuals to experience success in changing behaviour in one area and that this acts to build self-efficacy in other more difficult
areas that they find more challenging. The processes of change are common to any
type of behavioural change and that it makes sense that gained experience in the use of
utilising these processes in one area can then be transferred to other areas. Thus
effectively the individual has a head start when embarking on a more challenging
behavioural change like smoking cessation. Hivert et al. (2007) randomly assigned
healthy, moderately active, first and second-year university students into an
intervention group (N=57, 47 women and 11 men) and a control group (no
intervention). The intervention group undertook a healthy lifestyle educational and
behavioural intervention programme over a 24 month period. Topics covered within
the course that were delivered at 2 weekly intervals included the benefits of
maintaining a healthy weight, dietary and exercise recommendations for the
maintenance of health, and behaviour modification strategies to maintain a healthy
lifestyle. Findings indicated that the intervention lead to better weight management
and maintenance but no change in physical activity or fitness.
Artinian et al. (2010) reported that, in studies where dietary behaviour and PA were
targeted together, positive results were reported. However they conclude that there
exists limited knowledge about the relative benefits of simultaneous versus sequential
delivery of multiple PA and dietary behaviour change. Vandelanotte et al. (2005)
compared simultaneous versus sequential interventions for MHBC with 771 adults of
normal weight. The two targeted computerized interventions which encouraged
simultaneous or sequential change in physical activity and dietary fat intake both
outperformed the control group and did not significantly differ from each other at the
six month follow up. Thus the inference here being that whether participants engaged
in both changes together or one after the other it did not make any difference to the
final result. Thus it makes sense to engage in a simultaneous behaviour change
intervention as opposed to sequential from an economic and efficient use of resources perspective.

A Multicomponent Approach
As well as targeting multiple health behaviours at the same time, many writers advocate for the use of multicomponent interventions where many different strategies are utilised to bring about the desired change. According to Prochaska and Prochaska (2011) multicomponent interventions have yielded significant preventative effects for multiple risk behaviours. When exploring policy initiatives with regard to MHBC interventions, further support for the use of multicomponent strategies exist. The WHO conducted a rigorous review of the global literature on diet and physical activity interventions finding that while no size fits all “multi component interventions that are adapted to the local context were most useful. Prochaska and Prochaska (2011) concluded that MHBC interventions can represent a new paradigm to help drive integrated interventions that have maximum impact on highest risks and highest costs within populations in need of lifestyle change. However they do point out that more research leading to stronger evidence is required in the field of MHBC interventions and this requires further investment and funding in what they describe as this orphan research area. Prochaska and Prochaska (2011) suggest that in order to advance the field of MHBC and have any impact on clinical practice and health care policy, stronger evidence of the achievability and effectiveness of MHBC interventions is required. As can be seen from the above all three health behaviours have the potential to impact on each other either negatively or positively. Multiple health behaviour change (MHBC) interventions have been defined as efforts to treat two or more health behaviours effectively within a limited time period simultaneously or sequentially
Evidence suggests that multiple risk factors for ill health can co-exist and thus individuals who possess a number of different risk factors may be amenable to change in one or more of them at the same time. Evidence has also shown that readiness to change in one area is often similar to readiness to change in another area. Also the stage of change in one area of health behaviour was also seen to be similar to that found in another health behaviour area particularly with regard to preparation. Whether multiple health behaviour change interventions take place in a simultaneous or sequential manner does not appear to affect the overall outcome. Thus, economically MHBC interventions are very attractive. Multicomponent interventions are recommended from a policy perspective to support behaviour change; in particular environments with opportunities for PA and the promotion of stair use are seen as effective in promoting physical activity. From a healthy eating perspective, intervention such as the provision of nutritious foods and point of purchase cues to healthy eating have been found to be effective.

2.7.2 Adherence and Maintenance in Behavioural Change

In their systematic review Fjeldsoe et al. (2011) suggest that findings support the efficacy of selected interventions in producing moderate, short-term improvements in physical activity and/or diet (Ammerman et al., 2002; Eakin et al., 2007; Goldstein et al., 2004; Kahn et al., 2002; Neville et al., 2009). However few intervention trials include evaluations of the maintenance of behaviour change which they defined as a follow-up evaluation of a behavioural outcome occurring at least three months post intervention. (Fjeldsoe et al., 2011, p.99). Marcus et al. (2000) reviewed the literature on maintenance of PA behavioural change following intervention. They concluded that a comprehensive review was not possible because of the paucity of reports of
maintenance of behaviour change and the inconsistency of physical activity measurement across trials. According to Fjeldsoe et al. (2011), the issue of maintenance of behavioural change following interventions is not receiving the attention it should with only one third of PA and/or dietary intervention trials published since 2000 reporting on maintenance of behavioural change. Despite this, some of the conclusions they reached included the fact that dietary behaviour interventions achieved maintenance more often than PA interventions. Other researchers also found that dietary changes may be more amenable to change than PA behaviours. (Eakin et al., 2009; Emmons et al., 2005). They also found that maintenance was less likely to be achieved in interventions targeting women, however they did point out that the majority of these studies focused on women with chronic illnesses. Fjeldsoe et al. (2011) concluded that interventions were more likely to achieve maintenance if they were conducted over a longer period (>24 weeks), included some face to face contact, used multiple intervention strategies and included follow up prompts, which they described as brief contacts that occurred after the main part of the intervention to reinforce previous intervention content. Interestingly, Fjeldsoe et al. (2011) did not find support for self-monitoring as an intervention strategy to support maintenance. They also concluded that there was limited evidence to suggest which intervention strategies support maintenance and whether these differ to those known to support behavioural initiation. Rothman et al (2009) suggest that it is necessary to explore initiation and maintenance behavioural determinants separately for both physical activity and healthy eating, as evidence suggests they are different. Williams et al. (2008) found physical activity initiation was predicted by different determinants (e.g. home access to PA equipment) than those related to maintenance of PA (self-efficacy, perceived satisfaction). Also initial
dietary behaviour was predicted by different determinants (e.g. attendance at an intervention session) than those associated with maintenance of dietary behaviour change (lower cost and burden associated with diet, development of distaste for fat).

According to Wadden et al. (2009) as the frequency of contact decreases, achievement of initial behavioural change also decreases. According to Rothman (2000) interventions targeting dietary behaviour weight reduction and new physical activity habits often result in impressive rates of initial behaviour change but frequently are not translated into long term change. And as Artinian et al. (2010) point out long term adherence is required as the beneficial effects of lifestyle changes accrue over time.

According to Artinian et al. (2010), across all behavioural domains, it is well established that adherence to any new behaviour will often decline as the intervention is reduced or withdrawn. In a systematic review of long term effectiveness of physical activity by Muller-Riemenschneider et al. (2008) only 25 out of 5,508 studies met the inclusion criteria. Within the 25 studies fulfilling the criteria, there was evidence of long term increases in physical activity in the intervention groups compared with the non-intervention group. In two thirds of the studies booster intervention sessions were used to enhance long term effectiveness. Artinian et al. (2010) suggests that the decision to maintain behaviour is dependent on whether the achieved outcomes associated with the new behaviour are sufficiently desirable to sustain the behaviour. Other factors influencing the adoption and maintenance of new PA or dietary change behaviour include age, sex, health status etc. Not surprisingly better health status has also being associated with higher PA levels. By contrast, obesity, higher BMI’s and smoking have been shown to be associated with low levels of PA. The review also showed how comorbid conditions such as depression negatively impact on adherence to health behaviour changes; also cognitive processing and memory deficits also
impact on adherence. Artinian et al. (2010) also report on studies which show that somatic factors related to side effects to the behaviour change may negatively impact on adherence, (e.g. suffering headaches following dietary intake changes).

According to Fjeldsoe et al. (2011) few intervention trials evaluate the maintenance of behaviour change. They define maintenance as a behavioural outcome occurring at least three months post intervention. The majority of studies in the area of healthy eating and physical activity report moderate short term improvements with few reporting on longer term maintenance. Where studies have reported in this area, successful maintenance was seen to be more of a feature within dietary behaviours changes as opposed to physical activity changes. Maintenance was found to decrease as contact decreased thus maintenance was seen to be more likely if the intervention took place over a longer period of time and included booster follow up sessions after main intervention was complete. Evidence suggests that researchers need to take into consideration that behavioural determinants differ for initiation of behavioural change and for maintenance of behavioural change and an awareness of this in planning interventions is important.

2.8 Potential Gains for Research and Practice as a Result of Study
It is anticipated that this study will contribute to the existing body of knowledge on student health behaviours. It is also anticipated that this study will assist health promotion planners and college administrators in the design and delivery of health promotion within college settings. It is hoped that this study will provide knowledge of the physical activity, healthy eating and psychological well-being behaviours of this group of students. It may also provide an insight into how such behaviours change over the course of the first year in college. As this study represents a pilot evaluation of the intervention, it will assist in informing health promoters as to the value of basing
a health behavioural change intervention such as this into the curriculum. It is hoped that it will also provide insight into what aspects of the intervention are and are not effective. It is anticipated that this study may inform researchers as to the value of targeting a number of different health behaviours together as is recommended by Prochaska and Prochaska (2008).

It is also anticipated that this study will inform future curriculum planning in the area of health and health promotion. In particular it is anticipated that this study will inform the undergraduate nursing curriculum, however it is also anticipated that it will have relevance to other undergraduate students and not necessarily confined to students undergoing a degree in nursing. Also, as the intervention group are undergraduate students undergoing a degree in nursing, it is anticipated that an intervention such as this may contribute positively to their future role as health promoting health care professionals. Obviously it is not possible to measure this as an outcome, however, literature in this area suggest that nurses who are self-aware with regard to their own health are more effective as role models for health promotion with their patients. It may also provide health promoters with key information on the specific requirements of implementing an intervention in the college setting.

**Summary and Conclusion of Literature Review**
The above literature review has addressed the background to the study with regard to where this study fits in the broader conceptual picture of health promotion. It is clear that there is recognition that any health promotion intervention needs to be based on sound evidence and be subjected to thorough evaluation. A number of levels to approaching behavioural change ranging from the individual to the community to a more structural approach exist and it is recognised that all three levels have their place in bringing about health behavioural changes. The settings approach incorporates
health promotion at every level and has received much attention within the health promotion literature of late. Evidence continues to exist for the individual approach in facilitating behavioural change. The individual approach is reflective of the notion of “developing personal skills” endorsed by the Ottawa Charter. The literature also provides evidence of the use of the transtheoretical model in assisting researchers in designing behavioural change interventions. Evidence also exists for the effectiveness of motivational interviewing in bringing about health behavioural change. There is recognition of the importance of individuals having the appropriate mind set to bring about behavioural change. The role of psychological concepts such as social support and self-efficacy in promoting and motivating behavioural change is highlighted.

As students transition to college, evidence exists within the literature that health behaviours often deteriorate. This is seen in this instance by reduced physical activity and increase in weight gain. It is also seen as a stressful time for students when they may be at risk of increased psychological distress. The inter-relationship between all health behaviours is seen from the literature with an increased emphasis on the use of multiple health behaviour change interventions. The current intervention involves a curriculum based educational individual health behavioural change approach with a group of undergraduate students in a college setting. This intervention aims to promote physical activity, healthy eating and psychological well-being within this population group by the introduction of a new curriculum module of study entitled Health and Well-being. As the intervention group is made up of a group of undergraduate nursing students, it is anticipated that this intervention will also assist them in developing their future health promotion roles within the health care environment. It is anticipated that this study will add to the body of knowledge in the area of health promotion interventions within this population of college students.
CHAPTER THREE
DESCRIPTION OF INTERVENTION

3.1 Introduction and Overview of Intervention
While writing on the subject of evidenced based health promotion, Juneau (2011) points out that in reality we do not have a real understanding of how evidence is been used in health promotion practice today. Juneau suggests that part of the reason for this is that when writing up the results of interventions, authors rarely report on how they used any available evidence to design their intervention. Thus, this chapter sets out to describe the nature of the intervention utilised within this study. The theoretical and practical contents of the health and well-being module will be described. A description of the structure and purpose of the theoretical aspect of this module will be given. Also, a description of the process of how all four workshops were carried out will take place.

The intervention involved the design and development of a new module within the BNSC Nursing curriculum. This came about as a result of growing concern for the health of students who themselves were preparing to be health professionals and thus would be expected to promote health. Up until this point much of the curriculum dedicated to health involved developing the health promotion role of the nurse. However, some of the literature in this area suggests that it is necessary to develop one’s own awareness relative to personal health behaviours before one can promote health to patients/clients in the health care setting. As stated within a recent article, before health care professionals can fulfil a role in health promotion or primary health care they first need to be aware of their own relationship to health and their personal health behaviours. (Healy and Mc Sharry, 2011). Many writers have called for an increase in the amount of input in the undergraduate curriculum on student health and health behaviours (Alpar et al., 2008; Clemmens et al., 2004). Baranowski et al.
(2002) and others have indicated that health related curricula have led to significant changes in knowledge, attitudes and behaviours of students in middle and high school. Abu Moghli et al. (2010) suggest that although the importance of a health course in promoting student health at university level has been acknowledged, the impact of such courses on students’ knowledge, attitudes and behaviour is still unclear (Sallis et al 1999; Cardinal et al., 2002). They suggest that nurse educators are in an ideal position to develop and provide health promotion and illness prevention programmes both for their own students and for a broader campus wide student population. This suggestion is reflective of the settings approach discussed earlier. Therefore, the module was designed to provide the students with knowledge and skills and also to give them an opportunity to explore their attitudes to their own health and health behaviours. Health promotion goals such as consciousness raising awareness, increasing knowledge, attitude change, behavioural change, acquiring new skills, and reduction in risk factors (Ewles and Simnett, 1995; Naïdo and Wills, 2009) are reflected within the module. As the module was part of the first year programme, it was incorporated into the assessment process and the marks and standards for the first year university exams. The module was assessed by 100% course work at the end of the module which involved students being required to complete an assignment on the benefits of physical activity and healthy eating to overall health and well-being. Other researchers have highlighted the benefits of incorporating academic assessment into health based interventions in college setting (De Vahl, 2005). Calfas et al. (2000) also used this method in their intervention study designed to increase student participation in physical activity in a college setting. It is believed that this will provide further motivation for the student to engage fully with the intervention. It also provides an opportunity for students to reflect on and rehearse what they learn within the module.
This in turn may increase the likelihood of the information being retained.

Following the design and development of this module it was necessary to present it at programme board for acceptance and incorporation into the programme. This took place in September 2008. A summary of the module’s theoretical and practical content related to the study can be found below (Table 3.1). The module outline and timetable for the module can be found in Appendix 3.1 and 3.2 respectively. Also the table in Appendix 6.1. shows how the module's aims and learning outcomes are integrated into the study’s aims and objectives and measurement variables therein. This table will form the basis for the discussion of findings in Chapter 6.

**Table 3.1 Module Content Related to Study**

<table>
<thead>
<tr>
<th>Physical Activity</th>
<th>Healthy Eating</th>
<th>Psychological Well Being</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory:</strong> Lecture on effects of physical activity (PA)</td>
<td><strong>Theory:</strong> Lecture on Healthy Eating</td>
<td><strong>Theory:</strong> Lecture on the concept of positive mental health psychological well-being and mental health promotion.</td>
</tr>
<tr>
<td>Benefits of PA</td>
<td>Components of a healthy diet</td>
<td>Workshops 4</td>
</tr>
<tr>
<td>Effects of inactivity</td>
<td>Recommended healthy eating practices etc.</td>
<td>Psychological well-being promotion workshop.</td>
</tr>
<tr>
<td>Recommended PA levels</td>
<td></td>
<td>Facilitated workshops on promoting positive mental health and psychological well-being in groups of 15 and facilitated by Mental Health Promotion officer and module leader.</td>
</tr>
<tr>
<td><strong>Workshop 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Fitness assessment and demonstration: Individual baseline physical assessments carried out in small groups.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Workshop 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Motivational Interviewing on physical activity goals carried out with groups of 15 facilitated by two trained MI facilitators (MINT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2 Content and Process of Module Delivery

Workshops
Overall three different types of workshops took place, firstly, a fitness assessment workshop, secondly, two group based motivational interviewing workshops (15 participants per group) took place around physical activity and healthy eating. Thirdly a workshop designed to promote psychological well-being took place. Following information giving sessions within the lectures on health and well-being, physical activity, healthy eating and psychological well-being (see table 3.1. for content), workshops took place. Below follows an outline of the workshops and how they were carried out.

3.2.1 Workshop No 1
Physical Fitness Assessment and Demonstration of Physical Activity Skills.

The first workshop involved participants being facilitated to take part in a fitness assessment workshop. This involved students rotating between five different fitness assessment stations each of which was supervised by a fourth year student undergoing a degree in Business Recreation and Leisure under the direction of their lecturer and course director. Stations involved sit ups, assessing core and abdominal strength, press ups, assessing upper body strength, grip strength test, and a step test assessing cardiovascular fitness and flexibility testing (see Appendix 3.3). Students received a score for each test and this was placed in their logbook which they got to keep. They also got feedback on how their results were rated from a fitness perspective. This gave them an opportunity to gain heightened awareness on how physically fit they were and ideas on which areas they may need to develop. Following the assessment, participants were guided through a cardiovascular exercise session. This was followed by guided stretching of all major muscle groups. A relaxation session completed the workshop.
3.2.2 Workshop No. 2 and 3
Three MI Protocols were developed, two for students, one which addressed physical activity and another to address healthy eating (see Appendix 3.4. and 3.5.). Another was developed for use by the facilitators (Appendix 3.6). The facilitator’s protocol and guide (Appendix 3.6) was based on the student copy but included tips for the facilitator to ensure a consistent approach in each group. Thus the facilitator’s pack commenced with the principles of MI and the communication skills required as a reminder to the facilitators. It also included motivational skills to be applied depending on the participant’s stage of change along with the processes of change. Miller and Rollnick (2002) suggest that groups should be made up of no more than 20 participants. The first group motivational interviewing (GMI) session was based on physical activity and the second on healthy eating. Prior to this session, the students had already had the theoretical input in terms of recommended activity levels, benefits of physical activity etc. (see table 3.1). They had also undergone the physical fitness assessment which was designed to develop their awareness of their own fitness and perhaps give them an opportunity to formulate a plan on areas where they wished to improve. Prior to the session they were asked to identify an improvement they wished to make in relation to their physical activity. At the commencement of the session participants were (15 per group with two facilitators) asked to sit in a circle. Ground rules (see Appendix 3.7.) were then circulated in a hand-out and discussed to facilitate a safe environment. Participants were given an opportunity to suggest any further ground rules if they so wished. Each participant was then given a hand-out of the MI protocol to use as a workbook throughout the process (Appendix 3.4 and 3.5). Participants were advised they could write on the workbooks and keep them for their own reference. The protocol included sequential steps to assist the participants in bringing about desired behavioural change. The facilitators guided the participants
through the protocol which commenced by asking the participants to identify a broad goal around the desired change. They then were guided to explore how this behaviour fitted into a typical day’s activity. Participants were then asked to self-assess what stage of change they were currently at in relation to this issue. Thus participants rated themselves as to if and how physically active they were according to the physical activity stage of change tool which was incorporated into the motivational interviewing protocol (see Appendix 3.4). Following this, participants were given an opportunity to assess their relationship to the proposed change and how ready they were to bring about change in this area. They were then guided to assess and explore how important making this change was to them. At this point participants were directed to the decisional balance quartet on their workbooks whereby the participants were requested to fill in the pros and cons of changing or not changing their behaviour. This was followed by an assessment and exploration of their confidence in making the change and again their readiness to apply this change to their lives was reassessed. The protocol also asked participants to identify what supports they could put in place to ensure success in carrying out planned change. Towards the end of the workshop participants were asked to write a plan for bringing about this proposed change with more specific objectives than the initial general goal. A diary to plan their proposed behavioural change in the area of healthy eating or physical activity was incorporated into the protocol. Participants were also asked to foresee possible obstacles to the plan and also to look at how they could be overcome. Finally participants were asked to plan a review date for themselves whereby they could evaluate their progress. While all participants completed their own workbooks, facilitators asked people to share their goals with the group and verbally worked through the protocol with a number of participants. During this process, participants were asked to focus on how what was
being discussed related to their own situation. Participants were also asked to contribute with encouragement or examples of what worked for them. In this way social support was promoted within the group itself. Also some of the participants shared the same accommodation and thus committed to going for walks or cooking healthy meals together.

3.2.3 Workshop No.4
Workshop Number 4 followed a lecture in psychological well-being and promoting positive mental health (see table 3.1. above). The workshops (consisting of groups of 15 participants) were facilitated by a Mental Health Promotion Officer and the researcher. The session outline is included in Appendix 3.8. After establishing the necessary ground rules, the workshop commenced with a recap on what psychological wellbeing involved. The first group exercise then took place, whereby the group was divided in two and each half were asked to discuss the characteristics of someone with good psychological well-being and the characteristics of someone with poor psychological well-being respectively. This was followed by feedback and a facilitated discussion in the main group. The second exercise involved paired group work whereby in pairs, participants were asked to share five sources of stress in their lives, and what they do to cope with this stress. Again this was followed by feedback and facilitated discussion in the main group. The discussion addressed the effects of positive or negative thinking on our perception of stress, coping strategies to help lessen stress in our lives and the importance of building psychological resilience which is an individual's tendency to cope with stress and adversity (Masten, 2009). The workshop concluded with a discussion on the importance of relaxation to reduce stress and a mindfulness based relaxation exercise. Nhat Hanh (2009) suggests that by practicing mindfulness, we can better manage challenges in our lives.
Summary

The above chapter has described the nature of the intervention utilised within this study. The theoretical and practical contents of the health and well-being module were described in detail. A description of the process of all four workshops took place. Thus to conclude, the theoretical aspect of this module set out to increase participants knowledge in the areas of physical activity, healthy eating and psychological well-being and their relationship to health. It was anticipated that the practical workshops would provide participants with an opportunity to develop self-awareness in relation to their health status and practices. It was also anticipated that participants would achieve the necessary motivation and support from the group motivational interviewing to bring about any desired health behaviour changes. The psychological well-being workshop served to enhance awareness of stress in their lives and their own reactions to this stress. It also assisted in identifying coping skills to build resistance to stress and compliment motivational aspects of behavioural change.
CHAPTER FOUR
METHODOLOGY

4.1 Introduction
The following chapter outlines the methodological approach taken to evaluate this health promotion intervention. The evaluation of this intervention involved a mixed methods approach whereby a quasi-experimental design was utilised to evaluate the impact and outcome of the intervention. The process aspect of the intervention was then explored by the use of a focus group. Quantitative data collection involved a health behaviours questionnaire incorporating a mixture of self-reported measures and objectives measures. The population group under study was that of first year undergraduate students in a rural college setting. A non-probability purposeful sample of 110 first year students was chosen from one particular college setting. Access to the sample was facilitated by College President, Head of Departments for Nursing and Health Studies and Home Economics. Ethical permission to carry out the study was granted by the NUI Galway ethics committee. Data was collected prior to the intervention (delivery of the health and well-being module), after the intervention and one year following the intervention. Quantitative data was analysed by SPSS and thematic content analysis was utilised for focus group analysis.

4.2 Aims and Objectives
This study set out to evaluate the impact of a module entitled health and well-being on the health outcomes of a group of undergraduate students. The main hypothesis was that a group of students receiving a module such as this would show improved health outcomes as a result of the module as opposed to a similar group who did not receive the module. Thus, to ascertain if this was or was not the case, it was necessary to measure baseline health behaviours prior to the delivery of the module, at the end of the module and again at twelve months follow up to ascertain whether any
Aims and objectives
The aim of this study was to evaluate the impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health outcomes of a group of students namely physical activity, healthy eating behaviours and psychological well-being.

The objectives were:

- To compare participants’ physical activity outcomes before and after completing a tailored educational programme on “Health and Well Being” by measuring, self-reported physical activity levels, stage of change for physical activity (PA), self-efficacy for PA and social support for PA.
- To compare participants’ healthy eating outcomes before and after completing a tailored educational programme on “Health and Well Being” by measuring, BMI, self-reported eating behaviours, weight loss aims and strategies, stage of change for healthy eating (HE), self-efficacy for HE and social support for HE.
- To compare how participants rate their psychological well-being both before and after completing a tailored educational programme on “Health and Well Being” by measuring psychological well-being.

4.3 Background and Overview of Study Design
The current study was designed to evaluate the effectiveness of a health promotion intervention in the form of a new module in the undergraduate curriculum. The module was entitled health and well-being and was introduced into the undergraduate nursing curriculum on a pilot basis. Naidoo and Wills (2009) suggest that, new or pilot interventions warrant a rigorous evaluation because without evidence of their
effectiveness or efficiency, it is difficult to argue that they should become established work practices. Thus an overall evaluative approach to methodology was taken and a quasi-experimental design was utilised to evaluate the impact and outcome of this intervention. A mixed methods approach to data collection was utilised in the form of a health behaviours questionnaire designed to evaluate the impact and outcome of the intervention and a focus group designed to elicit data on the process of the intervention.

4.4 Hypotheses
It was hypothesised that an intervention such as the introduction of this health and well-being module would lead to an improvement in participants health outcomes. Specific hypotheses related to the study are summarised in table 4.2. below.

<table>
<thead>
<tr>
<th>Health Behaviour</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td>Hypothesis 1(a) Physical activity levels (i.e. IPAQ MET scores) will increase from pre-intervention (T1) to post intervention (T2) and these increases will be maintained at follow up (T3), in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 1(b) The number of those meeting minimum physical activity levels will increase from pre-intervention (T1) to post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 2 Participants’ stage of change for PA will increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td></td>
<td>Hypothesis 3 Participants’ self efficacy for PA will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 4</td>
<td>Participants perceptions of social support for PA particularly from friends will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3), in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Healthy Eating</td>
<td></td>
</tr>
<tr>
<td>Hypothesis 1</td>
<td>Mean BMI scores of the intervention group will reduce from pre-intervention (T1) to post intervention (T2) and these reductions will be maintained at follow up (T3), in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>Participants’ stage of change for healthy eating will increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 3</td>
<td>Participants’ self-efficacy scores for healthy eating will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 4</td>
<td>Participants perceptions of social support for HE particularly from friends will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Psychological Well Being</td>
<td></td>
</tr>
<tr>
<td>Hypothesis 1</td>
<td>Participants psychological well-being scores will increase between pre (T1) and post intervention (T2) and these increase will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Research Question</td>
<td>Will psychological well-being scores as measured by the GP core at T3 be reflective of those of the WHO index. NB. (lower GP core scores represent healthy well-being whereas higher psychological well-being scores represent good psychological well-being).</td>
</tr>
</tbody>
</table>

### 4.5 Study Design

For the purpose of the current study an overall evaluative approach was taken. Within evaluation research the focus tends to be on a particular practice, policy or event. An evaluative study is normally carried out when the researcher wants to find out if, how
and to what extent the objectives of particular activities have been or are being met. Researchers can use quantitative and/or qualitative methods. Nutbeam (1998) suggests that as the concept of health promotion has evolved particularly since the 1986 publication of the Ottawa Charter, the range of strategies and actions to promote health have also expanded, which in turn adds complexity to the task of evaluating health promotion. According to Thorogood and Coombes (2003) there cannot be just one method for the evaluation of health promotion initiatives because the initiatives themselves draw on a variety of methods and disciplines. They further suggest that rigorous evaluation methods are needed in order to develop a new evidence base for the future development of health promotion. As stated a quasi-experimental design was utilised to evaluate the quantitative elements of the present study. Quantitative research is used to describe variables, examine relationships among variables, and determine cause-and-effect interactions between variables (Burns & Grove, 2009). Experiments (incl. quasi-experiment) examine and establish causal links between variables. However the quasi-experiment involves implementing a treatment (or in this case an intervention) and examining the effects of this treatment (intervention) using selected methods of measurement (Cook et al., 1979). Quasi-experimental studies differ from experimental studies by the level of control achieved by the researcher. Quasi-experimental studies usually lack a certain amount of control over the manipulation of the treatment, management of the setting, or selection of the subjects (Burns and Grove, 2009). Quasi-experiments cannot establish cause and effect relationships with certainty but can establish strong links. Within the current study a comparison group is utilised to compare effects of the intervention on those that receive the intervention and those that do not (comparison group).

On the other hand a focus group was utilised to evaluate the qualitative elements of the
Focus groups originated with market research in the 1920s as a method of gathering accurate information about product preferences (Robinson, 1999). The primary objective is to obtain accurate data on a limited range of specific issues, within a social context, where people consider their own views in relation to the views of others (Robinson 1999). The focus group can be described as a discussion that takes place in a social setting – a group interaction that serves to generate data for analysis (Kitzinger, 1994). The aim of the focus group is not to reach a generalised or representative statement of opinion (as with surveys). The assumption with focus group interviews are that opinions are not always readily available and are often open to influence of others in an interactive setting (Robinson 1999). Also Kitzinger (1995) suggests that the idea behind the focus group method is that group processes (group synergism) can help people to explore and clarify their views in ways that would be less easily accessible in a one to one interview. The accent is upon interaction within the group and the joint construction of meaning (Bryman 2004). Members of the focus group respond to each other and to the researcher. Different reactions stimulate debate about the topic between group members and generates ideas, questions, problems and solutions. Participants have the opportunity to validate or refute information and the ability to seek direct clarification (Lane and Terry, 2000).

There is general agreement within the health promotion literature that the use of multiple research methodologies greatly increases the validity of evaluation research (Nutbeam, 1998). Although this study utilises a predominantly evaluative research design, data collection consisted of a variety of data collection methods in keeping with a multiple research methods approach (Campbell and Fiske, 1959).

Pender et al. (2011) suggests that evaluation in health promotion is the process of
collecting and analysing information and is used to learn the value of a health promotion programme or intervention. They go on to differentiate between outcome and process evaluation. Process evaluation refers to verifying the content of the programme/intervention and whether it was delivered as intended whereas outcome evaluation focus on the results of the intervention. Outcome evaluations focuses on the results or changes brought about by the programme and include intended or unintended changes (Pender et al., 2011). The aim of the present study also sought to assess whether any behavioural change could be maintained at follow up. Fjeldsoe et al. (2011) define the evaluation of the maintenance of behavioural change, as a follow up evaluation of a behavioural outcome occurring at least 3 months post intervention contact. For the purpose of this study follow up data was collected one year following the intervention. It was felt that data collected one year on would provide more comprehensive information about health behaviour change maintenance then simply collecting data only at post intervention. Fjeldsoe et al. (2011) recommend that intervention trials should include evaluation of maintenance of behavioural outcomes and suggests that 12 months following the intervention is an optimal time to evaluate outcomes. Other writers differentiate the types of evaluation further and describe three different types of evaluation which are process, outcome and impact (Naidoo and Wills, 2009). According to Barry and Jenkins (2007) a formal system of evaluation needs to be put in place in order to systematically assess programme inputs, process, impact and outcomes. Process evaluation is concerned with assessing the process of programme implementation and in this case the intervention. Impact and outcome evaluation are both concerned with assessing the effects of the intervention however, impact evaluation relates to the immediate outcomes at the end of the programme whereas outcome evaluation is concerned with intermediate or long term effects e.g.
after 6 months or a year (assessed by follow up data collection within present study).

For the purpose of the current study the process, impact and outcome of the intervention will be evaluated. Naidoo and Wills (2009) define impact evaluation as the immediate effects or outputs such as increased knowledge or shifts in attitude (e.g. increase in physical activity behaviour). Impact evaluation tends to be the most popular choice of evaluation as it is the easiest to do. They go on to define outcome evaluation as the longer term effects such as changes in lifestyle (e.g. I now exercise four times a week). Outcome evaluation is more difficult as it involves assessment over a longer period of time; however it is often the most preferred form of evaluation. According to Thorogood and Coombes (2003) outcome evaluation aims to determine whether there is a relationship between an activity and the outcome whereas process evaluation enables us to explore what is going on within a health promotion initiative.

The Ottawa Charter viewed health promotion as a process not an outcome as health promotion is carried out with people not on them. Mihalic et al. (2002) outline the primary purpose of process evaluation as being, to improve our understanding of how a programme achieves what it does. According to Barry and Jenkins (2007) process evaluation involves assessing the active ingredients or components of the programme. Thus as recommended within the literature a comprehensive approach to evaluation is taken within this study, therefore, health outcomes are measured immediately after the intervention programme is completed (impact evaluation), the process of the intervention is evaluated at this time also. Health outcomes are measured again one year on (outcome evaluation). Naidoo and Wills (2009) suggest that there are bound to be changes in behaviours one year on, regardless of any health promotion intervention. For this reason, they recommend having a control or comparison group, so as to avoid the danger of attributing all behaviour change to the health promotion
programme and thereby over estimating its influence. Thus, the present study fulfils this criterion in that it included a comparison group for whom health behaviours were also measured but who did not undergo the intervention. As previously stated a mixed methods approach was taken to data collection in the present study thus drawing from both the quantitative and qualitative research paradigms. This is in keeping with a comprehensive evaluative approach to a health promotion intervention.

**4.6. Sampling**

Here, the population under study was first year undergraduate students in a rural college setting. A sample of convenience was chosen from the college where the researcher is employed as a lecturer. Thus all first year BNSC Nursing and B.ED Home Economics students (N=110) made up the selected sample. This sample was divided into both a comparison group and an intervention group. A power calculation showed that the study would need a minimum of 40 participants in each group, for findings to be reported at the 95% CL, with a confidence interval of 5 (Creative Research Systems, 2010). Initial pre-intervention numbers of 49 participants in the intervention group and 46 in the comparison group fulfilled this criterion adequately. Thus the selection of those who formed the intervention group and those who formed the comparison group were based on their programmes of study as opposed to randomly selected. As the two sets of students were following two diverse curriculums it would have been impossible to mix the programmes. Thus the intervention group comprised of first year undergraduate students undergoing the BNSC Nursing programme and the comparison group comprised of first year undergraduate students undergoing the B.ED Home Economics programme. The comparison group was selected on the basis that they resembled the intervention group in that they were also a predominantly female group as the majority of those who study Home Economics
are female. Also they shared the same campus as those in the intervention group and thus the same structural and environmental facilities for physical activity, healthy eating and psychological well-being.

**Inclusion and Exclusion Criteria:**

**Inclusion Criteria:** All first year (Sept 2008 intake) undergraduate Nursing and Home Economics Students in St Angela’s College Sligo (N=110).

**Exclusion Criteria:** First year students from other courses at St Angela’s College and those students with physical handicaps (which would render them unable to participate in the physical activity assessment workshop) or those with an underlying illness such as raised blood pressure.

**4.6.1 Negotiating Access**

Information about the study was submitted to the college’s Board of Management and Management Advisory Group prior to selection of respondents. Course coordinators were approached and provided with information about the study and consent to proceed obtained. A detailed ethics application to the universities ethics committee was submitted outlining the study and their approval was gained prior to commencing the study (see appendix 4.2). One month prior to the commencement of the study, a meeting took place with the comparison and the intervention groups separately as each was a distinct cohort of students registered for different courses. i.e. BNSC (Bachelor of Nursing Science) students representing the intervention group, while B.Ed (Bachelor of Education) students representing the comparison group. A register of attendance was kept and 51 students from the intervention group and forty five students from the comparison group attended this briefing session. The remaining students who were not present at that briefing session were emailed with the study information and invited to participate (see Appendix 4.3.). At this point, the nature of
the study was explained in detail. Thus while the intervention group undertook the
Health and Well Being module as part of their course curriculum, the comparison
group followed the standard B.ED curriculum. In addition, students in the intervention
group were informed that undertaking the module was part of their course and thus
compulsory; however taking part in the data collection process of the proposed study
was not compulsory and entirely up to themselves. The inclusion and exclusion
criteria were also outlined at this point. After explaining the inclusion and exclusion
criteria and the rationale for same, the researcher gave the students an opportunity to
ask questions. Cognizance was taken of the fact that some students may be concerned
that they did not fulfill the requirements for inclusion or they may be concerned that
some underlying condition may exclude them from the study. The researcher
remained sensitive to these possible concerns thereby avoiding inflicting any
emotional or psychological distress. Students were given the option to discuss any
matters of concern with the researcher in private and were reminded that they could
choose not to participate in the study without giving any explanation. At the
aforementioned meeting, one month prior to the commencement of the study, an
information pack containing (a) letter of invitation to participate in study (Appendix
4.3.), (b) Information on study (Appendix 4.4.), (c) consent form (Appendix 4.5.) was
given to each potential participant. In this way, information was given (Informed
Consent) and permission sought (Voluntary Participation Policy outlined) from
student participants. Participants were also reminded of the voluntary nature of
participation within the data collection process. This gave them an opportunity to
decide whether they wished to participate in the study. They were informed of the
process of returning the completed consent form to the researcher within a specified
period (greater than 24 hours). Participants were also informed that a collection box
would be made available for late consent form submissions.

4.7. Data Collection Tools
A self-completed health behaviours questionnaire was the main data collection tool utilised. A focus group with participants was also held to evaluate their intervention process.

4.7.1 Quantitative Data Collection Tool
Health Behaviours Questionnaire

As stated a self-completed questionnaire requiring participants to self-report on their own health behaviours was the main data collection tool (see Appendix 4.6.). Here, after completion of general health indicators, participants were asked to report on health behaviours in three main areas namely physical activity, healthy eating and psychological well-being. The questionnaire consisted of a number of sections, firstly demographics, secondly general health measures, thirdly physical activity, fourthly healthy eating and finally psychological well-being. Within section 1, demographic data on gender, age, course area and county of origin was collected. Marital status, number of dependants, income, parental education and parental occupation was also assessed within this section. In section 2, general health indicators were measured by utilising questions contained within the SLAN, 2007 survey (Kelly et al., 2008). Permission to use the questions from the SLAN questionnaire was sought and granted (See Appendix 4.7.1). These items consisted of self-reported general health measures including, rating of general health from poor to excellent, selection of options for participants to choose from to have better health e.g. less stress, and a selection of options for participants to choose from which prevent improvements in health e.g. lack of time. This section also included questioning pertaining to smoking, alcohol, and participants’ perceptions of the adequacy of their current healthy eating and
physical activity behaviours. Also for the purpose of the current study, objective measurements were taken by a clinical skills team on physiological measures of pulse, BP, height, weight and BMI. Objective measures generally tend to be more accurate than self-reported and in view of the relatively small sample size within this study it was possible to obtain these measures objectively.

Validity and Reliability of Health Behaviours Questionnaire
Although the questionnaire utilised was constructed for this study, it was made up of a number of different well known and validated tools drawn from other studies. It was important to examine the validity and reliability of the questionnaire as a whole in the context of the present study. Reliability is the ability of the research tool to give a reliable result, that is, that the same measurement repeated by different people, or by the same person on different occasions will give the same result (Parahoo, 2005). When a tool is reliable, it is said that bias due to the researcher's influence is reduced. Parahoo (2005) suggests that reliability is the first characteristic to test in any tool as it is an essential pre-requisite to validity. A number of techniques exist to help the researcher establish reliability. One of the most popular methods is that of “test retest” which involves administering the questionnaire on two occasions and comparing responses. Thus, three months prior to the commencement of the main study the questionnaire was given to another group of undergraduate students. The students were in their second year of the same BNSC programme. Six weeks later the same questionnaire was administered to the same group of students and on analysis, results indicated that the questionnaire continued to yield similar results indicating a reasonable degree of reliability.

A research tool is said to be valid if it tests what it sets out to test and does so accurately. The validity of an instrument determines the extent to which an instrument
actually measures what it is supposed to measure (Parahoo, 2005). Many different forms of validity exist, within this study, content and construct validity are the most relevant and thus will be explored in the context of the current study. Content validity is the degree to which the questions adequately represent the phenomena being studied (Parahoo, 2005) whereas construct validity is the extent to which the instrument is adequately measuring the abstract concept underlying the scores being produced. According to Polit and Hungler (1995) a construct is defined as an abstraction or concept that has been deliberately invented (constructed) by researchers for a scientific purpose. In the case of the current study that concept is the health and well-being module. In order to explore content and construct validity following the development of the questionnaire, the questionnaire was given to two colleagues in the area of health promotion and the research supervisor. They were asked to assess whether they felt the content of the questionnaire adequately represented their understanding of physical activity, healthy eating and psychological well-being and that, all together, the questionnaire would be able to ascertain participants health and well-being in the context of these health behaviours. Feedback from these experts indicated that they considered the questionnaire to adequately represent the concept in question. Thus the researcher was satisfied as far as possible that the questionnaire would measure what was set out within the study and it would do some in a reliable fashion.

Validity and Reliability of Individual Measures utilised within the Questionnaire

Physical Activity
Section 3 dealt with physical activity which was assessed by a self-reported physical activity measure, stage of change for physical activity, self-efficacy for physical activity and social support for physical activity. The main instrument used to measure physical activity was that of the International Physical Activity Questionnaire (IPAQ)
short version (Craig et al, 2003). The IPAQ measures self-reported levels of physical activity. This questionnaire assesses the participant’s physical activity over the previous week and classifies activity on three levels i.e. walking, moderate and vigorous. It then assigns a metabolic equivalent of task (MET) which is a physiological concept expressing the energy cost of physical activities. Total minutes of physical activity are then calculated over a week and this is then multiplied by an assigned MET score depending on the activity i.e. Walking = 3.3 METs; Moderate Intensity = 4.0; Vigorous Intensity = 8.0 METs. These are then added together to give a total MET-minutes/week score. Permission to use this tool was granted by the authors (see Appendix 4.7.2). The IPAQ has become the most widely used physical activity questionnaire with a long (31 items) and a short version (9 items) available. (Van Poppel et al., 2010). Dinger et al. (2006) carried out a study to examine the validity and reliability of the IPAQ short form in college students. The sample of undergraduate students wore a pedometer and an accelerometer for one week and completed the IPAQ at the end of the week. The results of their study indicated that time spent in vigorous physical activity from the IPAQ was significantly correlated with steps/day from the accelerometer and from the pedometer as well as count variables (\(p: 0.30 – 0.47, p < 0.01\)). Time spent in moderate activity from the IPAQ was significantly associated with the majority of accelerometer variables (\(p: 0.19 – 0.23, p < 0.05\)), and time spent walking was not significantly correlated to any step or count variables. With regard to reliability, reported time spent in each category of physical activity was compared between the two administrations of the IPAQ to examine stability and reliability of the instrument. The reported amount of time spent in moderate \((t = 3.9, df = 110, p < .01)\) and total physical activity \((t = 2.5, df = 110, p = .01)\) was different between administrations. However the intraclass correlation
coefficients (ICC) ranged from 0.71 – 0.89, indicating moderate to high reliability of the questionnaire items. They concluded that this questionnaire can be confidently used to assess college students’ participation in physical activity. Within the current study the short version was utilised with the addition of two extra questions related to strength/resistance exercise and another related to stretching/relaxation exercises. The rationale for their inclusion being that strength training is now recommended within the new Physical Activity guidelines for Ireland (2009) and internationally. Also activities such as Yoga and Pilates, although not fitting in to walking, moderate or vigorous exercise are a valuable form of physical activity.

**Stages of Change**
The stages of change measure for physical activity was based on the stages of motivational readiness to change model (Marcus and Forsyth, 2009) which in turn is based on the Trans theoretical model (Proschaska & Diclemente, 1984; 1986). The model outlines that change is a cyclical process with people going through a number of changes from pre-contemplation to maintenance. The stage that one is at in terms of physical activity is an indication of how physically active they are. Thus within the questionnaire, participants were asked to rate themselves from 1 to 5 (1 = pre contemplation and 5 = maintenance) as to if and how physically active they were. The physical activity stage of change questionnaire was adapted from SLAN 2007. (See Appendix 4.7.1 for permission). According to Woods et al. (2002) the construct validity and test re test reliability of this measure has being demonstrated by a number of studies (Marcus and Simkin, 1993; Marcus et al., 1994; Mutrie and Caddell, 1994; Cardinal 1997). In particular, the reliability of the stages-of-exercise-adoption measure has been examined and the Kappa index of reliability over a 2-week period was .78 (N = 20); (Marcus et al., 1992). Also concurrent validity for this measure has
been demonstrated by its significant association with the Seven Day Recall Physical Activity Questionnaire (Marcus and Simkin, 1993). Cardinal (1997) examined the construct validity of stages of change for exercise behaviour and found objective support for the stage-of-change model within the exercise domain. He concluded that by acknowledging and accurately assessing stage of exercise, researchers and clinicians may be able to improve physical activity promotion efforts.

**Self-efficacy**

Marcus and Forsyth (2009) define self-efficacy as confidence in one’s ability to successfully perform a particular behaviour. Thus the more confident a person is in their own ability to successfully perform a particular behaviour increases the likelihood that they will engage in the behaviour (Marcus and Forsyth, 2009).

Self-efficacy was measured by a five item questionnaire developed by Marcus et al. (1992) that examined how confident participants felt about maintaining regular physical activity under various circumstances e.g. when tired, when weather poor etc. Permission to use this tool was given (see Appendix 4.7.3). Scores were calculated by using the scoring algorithm which combines scores on each of the five areas and the average of all five items indicates self-efficacy. A higher score indicates greater self-efficacy. Increased self-efficacy is believed to be important for a person to adopt and maintain a programme of regular physical activity (Marcus and Forsyth, 2009).

Marcus et al (1992) describe the establishment of validity and reliability of their self-efficacy tool in conjunction with the stages of change for exercise behaviour with a sample of government employees and hospital employees (n=1,491) Total scores on the self efficacy items reliability differentiated employees at different stages, F (4, 369)= 36.57, p< .001. Also test re test reliability for the self efficacy score over a two week period was .78. They concluded that this was a highly reliable measure of self efficacy.
Social Support
According to Pender et al. (2011) social support can be defined as a network of interpersonal relationships that provide psychological and material resources intended to benefit an individual’s ability to cope. Social support is believed to be a strong indicator of behavioural change (Lewis et al., 2006; Sarason et al., 1990). In the current study, social support was measured using a tool developed by Sallis et al. (1987) who granted the researcher permission to use any of the tools on his website (see Appendix 4.7.4). The social support measurement tool was in the form of a questionnaire which includes a list of 13 items which friends or family might do to encourage the participant to be physically active. Participants were asked to score these items twice (once for family support and once for friends support) from 1-5 (1= never, 5 = very often). Higher scores reflect more perceived social support from these people. Sallis et al. (1987) published an article entitled, “the development of scales to measure social support for diet and exercise behaviours.” Here, support from family and friends were assessed separately for both diet and exercise habits. Social support scales were correlated with respective self-reported dietary and exercise habits providing evidence of concurrent criterion related validity. Sallis et al (1987) conclude that both test-retest (range, r=0.55-0.86) and internal consistency reliabilities (range, alpha = 0.61-0.91) were acceptable.

Healthy Eating
Section 4 of the questionnaire included a number of questions designed to assess participants eating behaviours and dietary intake based on the food pyramid.

Permission to use food pyramid was sought and gained (see Appendix 4.7.5)

Participants’ weight and height were recorded objectively by a clinical skills team. Similarly to the physical activity section, stages of change, self-efficacy and social support for healthy eating were also assessed (see questionnaire at Appendix 4.6).
BMI
Participants’ body mass index was calculated at each data collection episode using the WHO, 1995 classification (see Appendix 4.8). Body Mass Index (BMI) is an index commonly used to classify underweight, overweight and obesity in adults. It is based on the individual’s weight-to-height ratio. It is defined as the weight in kilograms divided by the square of the height in metres ($kg/m^2$), (WHO, 1995). According to the CDC (2008), BMI is a simple, inexpensive, and non-invasive measure of body fat which relies solely on height and weight. Studies have shown that BMI levels correlate with body fat and with future health risks, thus high BMI predicts future morbidity and death. Therefore, the CDC concludes that the BMI is an appropriate measure for screening for obesity and its health risks. According to Romero-Corral et al (2008) Body mass index (BMI) is the most widely used measure to diagnose obesity. They went on to test its usefulness and concluded that the accuracy of BMI in diagnosing obesity is limited, particularly for individuals in the intermediate BMI ranges, in men and in the elderly. Within the current study the BMI measure was applied as indeed it is the most frequently cited measure of weight in the literature and thus makes for ease of comparisons with other population groups e.g. SLAN, other studies on college students. Within the present study the BMI measure was calculated from weight and height measures that were obtained at data collection. Although cognisance is given to the fact that criticisms of this tool exists, it was felt that within the current study’s population who were predominantly female young adults, it was the most appropriate tool to utilise.

Food Pyramid
The food pyramid (DoH&C, 2005) was adapted and utilised as a measuring tool to assess how closely participant’s food intake met that of national recommendations (see Appendix 4.6). It was felt that this would make it possible to establish direct
comparisons as to actual intake and recommended intake within the analysis phase and make for a visually attractive easy to interpret representation of food intake within each food group. Permission to utilise the tool was granted (see Appendix 4.7.5.). Although the use of the food pyramid’s depiction as a guide to how to consume a healthy diet is well established within the national literature, this is the first time it has being utilised as a data collection tool. As stated above the rationale for this was that individuals are familiar with this tool and it also lays out examples of the various food groups. It was anticipated that this would assist participants in recalling food eaten. Also it was felt that the data obtained would be more readily comparable to recommendations and thus analysis of intake in comparison to recommendations would make for more meaningful results. The use of this tool was piloted prior to the main study and no adjustments were necessary as pilot participants indicated that they readily understood what the tool was requesting.

**Eating Behaviours**
General eating behaviours in the form of what participants ate for breakfast, lunch and dinner and what type of snacks they ate were also examined utilising questions from SLAN, 2007. This section also addressed whether or not participants wished to lose weight and if so what strategies were they most likely to utilise to achieve this weight loss aim.

**Stages of Change, Self-efficacy and Social Support for Healthy Eating.**
Stages of change, self-efficacy and social support for healthy eating were also measured in respect of healthy eating utilising the tools already described in the previous section under physical activity.
Psychological Well Being
Section 5 of the questionnaire dealt with psychological well-being. Here, psychological well-being was measured using a scale entitled WHO (five) Well-Being index (Bech et al., 1996). The tool was chosen for its brevity and ease of administration. The questionnaire already contained a large number of questions on healthy eating and physical activity and the concern was that respondents may be reluctant to also complete a detailed set of questions on psychological well-being. The scale requests participants to rate their feelings over the past two weeks in five areas. The five items included in the WHO-5 cover positive mood (good spirits, relaxation), vitality (being active and waking up fresh and rested), and general interests (being interested in things) (Bech and Wermuth, 1998; Beck et al., 2001). Each of the five items is rated on a 6-point Likert scale from 0 (= not present) to 5 (= constantly present). Thus, higher scores indicate better well-being. The WHO 5 Well Being Index was utilised to assess psychological well-being pre intervention, post intervention and at follow up. In interpreting the WHO 5 index, each raw score can be multiplied by 4 to get a score out of a 100. According to Bech et al. (2003), general populations have indicated that the mean score of WHO 5 is around 70/100 or 17/25 in raw scores. Bech (2004) states that the WHO 5 is a one-dimensional scale for the measurement of positive psychological well-being. A raw score below 13 indicates poor wellbeing and is an indication for testing for depression under ICD-10 (International Classification of Diseases). According to Bech (2004) the WHO 5 has been shown to have a high degree of acceptability and applicability in a large European study in people with diabetes. Henkel et al. (2003) performed a validity test on the WHO 5 index as a screening test for depression in primary care and found that, compared to other well utilised items such as the general health questionnaire, the WHO 5 index showed a sensitivity of 93% and a specificity of 64%. The first version
of the psychological well-being index had 28 items. According to Bech (1997), psychometric analysis of the WHO well-being index isolated five items, the sum of which was a sufficient measure of the dimension of positive psychological well-being. Bech (2004) concludes that the WHO 5 is a user friendly short scale for the measurement of positive psychological well-being. He goes on to say that its psychometric properties are acceptable both when used as a screening instrument for depression and when used to measure quality of life in different populations.

**GP Core**
The GP Core (Clinical Outcomes in Routine Evaluation) 14 was utilised at follow up only in an attempt to provide some comparison reliability, as during preliminary analysis it became apparent that poor psychological well-being was prevalent among this sample population. Thus, the GP core was added into the third data collection episode simply as another means of assessing psychological well-being at that point and also as a means of establishing comparison validity to the WHO 5 index score. The GP core is a 14 item tool which asks participants to rate how they have felt over the past week. Examples of options include “I have felt tense, nervous and anxious”; I have felt able to cope” etc. Sinclair et al (2005) point out that this measure is “copy left” meaning that it is free to use by users in practice or research. Sinclair et al. (2005) tested the use of the GP – CORE with a group of students. Analyses showed this measure to have good reliability to distinguish between clinical and non-clinical populations. Sinclair et al. (2005) concluded that overall, this measure showed good reliability and showed convergent validly against longer measures. Unlike the other tools within this study, this was not pilot tested as it was not included in the study until the follow up study.
4.7.2 Qualitative Data Collection Methods

Focus Groups:
Data was also collected in the form of a focus group with a subset of the intervention group following the end of the module to ascertain qualitative data on their views of the module content and process. According to Barry and Jenkins (2007), process evaluation is critical to the validity of programme evaluations. Firstly, it allows the researcher to make confident connections between programme and outcomes (internal validity) and secondly it allows for replicating interventions in other settings (external validity). Thirdly, it assists in determining how or why a programme works (construct validity) and fourthly it allows for variability in implementation (introduces error variance that reduces the power of statistical analysis (statistical conclusion validity). Within the initial “study information letter, (Appendix 4.4.) potential participants were informed that there was a possibility that they may be selected to take part in this focus group. Thus, participants for inclusion were recruited at the end of the module on a voluntary basis. Generally, the strategy of over recruitment is promoted, as often people may not attend (Webb 2002). This proved unnecessary in this case in that, thirteen participants turned up for the focus group which made for a rather large focus group, however a decision was made to include all thirteen participants so as to acknowledge and not discourage such enthusiastic participation.

According to Branigan and Mitchell (2003), if focus groups are to retain their reputation as a reliable and valid method for evaluation, there must be thorough planning, skilled moderation and rigorous analysis. Thus, a topic guide was prepared in advance to ensure all pertinent areas would be covered (see Appendix 4.9.2). Also a skilled researcher and experienced moderator facilitated the focus group. Thematic content analysis took place aided by NVIVO. In order to ensure validity and reliability throughout the process, cognisance was paid to possible potential pitfalls within the
focus group method. Branigan and Mitchell (2003) outline possible problems with this method such as the existence of power differentials whereby the views of subordinates may be muted by the opinions of the dominant. In this instant it was important that the module leader/researcher did not take part in the focus group. It was anticipated that participants would then be freer to evaluate the module more honestly and not be concerned about offending the module leader who is also the researcher. Also this arrangement may have helped to avoid another potential problem with this method, that of social desirability responses whereby, participants feel they need to tell the researcher what they want to hear. Although these steps were put in place, both the facilitator and the moderator were also lecturers and thus could be seen to have power over the participants also. Another potential problem outlined by Braningan and Mitchell (2005) is where extroverts in the group may dominate. Within this focus group, there were a number of outspoken individuals however there was also a very skilled facilitator who was able to manage the group to ensure maximum participation from all involved.

**Rigor of the Qualitative Element of the Research Process**

Within qualitative data collection, it is much more difficult to establish validity and reliability than it is with the use of quantitative data collection tools. Thus researchers endeavour to be as rigorous as possible to ensure that the study is conducted as objectively as possible with minimum bias. In an effort to achieve rigour (trustworthiness) in a qualitative study, the researcher must uphold three criteria which are credibility, dependability and transferability. Firstly, a qualitative study can be said to be credible when it presents such faithful description or interpretations of a human experience, that the people having that experience would recognise it as their own (Lincoln and Guba, 1989). One strategy for enhancing credibility of a study is
that of “external/expert checks”. This is where, when the researcher is generating themes and categories, they can enhance the validity of the categories by enlisting the help of another researcher (independent analysis) or an expert (to check perceived credibility of categories) (Burnard, 1991). Within the present study, the researcher enlisted the help of a colleague who recently completed a PHD in a similar field to view themes generated to ascertain whether she felt such themes were credible based on the focus group transcript. A mixed methods approach as was utilised within the present study is another means of enhancing credibility in that data from a variety of sources arriving at similar conclusions can help to confirm data (Holloway and Wheeler 2002).

In order to enhance dependability of a study, it is recommended that the researcher leave an ‘audit trail’ so that the pathway of decisions made in the data analysis can be checked by another researcher (Guba and Lincoln, 1989). Through the use of NVIVO, it is possible to follow the path the generation of themes went through from the original transcript, where original themes were condensed or integrated etc. This makes it possible to trace the data analysis process from its inception to its synthesis. Reflexivity is another dimension of dependability, this is where the active acknowledgement by the researcher that own perceptions, experiences, actions and decisions will impact on the meaning and context of the phenomenon under investigation (Koch, 1998). As the researcher was also the module leader it was very difficult, if not impossible to remain completely objective, however cognisance was taken of the risk of researcher bias and lack of objectivity being a threat to the rigor of the focus group and attempts were made, at all times to report both positive and negative contributions to the focus group. All of the above steps attempted to ensure that the focus group was conducted and analysed as rigorously as possible.
4.8 Data Collection Process

4.8.1 Data Collection Process - Quantitative
The first phase of data collection took place January 2009. Data collection took the form of respective groups of students completing a written questionnaire (see Appendix 4.6) about their health behaviours in the classroom setting during a timetabled slot. During this time, the clinical skills team members were on hand to record the objective measures of Blood Pressure, Pulse, Height, Weight and BMI. The data emanating from these sessions formed the baseline pre-intervention data. The data collection process took approximately forty five minutes in total. Thus it was pre-arranged with the coordinators of the different programmes to be timetabled for a one hour slot at the various data collection times. This worked reasonably well initially, however; attendance fell off during the second and third data collection phases. The second phase of data collection took place in April 2009 immediately following the completion of the health and well-being module. The same process for collecting data was followed. Attendance at data collection had reduced from pre-intervention. Numerous attempts were made to maintain sample numbers. The third and final data collection phase took place in January 2010, a year following the commencement of the Health and Well-being Module.

4.8.2 Data Collection Process - Qualitative

Focus Group
The focus group was facilitated by an experienced researcher who up until this point had not being involved in the study. A moderator was also present and compiled field
notes which included a seating diagram. The focus group was guided by a topic guide designed for the purpose of the study (see Appendix 4.9.2). At the outset, psychological safety was assured by outlining ground rules for the focus group process (see Appendix 4.9.3). Participants were then provided with the aim of the research study and a recap of module content to remind students of what was covered (see Appendix 4.9.1). Then, questions outlined in the topic guide were posed to stimulate debate. The topic guide was utilized to explore whether participants felt some content was more enjoyable and/or beneficial than other content. It also explored whether participants felt comfortable with the process and explored whether participants felt that the module had improved their health lifestyles or not as the case may be. It also sought participants’ views on how the college could contribute to promoting healthy lifestyles for its student population. The focus group interview was audio taped with permission from the participants. Tapes will remain in a locked cabinet for a period of one year following the end of the study to allow for analysis, after which time they will be destroyed.

4.9. Challenges of Data Collection
As previously stated as the study progressed it became increasingly more difficult to access participants to complete questionnaires and record physiological measures. Despite being timetabled for data collection with both groups, attendance fell off, as is a common phenomenon in research that requires a number of data collection episodes over a period of time from the same group of people. Thus the sample decreased from pre-intervention to post intervention and again at follow up. It was necessary for the researcher to become more innovative to maintain sample size. Thus, following the timetabled slot for data collection the researcher checked ID numbers with those of the first data collection period and was able to ascertain what participants were missing.
The researcher contacted these participants by email initially and then by text if no response. The researcher organised extra data collection opportunities at various times suitable to the students’ timetables, lunchtimes etc. The researcher was at all times careful not to harass and reminded students of the voluntary participation principle (see Appendix 4.10 for extract of email sent 25\textsuperscript{th} April following the 2\textsuperscript{nd} data collection episode). Despite providing many additional opportunities for data collection the attrition rate increased between each stage of data collection (see table 4.2. below.) This raised concerns that the study remained adequately powered. Thus between post intervention and follow up, a statistician from the statistical consulting unit, Limerick was consulted to determine if the study remained adequately powered. The statistician was supplied with provisional results from pre intervention and post intervention data collection episodes. Feedback from the statistician was that the study remained adequately powered as long as it had a minimum of thirty participants per group. (See Appendix 4.1 for correspondence with Jean Saunders Statistical Consulting Unit, Limerick). Thus the researcher was reassured that numbers were still adequately powered despite attrition rates.

### Table 4.2. Response Rate:

<table>
<thead>
<tr>
<th>Response rate</th>
<th>T1 (Jan 09)</th>
<th>T2 (April 09)</th>
<th>T3 (Jan 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>49</td>
<td>44</td>
<td>33</td>
</tr>
<tr>
<td>Comparison</td>
<td>46</td>
<td>38</td>
<td>29</td>
</tr>
</tbody>
</table>
4.10 Ethical Concerns
The upholding of ethical principles is crucial throughout the research process. These include autonomy, nonmaleficence, beneficence, justice, veracity, privacy, anonymity and confidentiality. For the purpose of the current study, only the ethical principles relevant to this study will be addressed.

Autonomy – respondents were facilitated to decide of their own free will whether they wished to participate in the study or not. All respondents were informed that they could withdraw from the study at any stage without penalty.

Beneficence – Potential benefits to respondents from participating in this study were increased health awareness and potentially improved health outcomes.

Veracity – Obligation to tell the truth. Respondents were informed about the purpose of the study, and given all relevant information about the study.

Privacy – The right to privacy stresses that an individual has a right to determine which private information can be shared with others. Private information can include attitudes, opinions and in this case personal health behaviours or health status indicators. For this reason the researcher treated all data collected with the strictest confidence. Respondent names did not appear anywhere on the questionnaire as they were coded numerically. However it was necessary for the researcher to be able to link respondents questionnaires between phases and thus respondents were issued a numerical code at the outset of the first data collection phase and asked to maintain this code for the duration of the study.
**Anonymity and confidentiality** – Based on the right to privacy, respondents have the right to anonymity and confidentiality. In the proposed study respondents remained anonymous to all involved apart from the researcher who collected and analysed the data. Also, respondents’ identity will remain anonymous in all subsequent publications. All records containing data will be retained for approximately five years to facilitate dissemination of findings. All data relevant to this study is stored in a locked cabinet. Data stored on computer is pass word protected and only the researchers will have access. All data is protected according to the Data Protection Acts of 1988 and 2003 which stipulate rules about safeguarding the privacy of personal data.

**Nonmaleficence** - The likelihood of this study causing mental stress was unlikely but possible. The completion of the questionnaires whereby participants were asked to identify their weight and eating behaviours may have been a potential stress for some respondents who have had or have a tendency towards an eating disorder or be particularly over or under weight. In fact, one candidate chose not to participate in the data collection due to her reluctance to partake in body weight calculations and the mental distress this would cause her. The particular student engaged fully in the module but did not take part in the data collection process. The researcher also remained alert to the potential for psychological distress arising for participants. The exploration of psychological well-being either through questionnaires or workshops could potentially lead to distress in those who were psychologically vulnerable at that time. In anticipation of any such distress occurring, the researcher dealt with this as planned, in that she firstly acknowledged the potential for this to occur when introducing the psychological well-being workshop and provided details of college counselling services which participants could avail of if needed. Ground rules with the
aim of maintaining psychological safety were also set and abided by at the beginning of each workshop (see Appendix 3.7).

4. 11 Data Analysis
Both descriptive and inferential statistics were utilised in analysing the data emanating from the health behaviours questionnaire (appendix 4.6). Section 1 of the questionnaire was dedicated to demographic information and general health measures. Descriptive and inferential statistics were utilised to compare demographics between groups and to compare general health indicators such as perception of current health status, smoking and alcohol intake. This information was presented in bar charts which allowed comparisons to be drawn within groups and between groups. Sections 2, 3 and 4 dealt with physical activity, healthy eating, and psychological well-being respectively and contained a mixture of numerical scores data and categorical data. The software package SPSS (Statistical Package for the Social Sciences) was utilised to assist in analysing the data. Initially the data was examined for missing data and a plan to handle such data put in place (see below).

Numerical Data
As it became clear that not all numerical data was normally distributed, the Kolmogrov-Smirnov test was applied to test for normal distribution. Subsequently all numerical data that was normally distributed was subjected to t testing. Initially independent t tests were carried out to ascertain difference within intervention and comparison groups and subsequently paired t tests were carried out to ascertain differences within groups between two different time points (e.g. T1 and T2). Analysis of variance (ANOVA) was also performed in the form of one way ANOVA’s to ascertain how scores varied within group’s at all three time points. Mixed between within ANOVA testing was also performed to ascertain how scores varied between
groups and within groups over time. This provided information on whether there was a significant interaction effect in one group over the other. Numerical data that were not normally distributed were subjected to the Friedman test which is the non-parametric equivalent of the one way ANOVA and is used to measure a sample at three or more points in time. The Wilcoxon signed rank test was also utilised and is the non-parametric alternative to the repeated t test measure and designed for use with repeated measures of non-normally distributed numerical data. The Bonferroni correction was applied to guard against the possibility of an increased Type 1 error in view of the non-normally distributed data and the use of non-parametric tests compared to their more scientifically respected parametric counterparts.

**Categorical Data**
Chi square testing was utilised with categorical data such as the stages of change. The Chi square test is intended to test how likely it is that an observed distribution is due to chance. It measures how well the observed distribution of data fit with the expected distribution. Following the main data analysis, a number of variables were tested for interrelatedness via the Pearson correlation test. The Pearson correlation test examines whether two continuous variables (e.g. PA and BMI) exhibit linear correlation and it provides information of both the strength and the direction of the relationship. NVivo was used to assist with the thematic analysis in order to establish themes and categories from the focus group interview.

**Handling Missing Data**
When dealing with human beings it is inevitable that episodes of missing data will occur particularly in the case of the present study where data is collected over three time periods. Thus the researcher needs to have a plan to deal with such missing data. In the case of this particular study, on some occasions those who complete T1 and T2
may be missing for T3. Also a participant may complete data collection at all three
time periods but may miss some questions on the questionnaire.

Following all data collection, descriptive statistics are utilised to inspect the data for
missing variables to ascertain if any patterns exist requiring further investigation.

Different ways of dealing with missing data are available and the researcher explored
the options and developed a strategy for this particular study. The options button in
SPSS offers choices for dealing with missing data. There is an option to “exclude
cases list wise”. This option allows one to include cases in the analysis only if there
is full data on all variables listed in the variables box for that case at all three time
points. This option was rejected as it was felt that it would severely limit the sample
size. An alternative option is the “exclude cases pairwise option” which excludes the
case (person) only if that case is missing the data required for the specific analysis of
that particular variable. The case will still be included in any of the analysis for which
it has the necessary information. Thus this second option was selected for this study
as it appeared to be able to deal with the missing data in the most reasonably practical
way without affecting the sample size unduly. As a result, throughout the presentation
of findings, numbers (N) for some variables may vary due to missing data.

**Summary of Methodology:**
The evaluation of this intervention involved a mixed methods approach to evaluate the
impact, outcome and process of this intervention. The sample was made up of 110 first
year students from one particular college setting. Access to the sample was facilitated
by college president and course administrators. Ethical permission to carry out the
study was granted by NUI Galway ethics committee. Data was collected prior to the
intervention (delivery of the health and well-being module), after the intervention and
one year following the intervention. Data was analysed by SPSS and thematic content
analysis was utilised for focus group analysis.
CHAPTER FIVE
RESULTS

Introduction
Within this chapter findings of the study will be reported. Firstly a description of the sample will be given; this will be followed by a summary of descriptive data on general health measures. As previously stated process, impact and outcome of the intervention is evaluated. Firstly, process findings will be presented on in the form of qualitative data from the focus group. This will be followed by a presentation of impact and outcome evaluation of the study from a quantitative perspective. Within the quantitative section, data in the three main areas namely physical activity, healthy eating and psychological well-being will be presented sequentially.

5.1 Description of Sample
The study population was made up of 110 first year undergraduate students in a rural Irish college setting. This total study population was made up of students from two separate courses, i.e. the Bachelor of Nursing Science (BNSC) and the Bachelor of Education in Home Economics (B.ED). The BNSC group became the intervention group and the B.ED group served as the comparison group.

Response Rate
Overall 86.36% (95/110) of the valid sample took part in data collection at T1 (pre intervention). The response rate at post intervention (T2) was reduced to 74.54% (82/110) and dropped further to 56.36% (62/110) at follow up (T3). For a breakdown of the response rate per group see table 5.1. It is acknowledged that the response rate dropped off significantly at T3 (follow up). However, numerous attempts at preventing this are outlined within the methodology chapter.
Table 5.1 Response Rate:

<table>
<thead>
<tr>
<th>Response rate</th>
<th>T2 (Jan 09)</th>
<th>T2 (April 09)</th>
<th>T3 (Jan 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>86.36% (N=95)</td>
<td>74.54% (N=82)</td>
<td>56.36% (N=62)</td>
</tr>
<tr>
<td>Intervention</td>
<td>49</td>
<td>44</td>
<td>33</td>
</tr>
<tr>
<td>Comparison</td>
<td>46</td>
<td>38</td>
<td>29</td>
</tr>
</tbody>
</table>

Demographics Within Groups

Nationality
85.7% of the intervention group were Irish, 10.2% of U.K origin and 4.08% were of another nationality. 95.6% of comparison group were of Irish nationality, while 2.2% were of U.K and a further 2.2% of other origin.

Marital Status
81.3% of the intervention group were single, while 18.8% were either married or cohabiting. On the other hand 100% of the comparison group were single.

Significance values from marital status categories were tested using chi square test for independence, this test revealed a significant variation in marital status between groups ($X^2 = .315$, df =2, \( p = .010 \)). This may be explained by the large number of mature students that are on the nursing degree programme. There is a particular government initiative whereby when recruiting for this programme a certain quota is reserved for mature students particularly within the Intellectual Disability (ID) programme. This is not the case for the Bachelor of Education in Home Economics (B.ED) programme which traditionally is predominantly made up of school leavers.

Number of those with dependents
31.7% of the intervention group had either one or more dependants while 100% of those who responded to this question in the comparison group had no dependents.

On independent t testing this was significant ($t (68) = 4.01, p=.000$) with a large effect size of .19.
Monthly Income
There was considerable variation in the mean of both groups in terms of average monthly income (1,602 euro in intervention group and 344 euro in comparison group.) This is a reflection of the much higher number of mature students on the BNSC programme as opposed to the B.ED programme. Thus for comparison purposes the median instead of the mean will be used in a situation like this where there is not a normal distribution. Thus the median monthly income was 385 euro in the intervention group and 300 euro in the comparison group. A Mann Whitney U test revealed no significant difference between monthly incomes of the intervention group (Md=42.38, n=40) and the comparison group (Md=35.37, n=37) (U=605, z=-1.38, p=.167).

Hours in Part Time Employment
As can be seen from above the average number of hours spent in part time employment was 8.34 for the intervention group and 4.32 for the comparison group. There was found to be a statistically significant difference between both groups.

Intervention (M=8.34, SD= 6.04) comparison group (M=4.32, SD=4.7) (t (71) =3.16, p=.002) with a moderate effect size of 0.12.

Socio Economic Status Based on Parents Occupation
Intervention group
As can be seen from Table 5.3, more of the comparison group were from social class 1 and 2 than the intervention group; there was also more of the intervention group in SC3 and SC 4 than the comparison group. When a chi square test for independence was conducted on the breakdown of social class groupings, there was a significant difference in socio economic status based on fathers occupation with more of the intervention group falling in to social classes 3,4,5 than the comparison group (X² =15.65,df = 3 p=.001).
Educational Attainment
For the purpose of classifying educational attainment, educational attainment descriptors were based on those of SLAN, 2007. Thus, as can be seen from Table 5.2 below, parents of the comparison group had overall higher educational qualifications than parents of the intervention group. When a chi square test for independence was conducted on the educational level of participants parents, there was a significant difference with more of the comparison groups parents having higher educational qualifications that those of the intervention group ($X^2=9.34$, df=3, $p=.025$).

<table>
<thead>
<tr>
<th>Education level</th>
<th>Intervention</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary/Group Cert. ED1</td>
<td>30.4% (N=14)</td>
<td>15.6% (N=7)</td>
</tr>
<tr>
<td>Leaving Cert. ED.2</td>
<td>52.2% (N=24)</td>
<td>35.6% (N=16)</td>
</tr>
<tr>
<td>Third Level ED3.</td>
<td>17.3% (N=8)</td>
<td>48.9% (N=22)</td>
</tr>
</tbody>
</table>

Gender
The intervention group was made up of 44 females and 5 males. The comparison group was made up of 45 females and 1 male ($X^2=1.34$, df=1, $p=.246$).

Age
The age range within the intervention group was from 17-43 with a mean of 22.08, median of 19 and a mode of 18. On the other hand the age range in the comparison group was 17-28 with a mean of 18.7, median of 18 and mode of 18. On $t$ testing, there was a significant difference in the mean age of participants in both groups ($t$ (92) =3.39, $p=.001$).
Course Area
The intervention group was made up of 49 participants, 29 from the BNSC general programme and 20 from the BNSC Intellectual Disability programme. The comparison group was made up of 46 B.ED students (see table 5.3 for summary of demographics).

Table 5.3: Summary of Demographics

<table>
<thead>
<tr>
<th>Group</th>
<th>Intervention Group</th>
<th>Comparison Group</th>
<th>Results of Significance testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationality</td>
<td>Ireland =42</td>
<td>Ireland =43</td>
<td>Non Significant (p=.179)</td>
</tr>
<tr>
<td></td>
<td>UK = 5</td>
<td>UK = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other = 2</td>
<td>Other = 1</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single= 39</td>
<td>Single= 44</td>
<td>(X^2 = .315, p = .010)</td>
</tr>
<tr>
<td></td>
<td>Co Habiting= 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Married = 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of those with dependants</td>
<td>Yes = 13</td>
<td>Yes = 0</td>
<td>Significant (T= 4.01, p=.000)</td>
</tr>
<tr>
<td></td>
<td>No – 28</td>
<td>No - 29</td>
<td></td>
</tr>
<tr>
<td>Average Monthly Income</td>
<td>Mean= 1602</td>
<td>Mean= 344.05</td>
<td>Non Significant</td>
</tr>
<tr>
<td></td>
<td>Median= 385</td>
<td>Median= 300</td>
<td>Mann Whitney U test ((U = 605, z=-1.38, p=.167))</td>
</tr>
<tr>
<td></td>
<td>Mode= 200</td>
<td>Mode= 300</td>
<td></td>
</tr>
<tr>
<td>Average number of hours in part time employment</td>
<td>8.3 hours</td>
<td>4.32 hours</td>
<td>Significant (t=3.16, p=.002)</td>
</tr>
</tbody>
</table>

\(^1\)Socio economic grouping based on Fathers occupation

\(^1\)Social class classification based on those used in SLAN, 2008. i.e., SC1 and 2 =Managers and Professionals, SC 3 and 4 = Clerical, administrative and skilled manual, SC 5 and 6= Semi-skilled and unskilled manual.

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<table>
<thead>
<tr>
<th></th>
<th>SC5&amp;6=46.8%</th>
<th>5&amp;6 = 51.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/C=42.6%</td>
<td>N/C= 11.1%</td>
</tr>
<tr>
<td>Parents level of education(^2)</td>
<td>ED 1= 30.4% (n=14)</td>
<td>ED 1= 15.6% (n=7)</td>
</tr>
<tr>
<td></td>
<td>ED 2= 50% (n=23)</td>
<td>ED 2= 35.6%(n=16)</td>
</tr>
<tr>
<td></td>
<td>ED 3= 19.53% (n=9)</td>
<td>ED 3= 48.9%(n=22)</td>
</tr>
<tr>
<td>Gender</td>
<td>Female = 44</td>
<td>Female = 45</td>
</tr>
<tr>
<td></td>
<td>Male = 5</td>
<td>Male = 1</td>
</tr>
<tr>
<td></td>
<td>N=49</td>
<td>N=49</td>
</tr>
<tr>
<td>Gender</td>
<td>Female = 45</td>
<td>Female = 45</td>
</tr>
<tr>
<td></td>
<td>Male = 1</td>
<td>Male = 1</td>
</tr>
<tr>
<td></td>
<td>N=49</td>
<td>N=49</td>
</tr>
<tr>
<td>Age</td>
<td>Ranged from 17-43</td>
<td>Ranged from 17-28</td>
</tr>
<tr>
<td></td>
<td>Mean age of 22.08</td>
<td>Mean age of 18.7</td>
</tr>
<tr>
<td></td>
<td>Mode = 18</td>
<td>Mode = 18</td>
</tr>
<tr>
<td>Age</td>
<td>Ranged from 17-28</td>
<td>Ranged from 17-28</td>
</tr>
<tr>
<td></td>
<td>Mean age of 18.7</td>
<td>Mean age of 18.7</td>
</tr>
<tr>
<td></td>
<td>Mode = 18</td>
<td>Mode = 18</td>
</tr>
<tr>
<td>Course area</td>
<td>BNSC (Gen) = 29</td>
<td>B.Ed = 46</td>
</tr>
<tr>
<td></td>
<td>BNSC (ID) = 20</td>
<td>N=46</td>
</tr>
<tr>
<td></td>
<td>N=49</td>
<td>N=46</td>
</tr>
<tr>
<td></td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>(X^2 =9.34, \ p=.025)</td>
<td>(T=3.39, \ p=.001)</td>
</tr>
</tbody>
</table>

**Summary of Samples’ Demographics**

In summary, although both the intervention and comparison groups were first year undergraduate students in the same college, there were significant differences between groups in a number of areas. Firstly, significant differences were present in the area of age and marital status, number of dependents and average weekly hours spent in part time employment. Although the most frequently occurring age in both groups was 18, there were significantly more mature people in the intervention group. This may be attributed to the large numbers of mature people applying for the nursing degree as

\(^2\) Educational classifications based on descriptors according to SLAN, 2007: ( ED1 = Primary/Group Cert: ED2 = Leaving Cert: ED3= Third Level)
there are a number of places reserved for mature students in the recruitment process. Thus, the number of mature students within the intervention group may also account for the differences in marital status, number of dependents and time spent in part time employment. A number of students within the intervention group may also be supporting dependents.

5.2 General Health Measures
As well as focusing specifically on physical activity, healthy eating and psychological well-being. The study also applied general health measures in comparing the intervention and the comparison group. These general health indicators were measured by utilising questions contained within the SLAN, 2007 survey (see table 5.4 below). Permission was sought and granted for use of same. (See Appendix 4.7.1). Analysis of these general health measures will be presented in order of their appearance within table 5.4. Mainly descriptive statistics are utilised within this section to describe general health measures; however where possible inferential statistics are also utilised.

| Table 5.4 | General Health Measures |
| Questions Related to General Health Measures: Section 1 of Questionnaire |
| Rating of general health form poor to excellent |
| Selection of options for participants to choose from in order to have better health e.g. less stress (participants were asked to tick any option that applied out of a possible list of 15) |
| Selection of options for participants to choose from which they perceive prevent improvements in health e.g. lack of time (participants were asked to tick any option that applied out of a possible list of 7) |
| Smoking Status |
| Alcohol Intake |
| Self-perceptions of adequacy of current level of exercise |
| Self-perceptions of current diet and eating habits |
5.2.1 Participants Rating of their Health Status
As can be seen from figures 5.1 and 5.2 below there was a progressive rise in those who perceived their health as very good in both groups over the course of the study. Similarly there was a progressive increase in those in the intervention group who perceived their health as good from T1 to T3; however within the comparison group, after an initial increase from T1 to T2, there was a decrease between T2 and T3 within this category. There was also a progressive decrease from T1 to T3 in those in the intervention group considering their health as fair. This also decreased within the comparison group from T1 to T2 but increased again at T3. A small percentage of the comparison group considered their health as poor at T2. On chi square testing no significance was found between groups’ self-rating of health status across all three data collection episodes.

Figure 5.1 Participants rating of their health status at pre post and follow up: Intervention group
5.2.2 Requirements for Better Health
Here participants were asked to select from fifteen different options as to what they considered would help them to have better health e.g. less stress. They could tick as many options as they wished and there was no ranking system involved. It is important to point out that the following descriptive data was obtained from participants selecting from a number of options without prioritising. Thus for the purpose of analysis the numbers of times an option was selected was calculated and based on this information it was possible to distinguish what options participants selected most frequently. Therefore, what is presented in figures 5.3 and 5.4 is the five most frequently cited options per group. Although it was not possible to do statistical testing on this descriptive data, it is possible to see trends of similar patterns across groups. More time to exercise, more will power and change of weight were the top three areas cited by the intervention group as requirements for better health across all three data collection episodes. Less stress and more regular checks from the GP were the fourth and fifth area more frequently cited. Similarly the comparison group also had more time to exercise and more will power as their first and second most frequently selected options. However less stress featured as their third most frequently cited area for
health improvement across all three data collection episodes. Change in weight and more regular checks from the GP were the fourth and fifth areas more frequently cited within this group.

Figure 5.3: Requirements for better health at pre post and follow up.

**Intervention group:**

![Bar chart showing requirements for better health at pre post and follow up for the intervention group.]

Figure 5.4: Requirements for better health at pre post and follow up.

**Comparison group:**

![Bar chart showing requirements for better health at pre post and follow up for the comparison group.]

5.2.3 Prevents Improvements in Health

When participants were asked to select from a possible list of seven items which may prevent them making improvements in their health, the intervention group selected,
lack of time, feel no need and lack of facilities as the three most important factors overall across data collection time periods (figure 5.5). Similarly within the comparison group, lack of time, lack of facilities and feel no need were also the most important factors that prevented them from improving their health (figure 5.6). Financial problems and lack of information also featured strongly in both groups with lack of support as the seventh most relevant factor.

Figure 5.5 What prevents improvements in health:

Intervention group.

![Intervention group chart](image)

Figure 5.6. What prevents improvements in health:

Comparison group

![Comparison group chart](image)
### 5.2.4 Percentages of sample who smoke at pre, post and follow up

As can be seen from figure 5.7, at the outset considerably more of the intervention group (34.1%) were smokers compared to the comparison group (9.1%). Post intervention there was a reduction in smoking in the intervention group to 25.6% and a small increase in the comparison group to 13.5%. By follow up, percentages of those smoking in the intervention group increased again, but was still lower than that at pre intervention, whereas only 3.7% of the comparison group were smokers at follow up, even less than at pre intervention. A chi square test for significance was carried out which revealed a statistically significant difference in groups at T1 and T3 but not at T2 (T1= chi=.010; T2= chi = .287; T3= chi =.018). Although it is evident that there were higher levels of smokers in the intervention group, the changes reflected above must be considered in the context of the reduction in the response rate at post intervention and follow up. Thus, within the comparison group in particular, the apparent reduction in smokers may be due to original smokers dropping out of the study as opposed to actual changed behaviours.

**Figure 5.7: Percentages of sample who smoke**
5.2.5 Average Units of Alcohol Consumed on a Weekly Basis
As depicted within figure 5.8, the mean units of alcohol consumed per week by participants within the intervention group was 6.15 at pre intervention, 5.8 at post intervention and 5.18 at follow up. The mean units of alcohol consumed in the comparison group were 8.03 at pre intervention, 9.7 at post intervention and 7.9 at follow up. Although the comparison group appear to consume more alcohol than the intervention group, both groups were well below the recommended maximum of 14 units per week for women and 21 units for men. A Pearson test for correlation revealed no statistically significant difference in units of alcohol consumed per group.

Figure 5.8 Units of Alcohol Consumed per week

5.2.6 Self-Perceptions of Current Exercise levels
A small percentage in both groups considered they were taking enough exercise pre intervention (8.9% in intervention group and 6.8% in comparison group). At post intervention this increased in the intervention group to 15.9% and decreased in the comparison group to 5.4%. By follow up 18.2% of the intervention group considered they were getting enough exercise compared to 10% of the comparison group. Those who felt they should be taking a little more exercise in the intervention group remained reasonably stable across all three time periods ranging from 33.3% to 38.6% (see table 5.9). In the comparison group percentages increased from 27.3% to 48.6%
between pre and post intervention. It reduced to 30% at follow up. The percentage
who considered they should be taking a lot more exercise reduced from 57.8% at pre
intervention to 45.5% at post intervention and remained stable at follow up. While in
the comparison group 63.6% felt they should be taking a lot more exercise at pre
intervention, this decreased to 45.9% at post intervention and increased to 60% at
follow up (see table 5.10). On chi square testing no significance was found between
groups’ self-perceptions of current levels of exercise across all three data collection
episodes.

Fig. 5.9. Self-perceptions of Current Exercise Levels within Intervention group.

Fig. 5.10 Self perceptions of Current Exercise Levels within Comparison group.
5.2.7 Self Perceptions of Current Eating Habits
As can be seen from figures 5.11 and 5.12, a small percentage in both groups considered that their diet was about right at pre intervention. At post intervention this increased slightly in the intervention group and to a lesser extent in the comparison group. By follow up 12.1% of the intervention group considered that their diet was about right compared to 23.3% of the comparison group. The percentage of those who felt that their diet should be a little better was 53.3% in the intervention group and 65.9% in the comparison group at pre intervention. At post intervention this increased to 72.1% in the intervention group and reduced slightly to 64.9% in the comparison group. By follow up 66.7% of the intervention group and 93.3% of the comparison group felt their diet could be a little better. 31.1% of the intervention group and 25% of the comparison group felt their diet should be a lot better at pre intervention. At post intervention this reduced to 14% in the intervention group and reduced slightly to 24.3% in the comparison group. By follow up 21.2% of the intervention group and 6.7% of the comparison group considered their diet should be a lot better. On chi square testing no significance was found between groups’ self-perceptions of current diet and eating habits across all three data collection episodes.

Figure 5.11: Self-Perceptions of Current Diet and Eating Habits within the Intervention group.
Summary of General Health Perceptions
When participants were asked to rate their overall health from poor to excellent, the majority of the sample rated their health as good or very good with few rating it as poor or excellent. No significance was found between groups’ self-rating of health status across all three data collection episodes. When participants were asked what they felt they needed for better health, more time to exercise, more will power and change of weight were the top three areas cited by the intervention group. Similarly, the comparison group also cited more time to exercise and more will power as their first and second choice, however less stress featured as their third most important requirement for health improvement. When participants were asked what they felt prevented them from making improvements in their health, overall, lack of time, felt no need and lack of facilities were the most important factors within both groups. Considerably more of the intervention group were smokers ranging from 34.1% to 25.6% to 31.3% from T1 to T3. By contrast within the comparison group 9.1% were smokers at T1, 13.5% at T2 to 3.7% at T3. There was a statistically significant difference between groups with regard to smoking behaviour at T1 and T3 but not at T2. Generally alcohol consumption was low with both groups being well below the
recommended maximum units per week. No statistically significant difference in alcohol consumption per group was revealed. When participants were asked to rate the adequacy of their current exercise levels, a small percentage in both groups considered they were taking enough exercise pre intervention. At post intervention this increased in the intervention group and decreased in the comparison group. By follow up 18.2% of the intervention group considered they were getting enough exercise compared to 10% of the comparison group. Those who felt they should be taking a little more exercise in the intervention group remained reasonably stable across all three time periods. Within the comparison group percentages increased between pre and post intervention and reduced at follow up. The percentage who considered they should be taking a lot more exercise reduced in the intervention group between pre and post intervention and remained stable at follow up. While in the comparison group, those who felt they should be taking a lot more exercise decreased from T1 to T2 and increased again at follow up. On chi square testing no significance difference was found between group’s self-perceptions’ of current levels of exercise across all three data collection episodes. When perceptions of current diet and eating habits were compared, on Chi square testing, no significant difference was found between groups.

5.3 Process Evaluation
In keeping with the mixed methods approach outlined within the introduction to this chapter, data was collected in the form of a focus group with a subset of the intervention group following the end of the module to ascertain participants’ views of the module content and process.

Focus Group
The aim of the focus group was to assist in evaluating the process of the intervention and its contribution to overall health and well-being. It was anticipated that this would provide an added dimension to the existing impact and outcome measures obtained
from the quantitative analysis. It was also felt that these qualitative findings would assist in illuminating the quantitative findings. Thirteen participants from the intervention group took part in the focus group. It lasted for sixty four minutes, was audio tape recorded and facilitated by an independent lecturer experienced in focus group interviewing. Thematic content analysis was performed on the data assisted by the NVIVO qualitative analysis package.

Analysis revealed eight themes, (see Figure 5.13 below). Most themes have a number of sub themes ranging from two to six. There were twenty five subthemes in total.

*Figure 5.13: Focus Group Themes*
Theme No. 1: Participant/Facilitator Relationship
Sub themes here included trusting relationship with facilitator, felt valued, positive perspective and individualised approach to group members (see figure 5.14 below).

Figure 5.14: Theme 1: Facilitator Participant Relationship

This theme describes the nature of the participant facilitator relationship which is characterised by trust, valuing, positivity and an individualised approach.

Trust based relationship with facilitator:
The trusting relationship built up between the facilitator and participants is reflected within the focus groups by virtue of what was said but also by the enthusiastic open participation of the participants involved. A participant commented that:

“The facilitator (name) did a great job of reassuring everybody that what was said in the room was going to be confidential and that nobody was there to judge anybody else”

(Participant No. 4)

The above comment is a reflection of the psychological safety that the facilitator set
out to achieve by the ground rules set at the beginning of the workshops and an essential prerequisite to building a trusting relationship between facilitator and participants.

**Felt valued:**
One of the key communication skills utilised within motivational interviewing is affirmation. Affirmations may be given by the facilitator but the spirit of MI is necessary to convey the sentiment of valuing of individuals in receipt of these affirmations (Miller and Rollnick, 2005). If done correctly, the participant experiences feeling affirmed. This is conveyed in some of the following examples:

“When we were in the groups it felt like everybody's opinion mattered. So it involved us all. I suppose we were encouraged to be involved” (Participant No. 7)

From the above it can be seen that participants felt valued, affirmed and encouraged within the GMI workshops.

**Individualised Approach:**
Also, although the motivational interviewing took place in groups, participants recounted feeling an individualised approach which appears to have contributed to their experience of being valued and affirmed. This is reflected in the below comment.

“I think it was great, the small groups, when you are doing the motivational interviewing stuff that when the lecturer focused on you and they really did help you and tell you how....they didn’t say just generally ‘oh she did this.’ They focused on you ..... So I think it was good how they paid attention to you, individuals. It wasn’t just to the whole group” (Participant No. 6).

**Positive Perspective**
Motivational interviewing conveys a positive perspective to the change process as opposed to traditional health promotion which has often been criticised for coming from a more negative victim blaming perspective (Rodmell & Watt, 1986) This non
victim blaming shift in mind-set facilitated through the MI workshops and also by the stages of change, where relapse is part of a process as opposed to failure is reflected in the following comments from participants:

“*There is no right or wrong with it........ if you were to have a lapse ............... it is not wrong because tomorrow is another day. Start again tomorrow*” (Participant No. 9)

This positive perspective also resulted in a non-judgemental attitudinal quality being conveyed and reciprocated within the GMI workshops and is reflected within the following:

“This’s not as if people would start talking ...people don't really care. Honestly I don't care what someone else eats and I’m not going to say....... I don't think anybody would have done that” (Participant No. 4)

From the above, there appears to be a positive approach to health behavioural change. This is in contrast to reluctance to attempt to make changes due to fear of failure and negative self-evaluation. This less positive approach has often being associated with traditional health education where failure to succeed in bringing about behavioural change is seen in a negative light and as a reflection of personal weakness and lack of commitment. It appears that through the group MI workshops, a more positive perspective is opening up for the participants which sees relapse as just another phase of the change process and a part of human nature and not a personal failing.
Theme No. 2: Participants Own the Change:
Subthemes here included autonomy and evocation (see figure 5.15 below).

*Figure 5.15: Theme 2: Participants Own the Change:*

This theme reflects the fact that participants themselves bring about the change and it is not imposed from without i.e. facilitator. The facilitator merely facilitates the participant to develop awareness and elicit any changes they want to make from within. Meanwhile overall control and responsibility for the change remains with the participants’ themselves.

**Autonomy**
This is where the responsibility for change is left with the client and the facilitator respects the client’s individual autonomy. Reflections of how the autonomous nature of each participant developed throughout the focus group is reflected below:

“You control what you put into your mouth. You own control of what you go into the shop and buy. So if you buy the bar of chocolate or you buy the orange, it is totally your decision.” (Participant No. 8)

**Evocation:**
According to Miller and Rollnick (2002), evocation implies that rather than imparting
things such as wisdom or insight to the client, the facilitator’s role is to elicit these strengths from the client themselves and draw them out. It requires finding intrinsic motivation for change within the client themselves and facilitating its expression. Thus, the facilitator’s role is to provide space for the participant to elicit their own change talk from within themselves as opposed to prescribed from the facilitator. This process of evocation is reflected below in examples where participants come up with their own change!

“I think it was maybe that you were talking out loud and you were probably listening to yourself rather than listening to somebody else telling you how to do it. That’s what I found” (Participant No. 9)

Thus, the change talk is evoked from within as opposed to be imposed from without. Therefore this theme reflects the fact that personal responsibility for the change lies firmly with the participant themselves and the facilitator at all times respects the participant’s autonomy for bringing about this change or not as the case may be.

**Theme 3: The Power of the Group**
Here, sub-themes included motivation, peer pressure and social support (see figure 5.16 below)

*Figure 5.16: Theme 3: The Power of the Group*
It appears that the effectiveness of motivational interviewing with a group setting can be attributed to the power of the group itself, the social support contained within that group and the motivation that the group provides all contributing to positive effects on health and well-being. The group itself appears to be a powerful component within the effectiveness of group motivational interviewing and is an important component in distinguishing this mode of delivery from others.

**Peer Pressure**
The power of the group in instigating health behavioural change, self-reflection and enhancing health awareness is evident in the following extracts. There also appears to be an element of peer support and to a certain extent pressure to fit in and examine own health practices when everyone else is doing it.

“It was more motivating. When you said it out in front of other people then they expected you...or you felt they expected you to do it then. So you feel you have to work at it yourself, which in a way encouraged you to do it as well” *(Participant No. 11)*

Thus from the above it appears that the group participants were influenced by each other and by the group itself. Aspects where the group made a difference are highlighted in the following comments.

“Because after the motivational interviewing I actually gave up smoking and I was smoking for 15 years,....... it sort of motivates you a bit more if you have said it to other people as well. It is more of a commitment then as well, that you would like to give up smoking. So it kind of gives you that nudge to, you know?” *(Participant No. 9)*

**Social support**
Social support is a well-recognised construct within the literature known to positively contribute to the change process. Reflections of social support are seen in the following comments.
“Everybody had something to bring to the group and I suppose you felt that you weren't the only one who was having these difficulties or starting. You had a bit of support from each other.” (Participant No. 12)

The above reflects the camaraderie of the fact that the participants were all in this together and this identification acted as a type of support and encouragement for each other.

Motivation:
Motivation and how to motivate individuals to bring about behavioural change is a key factor in behavioural change theory. Examples of motivational elements present from the focus group are reflected below;

“People achieving something was- motivating as well because you feel yourself that you are being left behind. Everyone is giving up something or stopping something. There is no reason why you can’t.” (Participant No. 5)

Within the above there is a sense of where an individual makes a public commitment in the group to bring about some behavioural change; this in itself is more motivating than simply silently committing to oneself. In another way it is akin to asking for social support from the other group members to remind them of their commitments. Also it appears that participants found that when they received encouragement about their healthy eating or physical activity behaviours, this in itself was a motivating factor. Perhaps this is related to the spirit of MI where an overall positive encouraging stance is taken in motivating individuals towards behavioural change. Commitment itself is dealt with further on as a facilitator to behavioural change.

Thus the above reflects what makes the group effective in that social support from
members within the group was a facilitating factor. Also participants felt the group providing them with motivation and in some cases peer pressure encouraged them to bring about some health behavioural changes.

**Theme No. 4: Increasing knowledge and developing awareness of own health and how health behaviour change occurs:**

Here subthemes included developing health awareness, increased knowledge and stages of change (see Figure 5.17 below).

*Figure 5.17: Theme 4: Developing Knowledge and Health Awareness*

Within this theme, participants appear to have extended their knowledge around areas of health behaviours, and developed awareness of their own relationship to personal health behaviours.

**Increased Knowledge**

Within the following excerpts, it appears that knowledge of the recommended physical activity and healthy eating guidelines created for them a more positive
outlook in their ability to achieve them.

“I found knowing the daily recommended allowances made it a bit easier because you know for the physical activity and for the healthy eating because for the physical activity, you have to do 30 minutes most days a week and I was here, ‘30 minutes of walking isn’t too bad’ whereas before I thought ‘God I have to go for a walk.’ But when you actually time it, it is not too bad. And then the healthy eating, just knowing the food groups and that that helped as well. But I still have a few sweets!”

(Participant No. 13)

It appears from the above that acquiring knowledge about healthy eating and physical activity recommendations actually took the mystery out of their attainment. In that although people are aware of the need to eat healthy foods and take exercise, the specifics of these recommendations get lost somewhere along the way. Thus, acquiring specific knowledge on these areas appears to have made them less daunting and more attainable.

Stages of Change

Again the excerpt below demonstrates the fact that as participants became more knowledgeable with regard to e.g. the wheel of change, it appears to create for them a more positive perspective to their attempts to bring about some health behavioural change in their own lives. The fact that failure is not part of this wheel appears to be attractive to participants and appears to make it more likely that they will attempt change as the below excerpts convey.

“now you have more knowledge on while you can get into stages you can fall out of them at any stage but you can always just restart again. So it’s not the end of the world if you don’t succeed the first time” (Participant No. 7)

“You wouldn’t have thought of it as positively before this. You would have thought
that you could try again but the workshop has made it more positive for you I thought”

(Participant No. 6).

Increased theoretical knowledge about the change process in the form of the stages of change appears to have contributed to a more positive interpretation and is apparent in the excerpts above. Thereby, if one is not successful at the first attempt at some aspect of health behavioural change, they can try again without evaluating themselves negatively for having failed. Thus, the increased knowledge gained about the stages of change model appears to have made a positive contribution to the participant’s knowledge base but also to their motivation and self-belief. Somehow the knowledge that changes does not occur in a neat sequential manner in an all or nothing way appears to free individuals up to try and not be stopped by their fear of not succeeding.

**Developing Health Awareness**

As well as an increase in knowledge, participants also appear to have enjoyed learning more about themselves and found this beneficial as evidenced within the excerpt below.

“People don't realise how beneficial it is and how much information you do learn about yourself and about other things” (Participant No. 10)

“I thought the group work was very enjoyable, discussing you own levels of physical fitness and your healthy diet or unhealthy diet……. (Participant No. 8)

An increase in participants’ knowledge regarding the recommended levels of physical activity and healthy eating, and the stages of change is evidenced within the above. Participants becoming self-aware in relation to their own health is also apparent as is the view that this is a positive and beneficial thing. The adage that knowledge is power is brought to mind here in that there is a sense that equipped with knowledge on the health behaviours themselves, the change process and developing health awareness
somehow empowers participants to attempt to bring about behavioural change with confidence and enthusiasm.

**Theme No. 5: Barriers to Health Behavioural Change**

Sub themes here included, lack of time, inconvenience, affordability and effect of transition to college on health (See Figure 5.18 below).

**Figure 5.18: Theme No. 5: Barriers to Health Behavioural Change**

![Diagram](image)

**Effect of transition to college on health lifestyles:**
Commencing college itself appears to have an overall negative effect on participant’s health and lifestyle behaviours.

“before I started here I’d always be doing exercise but then you kind of get into the frame of mind of studying and you get lazy because you’re like sitting down all the time studying and then it is harder to get into something. I’d never have been sitting down studying before I started back to college but now I am in that frame of mind”.

*(Participant No 5)*

You just get lazy because you’re sitting down studying. I’ve put on weight since I started here... “We all have”! *(Participant No. 7)*
At this point the facilitator asked for a show of hands as to whether starting college had improved or disimproved their health lifestyle, 11 out of 13 stated that it had disimproved since commencing college. Thus it appears that attending college changes lifestyles to the extent that a lot of their time is spent sitting and studying and thus inactive.

**Affordability**
Affordability was also mentioned as a possible barrier to healthy eating in that cost tends to be greater than less healthy convenience foods.

“*Especially people who live away, they’re in college living in ... they mightn’t be able to afford to buy healthy foods and buy loads of fruit and stuff*” *(Participant No. 13)*

“*Food in the canteen, there is not a great variety or choice and prices vary from day to day.*” *(Participant No. 9)*

Thus, participants appear to be cognisant of the fact that it costs more to eat healthily than unhealthily a fact borne out in research carried out for the National Food Recommendations of (2011). According to the Food Safety Authority of Ireland (2011) the largest portion of money spent on healthy eating is spent on fruit and vegetables, followed by lean meat and fish. Foods rich in fat, sugar and salt are cheaper.

**Inconvenience:**
Engaging in healthy eating and physical activity is more likely to take place if it is made easy for individuals. If individuals are not highly motivated they will have difficulty engaging if it is inconvenient to do so, as is reflected below:

“*But I know if they had aerobics classes or something like that, I’d say there’d be a lot of people that would attend that or maybe more daytime activities*” *(Participant No. 3)*
Several agree with the above statement.

“Yes, not something you have to come back in in the evening for” (Participant No. 4)

There was general agreement within the group that having activities put on at lunchtime may facilitate them to engage in physical activities.

**Lack of Time**
Time was also seen as a large barrier to engaging in healthy lifestyle activities, be that engaging in physical activity or healthy eating.

“By the time I drive to college ...I’m up at 6.30 every morning. It might be 5.30, 6 o’clock by the time I’m home in the evening. ....but I did find the physical activity side of it harder because I’d just be shattered by the time I get out of the car”

( Participant No. 9)

However, there was an acknowledgement that time management was also an issue and perhaps participants were still in the process of adjusting to this new way of life, and hadn’t quite worked out a routine.

“It’s time management too. It’s finding time to do all this stuff”. (Participant No. 1)

Lack of time due to pressure of exams and other college work also appeared to be a significant barrier.

“Yeah because you were panicking and stressed out and you had no time so you just ate something quick”. (Participant No. 4)

From the above it can be seen that barriers to engaging in a healthy lifestyle in this student population include lack of time, inconvenience, affordability and adjusting to college and coping with the demands of college life itself. As well as contributing to their lack of time to exercise, exams and college workloads also affected psychological well-being in the form of increased stress and eating behaviours due to pressure of time. College student stress as a theme will be developed further later on.
Theme No. 6: Facilitators to Behavioural Change
Sub-themes here included commitment, fun, goal setting, monitoring and feedback, assignment and how college can facilitate healthy lifestyles (see figure 5.19 below).

Figure 5.19: Theme No. 6: Facilitators to Behavioural Change

This theme is entitled facilitators of behavioural change to represent the variety of techniques or processes that participants indicated that were useful or more likely to assist them in bringing about change in their health behaviours.

Commitment:
The importance of committing oneself to some behavioural change in the group setting was seen as an important aspect of engaging in the change process.

Commitment is identified within the trans theoretical model as an important process of change as discussed within the literature review. Evidence of the importance of this process is highlighted below:

"when you say it out to people or you hear yourself saying it, instead of just talking to yourself because talking to yourself doesn’t always work. But when you say it to other people you’re like “no, I’m going to put in the effort and do it and try and achieve it, You’ve said it now and other people know”. (Participant No. 7)
It appears from the above that this idea of declaring your intention to bring about some health behavioural change is an important first step. There appears to be a sense that a public commitment in front of a group of peers is more binding than a private commitment to yourself that nobody knows about so that if one does not succeed, the only person one is letting down is oneself. Thus, after making this public commitment in the group setting, participants were more motivated not to let themselves down in front of their peers. Participants appeared to use this commitment to the group as a form of motivation and encouragement for themselves.

**Goal Setting:**
Goal setting was also seen to be an important factor in facilitating health behavioural change as seen in the following extracts:

“Yeah, I found the group work interesting as well and Name (Facilitator) .... was telling us always to write down achievable goals. Don't go beyond it. Stick to one thing at the start. There is no point in putting pressure on yourself to do too many things at once because if you achieve one you can move on to the next one. So start from the bottom and work your way up instead of starting from the top and fail. So your sense of achievement by reaching each little step is greater than starting from the top and just falling”. (Participant No. 11)

The above reflects how participants seem to appreciate the concept of setting achievable and realistic goals and avoid over ambitions goals that they are unlikely to achieve. The setting of achievable goals is also an important aspect of building an individual’s self-efficacy (discussed earlier). By contrast having unrealistic over ambitions goals which individuals can’t achieve has a negative effect on an individual’s self-efficacy and makes them less likely to try again. The element of
setting goals is also related to commitment and although one may not feel like honouring their health behaviour change, the fact that they have set a goal and declared what they are going to do helps them in honouring their commitment.

**Monitoring and Feedback**
The importance of monitoring and feedback as a technique to assist individuals in keeping on track so to speak in the pursuit of their health behavioural change goal is highlighted in the literature review and reflected below.

“I think that it would have been a good idea to have the fitness assessment and then get tested again at the end of the year and say look how much you've lost or how much you've gained or whatever.”  *(Participant No. 6)*

Participants appear to be asking to be monitored and to receive feedback on their progress with bringing about their physical activity behavioural change goals in particular. It appears that students are saying that they would find a follow up fitness assessment more motivating than simply undergoing a once off fitness assessment. Within the current intervention a follow up to the fitness assessment was not planned and indeed was not feasible within the constraints of the timetable whereby this module is delivered and completed within a single semester. However, it appears it would have been a useful exercise.

Not all students enjoy completing assignments and often see them as very hard work; however, participants from the current study appear to indicate that the assignment was useful and also acted as an opportunity for rehearsal of all they had learned and a reminder for them of their health goals.

“It was in the lectures as well. The information that (facilitator) went through in the lectures did help as well and the assignment as well, because the assignment included all that. So it reiterated it for you. So we had to go and research it all again and go
It helps you remember what the recommended levels were and what fitness and what recommended levels of exercise you should do and all the healthy eating and all that as well” (Participant No. 4)

It appears that the assignment reinforced the learning gained during the module. It also reminded them of the recommendations for healthy eating, and physical activity etc. and they found this useful. Also the fact that they could relate personally to the module and the assignment further served to enhance their interest and motivation. De Vahl (2005) writes about utilising academic incentives to promote health behavioural change within students. Within the current study, the fact that the assignment content was so closely related to the module content appeared to work well as a reminder for participants.

Fun and Enjoyment:
The importance of fun and enjoyment in facilitating exercise/ physical activity in particular is highlighted by participants in the following extracts.

“You can do exercise and enjoy it. You can enjoy things that are seen as exercise, like going swimming or going to aerobics, like socialising and enjoying yourself and seeing your friends and stuff”. (Participant No.3)

Fun and enjoyment are well recognised within the literature as important facilitators of physical activity engagement, participants in the present study appear to agree with this and they are also requesting more fun like physical activity facilities within the college.

How college can facilitate healthy lifestyle behaviour
Participants were asked to comment on how they felt the college could contribute to facilitate them in adhering to their health behavioural change goals. Comments centred around food in the canteen, organised exercise sessions, support groups and the health and well-being module to be run over a longer time frame.
“This module should run from September to May, the full year, even if the college got more involved in running more activities. ..........It’s stress relief at the end of the day. It’s only for half an hour or 45 minutes and go home then”. (Participant No.6)

“I’d like to see more sports things running in the college” (Participant No. 2)

“Food in the canteen, there is not a great variety or choice and prices vary from day to day” (Participant No. 6)

“And the other thing, I think is focus groups, people you can talk to; groups that you could off load to. Even if it was a lecturer to come like today and just sit around and chat and get it out. (Participant No. 7)

Participants were also asking for more space between assessments as they felt overloaded with a lot of assessments over a short period of time which left very little room for anything other than study.

“I think they (assessments) should be spaced out better. We were just overloaded” (Participant No. 7)

Thus from the above it can be seen that participants considered techniques such as committing, goal setting and monitoring and feedback as important facilitators of health behavioural change. Fun also featured as a facilitator as well as course work directly related to their own health and health behaviours. Participants also had lots of suggestions as to how the college environment could facilitate health behavioural change. Here a need for further infrastructural support for healthy lifestyles on college campus is reflected. This is in line with the health promoting college’s network and also within the settings approach as described earlier. This is a particularly challenging aspect in a small campus setting such as the one within the present study where resources and facilities are limited.
Theme No. 7: Stress of Student Life
Here sub themes included stress of the first semester, stress of exams and coursework and coping strategies (see figure 5.20 below).

*Figure 5.20: Theme No. 7: Stress of the Student Life*

This theme deals with the stresses that students encounter on transition to college, particularly evident in the first semester, also the stress of exams and coursework and how they cope.

**Stress of first semester**
Participants describe the first semester (from Sept-Dec) as a very stressful period. The current focus group took place in April, thus the statements expressed are done so from a reflective point of view. The source of their stress appears to be from a number of factors that all come together in the first semester. Some of these factors include getting used of the course, the college, possibly new living conditions, new friends etc. Coping with the nature of third level assessments appears to have contributed to much of the stress. The below comments reflect this!
“The first semester was definitely the hardest semester. So I suppose if you had that class first maybe you mightn’t….the mental health aspect and the stress part of it, then you might be able to cope better” (Participant No. 7)

As well as describing the stress of the first semester, participants made suggestions as to how this could be reduced for future students. Many participants refer to the value of the psychological well-being workshop and suggest that having something like this at an earlier stage may prove more beneficial in reducing the particular stresses of the first semester. However in the absence of such an intervention in the first semester, participants reflected on how they did cope and attributed much of this coping ability to belonging to a group and talking about their stressors with other colleagues undergoing similar stress. Such comments are reflected below.

“I think in talking to each other….like I know what got me through the first semester was ….we’re a close group. We would chat to each other and ‘I’m stressed out’ or whatever, that kind of thing. And even just talking amongst ourselves I suppose helped us get through. At the time we didn’t realise that until after the groups but when you look back now and think ‘yeah, well I probably wouldn’t have got through only that whoever was there.’ It’s only now that you link it with ….it was a way of coping”.

(Participant No. 6)

It appears from the above that, on reflection and equipped with more knowledge about stress reactions and possible coping strategies, participants are in some way making sense of the experiences they had in the first semester. Armed with this information and knowledge gained from both the theoretical and practical workshop on psychological well-being, participants are developing an understanding of these experiences. Participants are also making suggestions that perhaps the setting up of
small groups for the purpose of supporting each other with the stress of the first semester would be a good idea in the future.

Stress of exams and coursework
The particular contribution that course work and exams made to student stress is obvious in the below comments.

“At the start of the year you’d be stressed out over loads of things. You’ve got your first assignment and you’ve got all these new things coming into your head” (Participant No. 5)

“I think since placement finished those three weeks before the holidays were just brutal. The amount of work that we were given was something shocking. Not being funny” (Participant No. 9)

There appears to be a sense of muddling through and getting through it almost by default as opposed to having a particular strategy or direction. The fact that the above students are student nurses, who undergo clinical placements appears to contribute to the stress. For these students, the academic year is broken up for them with clinical placements and as such much of the study and preparation for assessments takes place within the last three weeks of the semester following a six week clinical placement.

“I don’t know for anybody else but I know at Christmas time, I suppose because it was all new, we had our first exams and after starting college and everything else, I know I would have been very stressed and it’s only afterwards…..at the time I was kind of coping with it. I was like ‘oh I just have to get it done’ and I’d get it done and whatever. And it is only afterwards, and I suppose it came out from that mental health thing when we were talking about it afterwards, that you realise how stressed you were. (Participant No. 11)
The above comment reflects this element of stress, there also appears to be concern and fear almost of the possible effects of such stress on one’s mental health. The above excerpt clearly demonstrates an increased awareness of the negative effects of stress and recognition that help and support is necessary in the developing of appropriate coping skills.

**Coping Strategies;**
Utilising PA as a coping strategy is addressed within the interrelatedness section and is reflected briefly below:

“I just went out for a walk, totally better by the time I came back after a 30 minute walk”  **(Participant No. 10)**

Other coping strategies participants identified were associated with knowledge and awareness of the effects of stress and what you can do about it:

“Or even if there was a workshop organised for first years, within the first two weeks or something to have a talk about the mental health and stress. It could help them because it is quite stressful”  **(Participant No. 4)**

“Yes, because we are using them now (coping strategies) and I don't know about anybody else but now I’m kind of more settled. Maybe it’s just I’m longer here and I’m getting into a routine but I’m more settled this time round than I was then”.

**(Participant No. 6)**

After reflecting on their own experiences, participants are also suggesting the value of some form of support group for first year students to help them identify stressors and possible coping strategies and support from each other. Overall, participants are suggesting that physical activity and talking to someone or seeking support in the group were coping strategies that they had utilised successfully.
**Theme No. 8: Inter-relatedness of Health Behaviours**

This theme describes how all three health behaviours which are the subject of this study inter relate with each other and how changes in one may impact on another and vice a versa. This is reflective of the multiple health behavioural change interventions discussed within the literature review (Prochaska and Prochaska, 2008).

The knowledge gained within the module that healthy living is a combination of what you eat and how much you exercise appears to be evident in the extracts below. Participants discuss which they would prefer to do and which is easier.

“If you were doing a physical activity and you've got this healthy frame of mind, you're not going to come in from your walk and sit down with a big tub of ice cream. When you come in you feel refreshed and you’re more likely to drink water than you are to drink coke. ..Or if there is fruit there you take the fruit”. (Participant No. 11)

Also it can be seen that there is recognition of a synergistic relationship between both as when one is actively engaged in one healthy activity, this has a knock on effect on the other e.g. if one is exercising they are more likely to eat healthily. Thus, recognition that healthy eating and physical activity are important to health and that they have an effect on each other is evident from above.

The effects of physical activity on psychological well-being is also apparent in the participants’ conversation below:

“I actually go for a walk every evening now as well for 30 minutes. I study for two hours when I get in and then on the dot I get up and I go for a 30 minute walk and it seems to just settle things in my head and clear my head”. (Participant No. 1)

It is clear from the above that participants see the benefits of PA on their mental and psychological health and have experienced the benefits of putting this into practice.
There appears to be evidence of an awareness of how stress can affect one’s eating behaviours in the comments below:

“With exams ..........stress wise anyway, because you were panicking and stressed out .....and you have no time – you just eat something quick” (Participant No. 3)

Although, an awareness of how psychological stress may affect eating behaviours is in evidence, it is not evident that participants are doing anything about this. However, there is certainly an increased awareness which helps participants to notice if this happens to them. By becoming aware that their unhealthy eating is a response to stress, they may in time choose another stress relieving route such as exercise as opposed to unhealthy eating. An acknowledgement and awareness of how all three behaviours affect each other is evident from the extracts below.

“One thing kind of spurns off another and when you’re eating healthy then you’re thinking ‘oh I can go for my walk’ and that part leads on to the mental health and it all joins together. So it’s just the fact of taking the first step in the right direction”.

Thus, it is clear from the above that participants possess an appreciation of the importance of all three elements contained within this module and their synergistic relationship to each other. It is anticipated that this enhanced awareness will give students an opportunity to reflect on their own personal relationship to all three areas and develop their own repertoire of health knowledge specific to themselves.

**Summary of Process Evaluation - Qualitative Analysis of Focus Group:**

Analysis of the focus group provided data which assisted in evaluating the process of the intervention. Eight main themes were identified along with some associated sub themes. Firstly the nature of the facilitator/participant relationship emerged as a theme...
which was characterised by participants perceiving this relationship as being based on trust and experiencing the facilitators interactions as positive and individualised where individual participants felt valued. The fact that ownership for change remained with the participant throughout the process was highlighted within the second theme and reinforced with the subthemes of autonomy and evocation. Thus change was elicited from within the participants themselves, responsibility for such change remained with them and the facilitator respected the participants’ autonomy. Thirdly the power of the group was identified as a theme and characterised by sub themes such as social support, peer pressure and motivation. Here, belonging to the group served as a means of providing social support for individual participants as well as in some cases peer pressure to bring about some positive behavioural change. Participants also perceived this as being motivating. Fourthly increased knowledge and developing awareness about health behaviour change was identified as a theme, in that participants felt that they had gained valuable knowledge on healthy lifestyle behaviours. They also gained increased self-awareness and improved their knowledge on theories of behavioural change which helped them understand the change process and view relapse as part of the process and not as a failure. This in turn increased their willingness to engage in successive behaviour change attempts. Barriers to behavioural change was identified as the fifth theme and these included inconvenience, lack of time due to college workload, affordability and adjusting to college life. The sixth theme was entitled “facilitators to health behavioural change” and included sub themes such as goal setting, feedback and monitoring, commitment, fun and the college environment. The seventh theme was entitled “stress of the student life”. Here, the stressful nature of college life was addressed and in particular the first semester, the demands of academic assessments and the need for coping skills and support were highlighted.
Interrelatedness of all three health behaviours was the eighth and final theme. Here effects of physical activity on psychological well-being, as well as effects of psychological well-being on healthy eating behaviours along with other examples of how all three interrelate were addressed.

**Introduction to Quantitative Findings on Health Behaviours**

The next section will address the quantitative findings in the areas of physical activity, healthy eating and psychological well-being. This will be followed of a summary of these quantitative findings, after which both quantitative and qualitative findings will be integrated to illuminate each other.

**5.4 Physical Activity Outcomes**

Within this section, physical activity levels were recorded at pre and post intervention and follow up using the international physical activity questionnaire (IPAQ). Stages of change for physical activity were also assessed, as was self-efficacy and social support for physical activity. Table 5.5 below contains hypotheses pertinent to this section on physical activity. As it became clear that not all of the data was normally distributed; the Kolmogorov-Smirnov\(^3\) test for normal distribution was applied to all numerical data scores. Numerical data which was normally distributed was subjected to t tests and one way ANOVA testing to ascertain differences within groups between data collection episodes. Where statistical significant differences existed, mixed between within ANOVAS were utilised to ascertain where the difference lay between the groups and within the groups. Non normally distributed data (e.g. IPAQ MET Min scores) was subjected to the Friedman test (non parametric equivalent to ANOVA). Where differences were revealed, post hoc tests i.e. Wilcoxon signed rank test and

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\(^3\) As a test for normality, a non-significant result in the Kolmogrov-Smironov test indicates normality. In this case the majority of IPAQ results were significant, thus non normally distributed.
Bonferoni tests\textsuperscript{4} were applied to ascertain where the differences lay. Chi square test for independence was applied to categorical data such as stages of change across all three data collection episodes within groups to test for statistical significant differences.

\textsuperscript{4} To avoid against type I errors (rejecting the null hypothesis when it is actually true) a bonferroni adjustment is made to the normal alpha level of .05 to assess statistical significance. To do this the alpha level of .05 is divided by the number of comparisons you wish to make in this case 3, thus .05 divided by 3 = .017. Thus in order to be able to claim statistical significance in this instance the p value will need to be less than .017
Table 5.5 Summary of Hypothesis re. Physical Activity

<table>
<thead>
<tr>
<th>Health Behaviour – Physical Activity</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypothesis 1(a)</strong></td>
<td>Physical activity levels (i.e. IPAQ MET scores) will increase from pre-intervention (T1) to post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td><strong>Hypothesis 1(b)</strong></td>
<td>The number of those meeting minimum physical activity levels will increase from pre-intervention (T1) to post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td><strong>Hypothesis 2</strong></td>
<td>Participants’ stage of change for PA will increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and that these increases will be maintained at follow up (T3), in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td><strong>Hypothesis 3</strong></td>
<td>Participants’ Self efficacy for PA will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td><strong>Hypothesis 4</strong></td>
<td>Participants’ perceptions of social support for PA particularly from friends will increases between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
</tbody>
</table>
5.4.1 Total weekly physical activity levels as measured by the IPAQ Met Mins per week.

It was hypothesised that physical activity levels (i.e. IPAQ MET scores) would display significant increases from pre-intervention (T1) to post intervention (T2) and that that these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group.

The IPAQ (Craig et al, 2003) measures self-reported levels of physical activity. A questionnaire is used to assess the participant’s physical activity over the previous week and activity is then classified into three levels e.g. walking, moderate and vigorous. A metabolic equivalent of task (MET) which is a physiological concept expressing the energy cost of physical activities is assigned to the activity depending on level of effort. Total minutes of each level are calculated over a week and this is then multiplied by an assigned MET score depending on whether activity is classified as walking = 3.3 METs; moderate intensity = 4.0 or vigorous intensity = 8.0 METs. These are then added together to give a total MET-minutes/weekly score. Tests for repeated measures on IPAQ scores were deemed appropriate to assess whether the hypothesis would be supported or rejected. The Kolmogorov-Smirnov test was utilised to test for normal distribution of IPAQ scores. The probability values for five of the six tests applied three times across two groups were significant ranging from .000 to .007, (a non-significant result in the kolmogrov-smironov test indicates a normal distribution) thus the assumption of normal distribution was not met with the IPAQ measure. Therefore the non-parametric equivalent to ANOVA for repeated measures, the Freidman test was employed. Interestingly, the criteria protocol for using the tool suggests the reporting of medians rather than means given the non-normal distribution of energy expenditure in many populations.
For the intervention group, the Friedman was applied across scores for all three time periods. Results indicated that there was a statistically significant difference across time in IPAQ MET scores ($X^2 = 7.58$, $p=.023$). For the comparison group, the results of the Freidman test revealed that there was no significant difference across the time periods ($X^2 = 4.69$, $p= 0.96$) (see Table 5.6 for summary scores and median values).

In order to establish where the difference in IPAQ MET scores lay within the intervention group, post hoc tests were applied, Wilcoxon Signed-Rank tests, with Bonferroni correction were applied. The Bonferroni correction set the probability level at 0.017. Post hoc analysis revealed that there was a statistically significant difference between pre-intervention (T1) and post intervention (T2) ($Z= 2.48$, $p = 0.013$) with a small to medium effect size. There were no significant differences between post intervention (T2) and follow up (T3) ($Z= 1.46$, $p = 0.143$) and between pre intervention (T1) and follow up (T3) ($z=1.39$, $p= 0.16$).

<table>
<thead>
<tr>
<th>Friedman test</th>
<th>$X^2/Z$ value</th>
<th>P value</th>
<th>Median T1</th>
<th>Median T2</th>
<th>Median T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>7.58</td>
<td>.023</td>
<td>1281.75</td>
<td>2545.50</td>
<td>1388.5</td>
</tr>
<tr>
<td>Comparison</td>
<td>4.69</td>
<td>.096</td>
<td>1046</td>
<td>1298</td>
<td>896</td>
</tr>
</tbody>
</table>

Summary of IPAQ measures and tests applied:
The results of the Friedman test suggest that there was a statistical significant differences in the scores across all three time periods within the intervention group ($p=.023$). These differences were in the form of a large increase between time 1 and

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5 The effect size is a measure of the strength of the relationship between two variables. Partial eta squared indicate the proportion of variance that is explained by the independent variable. Values range from 0-1. Thus, .2 or above represents a small effect size, .5 or above indicating a medium effect size and .8 or above a large effect size.
time 2 and a small decrease between time 2 and time 3. On the other hand, results of the Friedman test suggest that there was no significant differences in the scores across all three time periods in the comparison group. This is indicated by a significance level of .096. These results partially support the original hypothesis in that physical activity levels (i.e. IPAQ MET scores) displayed significant increases from pre-intervention (T1) to post intervention (T2) in the intervention group, however the second part of the hypothesis was not upheld i.e. “that that these increases would be maintained at follow up (T3) in that there was a small decrease between T2 and T3 indicating that the increase in physical activity was not maintained.

5.4.2 Total actual minutes of physical activity per week

Introduction: In order to establish if participants were meeting minimum recommended activity levels in line with national guidelines, total weekly minutes of physical activity were measured. It was anticipated that this information would add to the study and prove interesting to ascertain what proportion of the sample population were achieving minimum levels of activity as recommended in the national guidelines (National Physical Activity Guidelines for Ireland, 2009).

For the intervention group, the Freidman was applied across scores for three time periods. Results indicated that there was no statistically significant difference across time in total minutes of weekly activity ($X^2 = .308, p= 0.857$). For the comparison group, the results of the Freidman test also revealed that there was no significant difference across the time periods ($X^2 = .861, p= .650$) (see Table 5.7 for summary scores and median values). Although not significant similar trends can be seen in median values with an increase in the intervention group between T1 and T2 and then a reduction between T2 and T3. Within the comparison group there appears to be a consistent reduction in median scores across all three time periods.
Table 5.7 Summary Statistics re. total weekly minutes of PA

<table>
<thead>
<tr>
<th>Friedman test</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>Median (T1)</th>
<th>Median (T2)</th>
<th>Median (T3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>.308</td>
<td>.857</td>
<td>397.5</td>
<td>545</td>
<td>280</td>
</tr>
<tr>
<td>Comparison</td>
<td>.861</td>
<td>.650</td>
<td>255</td>
<td>225</td>
<td>180</td>
</tr>
</tbody>
</table>

Minimum Recommendations for PA
Total weekly minutes of physical activity were then broken down into two categories based on whether or not participants were meeting the minimum National Physical Activity guidelines (i.e. achieving 150 minutes or more per week). Initially the overall physical activity participation rates were examined and then comparisons were made between intervention and comparison groups. Thus, it was hypothesised that the number of those meeting minimum activity levels would show a significant increase from pre-intervention (T1) to post intervention (T2) and that these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group.

Table 5.8: Overall PA levels in relation to national recommendations: Meeting minimum recommendations of 150 minutes of activity per week

<table>
<thead>
<tr>
<th>Overall</th>
<th>(Not meeting Minimum Recommendations)</th>
<th>(Meeting Minimum Recommendations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 (baseline)</td>
<td>21.3% (N=20)</td>
<td>78.7% (N=74)</td>
</tr>
<tr>
<td>T2</td>
<td>22.7% (N=17)</td>
<td>77.3% (N=58)</td>
</tr>
<tr>
<td>T3</td>
<td>27.8% (N=15)</td>
<td>72.2% (N=39)</td>
</tr>
</tbody>
</table>
As can be seen from table 5.8 and figure 5.21, when measured against national physical activity guidelines for physical activity, baseline activity levels in this population group were very good. However a gradual decrease in percentages of those meeting recommendations and an increase in percentages of those not meeting recommendations can be observed across data collection episodes.

Figure 5.21: Overall PA levels with regard to national recommendations within sample population.

Table 5.9: PA Levels with regard to National Recommendations for both Intervention and Comparison group

<table>
<thead>
<tr>
<th>Group</th>
<th>Intervention (Not meeting Min Recommendations)</th>
<th>Intervention (Meeting Min Recommendations)</th>
<th>Comparison (Not meeting Min Recommendations)</th>
<th>Comparison (Meeting Min Recommendations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>16.3% (N=8)</td>
<td>83.7% (N=41)</td>
<td>26.7% (N=12)</td>
<td>73.3% (N=13)</td>
</tr>
<tr>
<td>T2</td>
<td>17.9% (N=7)</td>
<td>82.1% (N=32)</td>
<td>27.8% (N=10)</td>
<td>72.2% (N=26)</td>
</tr>
<tr>
<td>T3</td>
<td>25.8% (N=8)</td>
<td>74.2% (N=23)</td>
<td>30.4% (N=7)</td>
<td>69.9% (N=16)</td>
</tr>
</tbody>
</table>
As can be seen, within the intervention group, there was an increase in those not meeting minimum recommendations over the course of the study, there was also a decrease in those meeting minimum recommendations. Similar trends are evident within the comparison group (see figures 5.22 and 5.23).

Figure 5.22: Percentages of Intervention group meeting minimum PA recommendations

Figure 5.23: Percentages of Comparison group meeting minimum PA recommendations
Table 5.10: Summary Statistics re. Meeting minimum physical activity levels

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>Group</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>df</th>
<th>phi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>1.16</td>
<td>.558</td>
<td>2</td>
<td>.558</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>.108</td>
<td>.948</td>
<td>2</td>
<td>.948</td>
</tr>
</tbody>
</table>

**Summary on Meeting Minimum PA Recommendations**

The Friedman test revealed no statistically significant difference across time in total minutes of weekly activity in either the intervention or the comparison group. Although not significant, trends were seen in median values with an increase in those not meeting minimum recommendations from T1 to T3 and a decrease in those meeting minimum recommendations in both groups. Although percentages of those meeting minimum recommendations are quite positive compared to national statistics, a gradual decrease in percentages of those meeting recommendations and an increase in percentages of those not meeting recommendations can be observed in both groups over time. No statistical significant difference was shown on chi square testing on two category total minutes of PA per week and group (see table 5.10). However, the reduction in sample size of both groups may make it difficult to see statistically significant patterns. Thus, the hypothesis that the number of those meeting minimum activity levels would show a significant increase from pre-intervention (T1) to post intervention (T2) and that that these increases would be maintained at follow up (T3) in the intervention group but not in the control group was not upheld. These findings appear contradictory to those of the IPAQ measure which showed statistically significant increased activity levels between pre and post intervention. However it is important to remember that the IPQA measure is measuring METS minutes based on different levels of activity regardless of whether participants are engaged in an activity for the minimum time recommendations. Those who partake in vigorous exercise can
accumulate very high IPQA levels although they may not be reaching 150 minutes per week of activity.

5.4.3 Stages of Change for PA
It was hypothesised that participants’ stage of change for physical activity would increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and that these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group. Here, the transtheoretical stages of change model (Prochaska and Diclemente, 1984,1986) was utilised to assess participants attitude to bringing about behavioural change, in this case in increasing their physical activity. The model outlines that change is a cyclical process with people going through a number of changes from pre-contemplation to contemplation to preparation, action and maintenance. The stage that one is at is an indication of how physically active they are and is also an indication of how motivated they are to become more physically active. Thus within the questionnaire participants were asked to rate themselves as to their current level of activity related to the stages of change questionnaire. Initially a baseline measures for stages of change for the entire population was taken, this was then further analysesed group by group.

Stages of Change for PA in Entire Sample at Baseline
At the outset (pre-intervention) most participants within this study sample were not active but thinking about it (38.4%) or in preparation for becoming active (38.4%). Very few were non active (2.3%) or active but not enough to meet recommendations (3.5%) and a substantial proportion were regularly active. (17.4%) 9see figure 5.24).
Within the intervention group, there was a reduction in those in stage 1 (non active and not intending to be) between pre and post intervention and a subsequent increase at follow up (T1=2.4%, T2=0% and T3 = 12.1%). Within stage 2 (not active but thinking about becoming active) there was a large decrease between T1 and T2 and a slight increase between T2 and T3 (T1=42.9%; T2=22%; T3=24.2%). Within stage 3 (preparation) there was an increase from pre to post intervention and a subsequent drop at follow up (T1=31%, T2=43.9% and T3=33.3%). Within stage 4 (somewhat active but not enough to meet recommendations) there was an initial increase from pre to post intervention and then a decrease at follow up (T1=2.4%, T2=12.2% and T3=9.1%). Finally within stage 5 (regularly active) there was little change between pre and post intervention and a small drop on follow up (T1=21.4%, T2=22% and T3= 21.2%) (see figure 5.25). Within the comparison group, there was a slight increase between T1 and T2 and an increase from T2 to T3 ( T1=2.3%; T2=2.9%; T3=4.2%). Within stage 2 there was a decrease between T1 and T2 and a slight increase again at follow up ( T1=34.1%; T2=17.1%; T3=29.2 %). There was an increase in those in stage 3 from T1 to T2 and from T2 to T3. ( T1=45.5%; T2=45.7%;
T3=50%). There was an increase in those in stage 4 between T1 and T2 and a subsequent drop at follow up (T1=4.5%; T2=11.4%; T3=4.2%). Within stage 5 a small increase occurred between T1 and T2 which was followed by a drop at follow up (T1=13.6%; T2=22.9%; T3=12.5%) (see figure 5.26). A chi square test for independence within the intervention group revealed a significant association between stages of change and time (see table 5.11). This was also the case in the comparison group. However on chi square testing no statistical significance between groups was found at T1, T2 or T3. (See table 5.12) Thus the hypothesis that stages of change would increase from stage 1 through to stage 5 from pre intervention to post intervention within the intervention group and not in the comparison group was not upheld.

**Figure 5.25: Stages of Change for PA in Intervention Group**
Figure 5.26: Stages of Change for PA in Comparison Group

Table 5.11: Chi square test for independence between stages of change for PA and time within groups.

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>Group</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>Df</th>
<th>phi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>31.10</td>
<td>.001</td>
<td>10</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>32.88</td>
<td>.000</td>
<td>10</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 5.12: Chi square test for independence between stages of change for PA and time between groups

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>df</th>
<th>Phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>2.64</td>
<td>.619</td>
<td>4</td>
<td>.619</td>
</tr>
<tr>
<td>T2</td>
<td>1.94</td>
<td>.857</td>
<td>5</td>
<td>.857</td>
</tr>
<tr>
<td>T3</td>
<td>5.02</td>
<td>.413</td>
<td>5</td>
<td>.413</td>
</tr>
</tbody>
</table>

Summary of Stages of Change for PA
In the intervention group, there was a decrease in those in stage 1 at T2 and an increase at T3, while in the comparison group there was a continual increase in those in stage 1 from T1 to T3. This increase from T1 to T2 in the intervention group may be
indicative of a willingness to start thinking about becoming active as a result of the intervention and the decrease between T2 and T3 indicative of lack of maintenance. With regard to stage 2, a similar pattern can be seen between groups whereby, there was a reduction in those in stage 2 at T2 and a subsequent increase in those in stage 2 at follow up. Within the intervention group, there was an increase in those in stage 3 at T2 and this was followed by a drop at T3 while the comparison group showed a slight increase at T2 and again at T3. Perhaps the increase in stage 3 in the intervention group is reflective of participants preparing to take action as a result of the intervention and again the drop at follow up as a reflection of lack of maintenance. With regard to stage 4, in the intervention group there was an increase at T2 followed by a drop at T3. A similar pattern was observed in the comparison group. Percentages in stage 5 remained fairly stable in the intervention group throughout the course of the study, while in the comparison group, an initial increase between T1 and T2 was followed by a drop at T3 (see figures 5.25 and 5.26). Although the intervention did not succeed in bringing about statistically significant increases in stages of change for PA, it may have assisted participants in the intervention group in maintaining activity levels throughout their first year in college. A chi square test revealed no statistical significance difference between groups. Thus the hypothesis that stages of change for PA would increase from stage 1 through to stage 5 from pre intervention to post intervention within the intervention group and not in the comparison group was not upheld.

5.4.4 Self Efficacy for Physical Activity
It was hypothesised that participants’ confidence in undertaking physical activity in the intervention group would improve as reflected by an increase in self-efficacy scores for physical activity between pre (T1) and post intervention (T2) and that that
these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group.

**Introduction to Self-efficacy**
Self-efficacy was measured by a five item questionnaire that examined how confident participants felt about maintaining regular physical activity under various circumstance e.g. when tired, when weather poor etc. Scores were calculated by combining scores on each of the five areas and then the average of all five items indicated self-efficacy. A higher score indicates greater self-efficacy and vice versa. As normal distribution was present for these scores, parametric tests were applied.

**Self-efficacy mean scores for both groups**
Within the intervention group there was an increase in the mean self-efficacy score between pre and post intervention and a subsequent small drop between post intervention and follow up and an overall drop between pre intervention and follow up. On t testing, none of these changes showed statistical significance, however an increase in self-efficacy mean scores between pre and post intervention was approaching significance (P=.064).Within the comparison group, there was an increase in the mean self-efficacy score between pre and post intervention and a small decrease between post intervention and follow up and an increase between pre intervention and follow up. None of these changes showed statistical significance (see tables 5.13 and 5.14).

Thus, the intervention group showed an increase in mean self-efficacy for PA scores between pre and post intervention and a subsequent drop from post intervention to follow up with the group returning to pre score. Conversely the comparison group showed a steady gradual rise in mean self-efficacy scores across all three stages, however on one way ANOVAs, neither groups showed a significant effect for time.
(Intervention group sig = .331; Comparison group = .371). When mixed between within ANOVAs were completed, there was no significant interaction effect or main effect over time or no between subject effects over time (see table 5.15). Thus the hypothesis that self-efficacy for physical activity levels would display significant increases from pre-intervention (T1) to post intervention (T2) and that that these increases would be maintained at follow up (T3), in the intervention group but not in the control group was not upheld.

**Table 5.13: Descriptive statistics, T test and one way ANOVA results for Self efficacy for PA in the Intervention group**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>42</td>
<td>11.9</td>
<td>3.7</td>
<td>T1-T2 = .064</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>41</td>
<td>12.9</td>
<td>4.3</td>
<td>T2-T3 = .214</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>33</td>
<td>11.9</td>
<td>4.4</td>
<td>T1-T3=.622</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig=.331</td>
</tr>
</tbody>
</table>

**Table 5.14: Descriptive statistics, T test and one way ANOVA results for Self efficacy for PA in the Comparison group**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>44</td>
<td>11.7</td>
<td>3.86571</td>
<td>T1-T2 =.182</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>35</td>
<td>13.11</td>
<td>4.03261</td>
<td>T2-T3 =.696</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>24</td>
<td>12.7</td>
<td>3.62919</td>
<td>T1-T3=.326</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig = .371</td>
</tr>
</tbody>
</table>
Table 5.15: Mixed between within ANOVAs results for self-efficacy for PA

<table>
<thead>
<tr>
<th>Interaction effect</th>
<th>Effect Size</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
<td>.95</td>
<td>Non-Significant</td>
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<tr>
<td>Walks Lambda F</td>
<td>1.003</td>
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</tr>
<tr>
<td>Partial Eta squared</td>
<td>.041</td>
<td></td>
</tr>
<tr>
<td><strong>Main Effect</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilks Lambda value</td>
<td>.928</td>
<td>Non-Significant</td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.072</td>
<td></td>
</tr>
<tr>
<td><strong>Between subject</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>0.021</td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.27: Mean Self-Efficacy scores for PA in intervention and comparison groups over T2, T2 and T3.
Summary of Self-efficacy for PA in both groups
Within the intervention group, there was an increase in the mean self-efficacy score between pre and post intervention and a subsequent drop between post intervention and follow up and an overall drop between pre intervention and follow up. Within the comparison group, there was an increase in the mean self-efficacy score between pre and post intervention and a small decrease between post intervention and follow up and an increase between pre intervention and follow up. None of these changes showed statistical significance.

5.4.5 Social Support for Physical Activity
Social support was measured by a questionnaire (Marcus and Forsyth, 2009) which comprised of a list of 13 items which friends or family might do to encourage the participant to be physically active. Participants were asked to score these items twice (once for family support and once for friends support) from 1-5: 1= none, 5 = very often. Higher scores reflect more perceived social support.

Social support
It was hypothesised that participants’ perceptions of social support for PA particularly from friends would increases between pre (T1) and post intervention (T2) and these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group.

Family Social Support for PA
As assumptions for normal distribution were met within social support scores, t tests were applied to assess for differences between T1, T2 and T3. One way ANOVAs were also carried out to assess effect for time within groups. This was followed by mixed between within ANOVAs to assess main effect over time, interaction effect and between subject effects. On paired t testing, within both groups, a remarkably similar trend occurred in that a small non statistically significant increase in mean family social support for PA occurred between pre and post intervention. Following this, a
A statistically significant decrease occurred between post interventions and follow up and a statistically significant decrease also occurred between pre intervention and follow up (see table 5.16 and 5.17). On one way repeated measures ANOVA’s there was a significant effect for time in both groups (see table 5.16). When mixed between within ANOVAs were completed on family social support for PA, there was no statistically significant interaction effect, however with a significance level of 0.054, it was approaching significance. There was no significant difference in the family social support scores between groups however there was a highly significant main effect over time (See table 5.18).

**Table 5.16: Descriptive statistics, t tests and one way ANOVA results for family social support for PA in Intervention group**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>42</td>
<td>30.8</td>
<td>9.2</td>
<td>T1-T2 = .093</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>41</td>
<td>33.92</td>
<td>9.5</td>
<td>T2-T3 = .000</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>32</td>
<td>25.59</td>
<td>10.94</td>
<td>T1-T3=.019</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig = .002</td>
</tr>
</tbody>
</table>

**Table 5.17: Descriptive statistics, t tests and one way ANOVA results for family social support for PA in Comparison group**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>44</td>
<td>35.54</td>
<td>13.31</td>
<td>T1-T2 =.552</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>36</td>
<td>36.58</td>
<td>12.64</td>
<td>T2-T3 = .000</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>24</td>
<td>23.4</td>
<td>11.65</td>
<td>T1-T3=.000</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig= .001</td>
</tr>
</tbody>
</table>
Table 5.18: Mixed between within ANOVA for family Social Support for PA

<table>
<thead>
<tr>
<th>Interaction effect</th>
<th>Sig</th>
<th>.054</th>
<th>Non Significant (Approaching sig.)</th>
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<tr>
<td>Wilks Lambda value</td>
<td>.881</td>
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<tr>
<td>Walks Lambda F</td>
<td>3.118</td>
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<tr>
<td>Partial Eta squared</td>
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<table>
<thead>
<tr>
<th>Main Effect</th>
<th>Sig</th>
<th>.000</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
<td>.424</td>
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<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>31.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.576</td>
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<tr>
<td>Effect size</td>
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</table>

<table>
<thead>
<tr>
<th>Between subject effects</th>
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<th>Non Significant</th>
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<tbody>
<tr>
<td>Walks Lambda F</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary of mean family social support tests for physical activity
On T testing, both groups showed a small non-significant increase in family social support initially between pre and post intervention, this was followed by a statistically significant drop from post intervention to follow up. On one way repeated measures ANOVA’s there was a significant effect for time in both groups. On mixed between within ANOVA’s, there was no significant interaction effect or no between subject effects over time, however there was a highly significant main effect over time.

Friends Social Support for PA
On paired t tests, both groups showed a slight increase in mean friends social support for PA between pre and post intervention, this was followed by a statistically significant decrease between post intervention and follow up. Between pre intervention and follow up both groups showed a small non statistically significant reduction in mean friends support for PA. (see tables 5.19 and 5.20). On one way repeated measure ANOVA’s there was a significant effect for time in the intervention group at .038 and a non statistically significant effect for time in the comparison group, however at significance value of .055, it was approaching significance.

Although similar trends can be seen in both groups, the changes in the intervention
group were more dramatic as they were statistically significant. However, as changes in the comparison group are very close to being significant, caution has to be exercised in drawing too many conclusions from this data. When mixed between within ANOVA’s were completed on friends social support for PA, there was no significant interaction effect or no between subject effects over time, however there was a significant main effect over time (see table 5.21).

Table 5.19: Descriptive statistics, t test and one way ANOVA results for friends’ social support for PA in Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>42</td>
<td>28.35</td>
<td>10.5</td>
<td>T1-T2 = .086</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>41</td>
<td>30.36</td>
<td>8.9</td>
<td>T2-T3 = .009</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>31</td>
<td>27.38</td>
<td>8.5</td>
<td>T1-T3= .848</td>
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<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>.038</td>
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</table>

Table 5.20: Descriptive statistics, t test and one way ANOVA results for friends social support for PA in Comparison group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>44</td>
<td>30.63</td>
<td>10.47</td>
<td>T1-T2 =.778</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>35</td>
<td>33.5</td>
<td>11.68</td>
<td>T2-T3 = .011</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>24</td>
<td>27.54</td>
<td>9.46</td>
<td>T1-T3= .099</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>.055</td>
</tr>
</tbody>
</table>
Table 5.21: Mixed between within ANOVA results for friends Social Support for PA

<table>
<thead>
<tr>
<th>Interaction effect</th>
<th>Sig</th>
<th>0.412</th>
<th>Non Significant</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Wilks Lambda value</td>
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</tr>
<tr>
<td></td>
<td>Walks Lambda F</td>
<td>0.904</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial Eta squared</td>
<td>.039</td>
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</table>

**Main Effect**

<table>
<thead>
<tr>
<th>Sig</th>
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<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
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<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
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<tr>
<td>Partial Eta squared</td>
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</table>

? Effect size

**Between subject**

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<tr>
<th>Sig</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Walks Lambda F</td>
<td>.043</td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.001</td>
<td></td>
</tr>
</tbody>
</table>
Summary of friends social support measures
Paired t testing revealed that both groups showed a slight non statistically significant improvement in mean friends social support for PA between pre and post intervention. Both groups then showed a statistically significant decrease in mean friends’ social support for PA between post intervention and follow up. On one way repeated measures ANOVA’s there was a significant effect for time in the intervention group at .038. In the comparison group, while non significant, at a significance level of .055 was approaching significance. When mixed between within ANOVA’s were completed, there was no significant interaction effect or no between subject effects over time, however there was a significant main effect over time.

Conclusion of Family and Friends Social support for PA
It is clear that over time there were statistically significant changes in family and friends’ social support for PA over the course of this first year in college. Although not significant, an increase was observed within both groups for social support from family and friends, between T1 and T2, this was then followed by a statistically significant decrease in family and friends social support for PA between T2 and T3. It is clear that whatever slight improvement occurred it was not maintained. Thus the
hypothesis that participants perceptions of social support for PA particularly from friends would increases between pre (T1) and post intervention (T2) and these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group was not upheld for either family or friends social support for PA.

**Summary of all findings on PA measures**

With regard to physical activity levels as measured by the IPQA, within this non normally distributed variable. The Friedman test showed a statistical significant difference in IPAQ scores within the intervention group (p=.023) but not in the comparison group. These differences were in the form of a large increase between time 1 and time 2 and a small decrease between time 2 and time 3. Post hoc tests revealed that the statistically significant difference lay between pre (T1) and post (T2) intervention scores.

With regard to total minutes of physical activity per week, the Friedman test revealed no statistically significant difference across time in total minutes of weekly activity in either the intervention or the comparison group.

With regard to the SOC, in the intervention group, there was a decrease in those in stage 1 at T2 and an increase at T3. While in the comparison group there was a continual increase in those in stage 1 from T1 to T3. A similar pattern was seen between groups with regard to stage 2. Within the intervention group, there was an increase in those in stage 3 at T2 and this was followed by a drop at T3 while the comparison group showed a slight increase at T2 and again at T3. With regard to stage 4, there was an increase at T2 followed by a drop at T3 in both groups. Percentages in stage 5 remained fairly stable in the intervention group throughout the course of the study, while in the comparison group, an initial increase between T1 and T2 was
followed by a drop at T3. A chi square test revealed no statistical significance difference between groups. Mean self-efficacy scores for PA improved within the intervention group between pre and post intervention and subsequently dropped between post interventions and follow up. Within the comparison group, there was an increase in the mean self-efficacy score between pre and post intervention and a small increase between post intervention and follow up. Although on t testing, none of these changes showed statistical significance an increase in PA self-efficacy scores between pre and post intervention within the intervention group was approaching significance (p=.064). With regard to social support, both groups showed a non-significant increase in friends and family social support for PA between pre and post intervention, this was followed by a statistically significant drop from post intervention to follow up again in both groups for both family and friends social support for PA.

5.5 Healthy Eating
Within this section, findings are presented with regard to the objectives set in this area. Data is presented on BMI measures, food intake, stages of change for healthy eating, self-efficacy for healthy eating and social support for healthy eating. Other descriptive data on participants’ food habits and behaviours were also obtained based on questions in table 5.23 below. However, not all of this data is presented, as it became apparent during analysis, that it would not be logistically possible to present all of the information collected on this topic due to word limitation. Related healthy eating hypotheses and research questions are presented in table 5.22 below.
<table>
<thead>
<tr>
<th>Health Behaviour</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Eating</td>
<td>Mean BMI scores of the intervention group will reduce from pre-intervention (T1) to post intervention (T2) and these reductions will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 1</td>
<td>Participants’ stage of change for healthy eating will increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>Participants’ self-efficacy scores for healthy eating will increase between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3), in the intervention group but not in the comparison group.</td>
</tr>
<tr>
<td>Hypothesis 3</td>
<td>Participants perceptions of social support for HE particularly from friends will increases between pre (T1) and post intervention (T2) and these increases will be maintained at follow up (T3) in the intervention group but not in the comparison group.</td>
</tr>
</tbody>
</table>
Table 5.23: Questions related to Healthy Eating

<table>
<thead>
<tr>
<th>Questions Relating to Healthy Eating: Section 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of intake according to food group and portion numbers according to the food pyramid (DoH&amp;C, 2005).</td>
</tr>
<tr>
<td>Assessment of fried food, milk and salt intake</td>
</tr>
<tr>
<td>Assessment of where meals were eaten given a variety of options</td>
</tr>
<tr>
<td>Assessment of what foods participants ate for breakfast lunch and dinner</td>
</tr>
<tr>
<td>Assessment of type and amount of snacks consumed per day</td>
</tr>
<tr>
<td>Assessment of type of butter/spread used</td>
</tr>
<tr>
<td>Assessment of whether participants actively trying to lose weight and if so what strategies are being utilised.</td>
</tr>
</tbody>
</table>

**Description of Measurement Indicators:**
Measures used here included the Body Mass Index (see Appendix 4.8) and food intake relative to the food pyramid recommendations. Other descriptive information on eating habits and food choices included most popular food choices for breakfast, lunch and dinner as well as most popular snack choices. Information on weight management desire, aims and strategies were also included. Similar to the physical activity section, measures of stages of change, self-efficacy and social support are also included. As scores within this section were normally distributed (i.e. BMI scores, self-efficacy scores and social support scores), parametric tests were applied. Thus, t-tests, one way ANOVA and mixed between within ANOVA’s were utilised to ascertain where the difference lay between groups and within the groups. Chi Square tests for independence were applied to categorical data such as stages of change across all three data collection episodes.
5.5.1 Body Mass Index
Participants Body Mass Index was calculated at each data collection episode using the WHO, 1995 classification (see appendix 4.8). Body Mass Index (BMI) is an index commonly used to classify underweight, overweight and obesity in adults. It is based on the individual’s weight-to height ratio. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m²), (WHO, 1995).

It was hypothesised that mean BMI scores of the intervention group would reduce from pre-intervention (T1) to post intervention (T2) and that these reductions would be maintained at follow up (T3), in the intervention group but not in the comparison group.

As can be seen from table 5.24, at baseline 37.1% of this population was either overweight or obese. This increased to 42% at T2 and fell back to 33.9% by follow up. However this may be attributed to the fact that the numbers decreased throughout the data collection process. However it would appear that approximately one third of this population was either overweight or obese.

Table 5.24: Overall overweight and obesity levels of entire sample based on WHO classification (WHO, 1995)

<table>
<thead>
<tr>
<th>Overall s</th>
<th>Underweight</th>
<th>Ideal weight</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>6.7% (N=6)</td>
<td>56.2% (N=50)</td>
<td>29.2% (N=26)</td>
<td>7.9% (N=7)</td>
</tr>
<tr>
<td>T2</td>
<td>3.7% (N=3)</td>
<td>54.3% (N=44)</td>
<td>29.6% (N=24)</td>
<td>12.3% (N=10)</td>
</tr>
<tr>
<td>T3</td>
<td>0% (N=0)</td>
<td>66.1% (N=41)</td>
<td>30.6% (N=19)</td>
<td>3.2% (N=2)</td>
</tr>
</tbody>
</table>
As can be seen from Table 5.25 at the outset 33.3% (N=15) of this intervention group were either overweight or obese at baseline, 37.3% (16) were either overweight or obese at T2 and 36.3% (N=12) were either overweight or obese at follow up.

Table 5.25: Overall overweight and obesity levels in Intervention group

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Underweight</th>
<th>Ideal weight</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>6.7% (N=3)</td>
<td>60% (N=27)</td>
<td>22.2% (N=10)</td>
<td>11.1% (N=5)</td>
</tr>
<tr>
<td>T2</td>
<td>2.3% (N=1)</td>
<td>60.5% (N=26)</td>
<td>23.3% (N=10)</td>
<td>14.0% (N=6)</td>
</tr>
<tr>
<td>T3</td>
<td>0% (N=0)</td>
<td>63.6% (N=21)</td>
<td>33.3% (N=11)</td>
<td>3% (N=1)</td>
</tr>
</tbody>
</table>

As can be seen from Table 5.25, at the outset 40.9% (n=18) of this comparison group were either overweight or obese at baseline; 47.3% (N=18) were either overweight or obese at T2; and 31% (N=9) were either overweight or obese at follow up. The fall of rate in number of participants during the life of the study may be responsible for the dramatic percentage differences at each time point.

Table 5.26: Overall overweight and obesity levels in Comparison group

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Underweight</th>
<th>Ideal weight</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>6.8% (N=3)</td>
<td>52.3% (N=23)</td>
<td>36.4% (N=16)</td>
<td>4.5% (N=2)</td>
</tr>
<tr>
<td>T2</td>
<td>5.3% (N=2)</td>
<td>47.4% (N=18)</td>
<td>36.8% (N=14)</td>
<td>10.5% (N=4)</td>
</tr>
<tr>
<td>T3</td>
<td>0% (N=0)</td>
<td>69% (N=20)</td>
<td>27.6% (N=8)</td>
<td>3.4% (N=1)</td>
</tr>
</tbody>
</table>
Summary of BMI scores between groups
Paired T testing on BMI scores revealed a statistically significant increase in BMI scores in the comparison group between pre intervention and post intervention (P=.000). All other t tests between post intervention and follow up and between pre intervention and follow up did not show statistically significant changes in either group. On one way repeated measures ANOVA, there was no statistically significant effect over time in the intervention group P=.550. However there was a statistically significant effect for time in the comparison group at p=.000. This was characterised by an increase in BMI mean scores between pre and post intervention, this was then followed by a small decrease between post intervention and follow up. On mixed between with ANOVA testing, changes in BMI scores showed a statistically significant main effect for time across all three time periods. However no interaction effect or main effect for time between groups were observed (see tables 5.27-5.29 below). Thus, the hypothesis that mean BMI scores of the intervention group would reduce from pre-intervention (T1) to post intervention (T2) and that these reductions would be maintained at follow up (T3) in the intervention group but not in the comparison group was not upheld.

Table 5.27: Descriptive statistics, T test and one way ANOVA results for BMI scores in Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>45</td>
<td>23.99</td>
<td>4.4</td>
<td>T1-T2 = .474</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>43</td>
<td>24.46</td>
<td>3.8</td>
<td>T2-T3 = .315</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>33</td>
<td>23.91</td>
<td>2.8</td>
<td>T1-T3=.592</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>P=.550</td>
</tr>
</tbody>
</table>
Table 5.28: Descriptive statistics, T test and one way ANOVA results for BMI scores in comparison group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>44</td>
<td>24.08</td>
<td>4.19</td>
<td>T1-T2 =.000</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>38</td>
<td>25.07</td>
<td>44.47</td>
<td>T2-T3 = .315</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>29</td>
<td>23.56</td>
<td>3.04</td>
<td>T1-T3=.064</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>P= .000</td>
</tr>
</tbody>
</table>

Table 5.29: Mixed between-within ANOVAs for BMI scores

<table>
<thead>
<tr>
<th>Interaction effect</th>
<th>Sig</th>
<th>.379</th>
<th>Non Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
<td>.965</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>.998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effect</td>
<td>Sig</td>
<td>0.034</td>
<td>Significant.</td>
</tr>
<tr>
<td>Wilks Lambda value</td>
<td>0.882</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>3.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between subject effects</td>
<td>Sig</td>
<td>0.733</td>
<td>Non Significant</td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>0.117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.002</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary of BMI Scores
Paired T testing on BMI scores revealed a statistically significant increase in BMI scores in the comparison group between pre intervention and post intervention. All other t tests proved none significant. One way ANOVA’s revealed statistical significance in the comparison group but not in the intervention group. On mixed between with ANOVA testing, changes in BMI scores showed a statistically significant main effect for time across all three time periods. However no interaction effect or main effect for time between groups were observed.

5.5.2 Food Intake and Weight Management
Food intake patterns were calculated and compared against the food pyramid recommendations. The food pyramid (DoH&C, 2005) was adapted and utilised as a measuring tool to assess how closely participants’ food intake met that of national recommendations (see Appendix 4.6, section 3). It was felt that this would make it possible to establish direct comparisons as to actual intake and recommended intake within the analysis phase and make for a visually attractive easy to interpret representation of food intake within each group. It was anticipated that those in the intervention group would show more improvement in complying with the food
pyramid recommendations than those in the comparison group following the intervention and at follow up.

**Descriptive information on dietary intake according to the food pyramid**

As can be seen from below (Figure 5.31), participants were more likely to be consuming the recommended portions of food stuffs such as bread/cereals and fruit and vegetables and dairy than foodstuffs such as meat and fats. Small numbers of participants in the intervention group consumed the recommended portions of fat at T1 and T2 but a slightly upward trend can be observed between T2 to T3. The consumption of all other food groups remained reasonably stable between T1 and T2 and then showed a downward trend at follow up indicating that fewer participants were consuming recommended portions for these food groups at follow up than at pre and post intervention.

**Figure 5.31: Numbers of those who were consuming recommended number of portions of various food groups based on food pyramid in Intervention group**

Again as can be seen from below (Figure 5.32), participants in the comparison group were more likely to be consuming the recommended portions of food stuffs such as
bread/cereals and fruit and vegetables than foodstuffs such as meat and fats. Small numbers of participants in the comparison group consumed the recommended portions of fat at T1; this increased at T2 and increased further at T3. Meat consumption remained reasonably stable whereas the consumption of all other food groups showed a decline especially between T2 and T3 indicating that fewer participants were consuming recommended portions for these food groups at follow up than at pre intervention.

**Figure 5.32: Numbers of those who were consuming recommended number of portions of various food groups based on food pyramid in Comparison group**

Thus to conclude although it was anticipated that those in the intervention group would show more improvement in complying with the food pyramid recommendations than those in the comparison group following the intervention and at follow up, this was not the case.
5.5.3 Comparison of Weight Management Aims and Strategies between groups. Descriptive data was obtained on whether or not participants had a weight management aim and what strategies they were utilising to achieve this aim. Participants were asked whether they wished to maintain weight, lose weight or gain weight. Those with a weight loss aim were asked to select the weight loss strategies they were utilising from a selection of three. The three weight loss strategies included “take more exercise”, restrict calories” and restrict fat intake”. It was anticipated that those in the intervention group would display a balanced approach to weight loss strategies (i.e. including exercise as well as calorie restrictions) following the intervention as opposed to the comparison group.

When participants were asked about their weight management aim, the majority wished to lose weight (see figure 5.33). 69.1% of intervention group wished to lose weight pre intervention. This is despite the fact that only 33.3% (N= 15) of this intervention group were either overweight or obese at baseline and thus needed to lose weight. Post intervention 85.7% of the intervention group wished to lose weight while BMI recordings at T2 showed that 37.3% were either overweight or obese. At follow up, 80% of the intervention group wished to lose weight despite the fact that just 36.3% were either overweight or obese at that point. Within the comparison group 75.8% wished to lose weight at pre intervention despite only 40.9% of them being either overweight or obese. This reduced to 65.5% post intervention although obesity and overweight levels at this point were 47.3%. It increased again to 86.4% by follow up while BMI recordings indicated that at this point, only 31% of this group were either overweight or obese. Thus it must be concluded that as well as those that were overweight or obese, a large number of participants who were classified as of ideal weight or indeed underweight also wished to lose weight.
Figure 5.33: Those wishing to lose weight in intervention and comparison group

**Weight Management Strategies:**
Following the intervention one would assume that those in the intervention group would utilise all of the weight loss strategies particularly the take more exercise strategy. Thus one could hypothesise that those in the intervention group would utilise the take more exercise strategy more frequently than those in the comparison group.

**Weight Management Strategies in the intervention group across all three time periods**
Within the intervention group, participants used all or some of the three strategies to lose weight i.e. 37.4% utilised the “eat fewer calories” strategy, 33.3% utilised the “eat less fat” strategy and 62.9% utilised the “take more exercise” strategy at pre intervention. At post intervention 17% were utilising the “eat fewer calories” strategy, 40% the “eat less fat” strategy and 80% were utilising the “take more exercise” strategy. By follow up 47.6% were utilising the “eat fewer calories” strategy, 52.3% utilised the “eat less fat” strategy and 66.6% utilised the “take more exercise” strategy (see Figure 5.34).
Within the comparison group, participants used all or some of the three strategies to lose weight also, 64.5% utilised the “eat fewer calories” strategy, 41.9% utilised the “eat less fat” strategy and 74.1% utilised the “take more exercise” strategy at pre intervention. At post intervention 70% were utilising the “eat fewer calories” strategy, 26.6% the “eat less fat” strategy and 70% were utilising the “take more exercise” strategy. By follow up 57.14% were utilising the “eat fewer calories” strategy, 66.6% utilised the “eat less fat” strategy and 57.14% utilised the “take more exercise” strategy (see figure 5.35). As the SPSS data base was set up to input strategies as three variables, it was not possible to complete a chi square test to ascertain with certainty that there was a statistically significant difference in weight management strategies between groups. However it appears that the increase in those taking more exercise in the intervention group between T1 and T2 is reflective of the increased activity levels as seen with the IPAQ measure and the subsequent fall off at T3.

**Figure 5.35: Weight Loss Strategies in Intervention group across all three time periods.**
Summary of Weight Loss Aim and Strategies:
To conclude, the majority of both the intervention group and the comparison group wished to lose weight regardless of BMI’s. With regard to weight management strategies, it would appear that there was a large increase in those taking more exercise in the intervention group between pre and post intervention. However this increase was not maintained and fell off at follow up. Within the comparison group there was a reduction in those taking exercise as a weight loss strategy between pre and post intervention and a further reduction at follow up.

5.5.4: Stages of Change for Healthy Eating Related Hypothesis:
It was hypothesised that stages of change for healthy eating would increase from pre-contemplation towards maintenance between pre (T1) and post intervention (T2) and that that these increases would be maintained at follow up (T3) in the intervention group but not in the comparison group. As was the case with physical activity, the
transtheoretical stage of change model (Prochaska and Diclemente, 1984, 1986) was utilised to assess participants’ attitude to bringing about behavioural change, in this case in increasing their healthy eating behaviours.

**Stages of change for healthy eating in entire sample**

At the outset (pre-intervention) most participants within this study sample were not currently healthy eating but thinking about it (18.6%) or in preparation for becoming engaged in healthy eating (52.3%). 4.7% practiced healthy eating sometimes but not enough to fulfil criteria for healthy eating and 24.4% were regular healthy eaters (see Figure 5.36).

**Figure 5.36: Stages of change in entire sample at baseline**

![Stages of change in entire sample at baseline](image)

**Stages of change for healthy eating in intervention group**

Within the intervention group, no participants were at stage 1 (not currently practicing healthy eating and not thinking about doing so) at pre intervention, this increased to 2.3% at post intervention and reduced to 0% at follow up. Within stage 2 (not currently practicing healthy eating but thinking about doing so) there was a large decrease between T2 and T2 and an increase between T2 and T3 (T1=23.3%; n=10; T2=11.4%; n=5; T3=22.6%; n=7). Within stage 3 (preparation) although actual numbers of participants dropped percentages remained quite stable from pre to post
intervention and at follow up (T1=53.5%: n=23; T2=50%: n=22; T3=51.6%: n=16). Within stage 4 (practicing healthy eating but not on a regular basis) there was an initial increase from pre to post intervention and then a decrease at follow up (T1=4.7%; n=2; T2=18.2%; n=8; T3=3.2%; n=1). Finally within stage 5 (regular healthy eating) percentages remained fairly stable across T1 to T3 (T1=18.6%; n=8; T2=18.2%; n=8; T3=22.6%; n=7). Thus stage 4 would appear to show the main changes in that there was an increase from T1 to T2 which may indicate participants increased willingness to practice healthy eating following intervention. As this decreased again at follow up it may indicate that whatever changes had occurred at T2 these changes were not maintained (see Figure 5.37 below).

Figure 5.37 Stages of Change for Healthy Eating in Intervention group

Within the comparison group, no participants were at stage 1 at pre intervention, this increased to 2.7% at post intervention and reduced to 0% at follow up. Within stage 2 there was a decrease between T1 and T2 which remained relatively stable at follow up (T1=14%; n=6; T2=5.4%; n=2; T3=6.7%; n=2). Within stage 3 although actual numbers of participants remained relatively stable, percentages increased from T1 to T2 and decreased at follow up (T1=51.2%; n=22; T2=70.3%; n=26; T3=63.3%; n=19). Within stage 4 there was an initial decrease from pre to post intervention and
then an increase at follow up (T1=4.7%:n=2; T2=2.7%:n=1; T3=10%: n=3). Finally within stage 5 there was a decrease between T2 and T2 and a slight increase again at follow up, (T1=30.2%:n=13; T2=18.9%:n=7; T3= 20%:n=6). Within this comparison group stage 5 would appear to show the main changes in that there was a progressive fall off in those who practiced regular healthy eating from T1 to T2 and again at T3. This may indicate that participants’ healthy eating behaviours deteriorated over the course of the study (their first year in college) (see Figure 5.38 below). On chi square testing, none of these changes showed statistical significance within or between groups (see Tables 5.30 and 5.31).

Figure 5.38: Stages of Change for Healthy Eating in Comparison group

<table>
<thead>
<tr>
<th>Not currently practicing healthy eating</th>
<th>Not currently practicing healthy eating but thinking about doing so</th>
<th>Preparation</th>
<th>Practicing healthy eating but not regularly</th>
<th>Regularly engage in healthy eating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Intervention</td>
<td>Post Intervention</td>
<td>Follow Up</td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
</tbody>
</table>

Table 5.30: Chi square test for independence between stages of change for HE and time within groups.

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>X2 / Z value</th>
<th>P value</th>
<th>df</th>
<th>phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>9.8</td>
<td>.273</td>
<td>8</td>
<td>.289</td>
</tr>
<tr>
<td>Comparison</td>
<td>8.07</td>
<td>.426</td>
<td>8</td>
<td>.426</td>
</tr>
</tbody>
</table>
Table 5.31: Chi square test for independence between stages of change for HE and time between groups.

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>Df</th>
<th>phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>2.21</td>
<td>.529</td>
<td>3</td>
<td>.529</td>
</tr>
<tr>
<td>T2</td>
<td>6.5</td>
<td>.160</td>
<td>4</td>
<td>.160</td>
</tr>
<tr>
<td>T3</td>
<td>4.09</td>
<td>.251</td>
<td>3</td>
<td>.251</td>
</tr>
</tbody>
</table>

Summary of Stages of Change for Healthy Eating
Similar patterns between groups were observed (see Tables 5.37 and 5.38) particularly in stage 1. In stage 2 there was a decrease from T1 to T2 in both groups and an increase again at T3, however the increase was more marked in the intervention group. In stage 3 there was a small decrease from T1 to T2 in the intervention group and a subsequent increase at T3. While in the comparison group there was an increase from T1 to T2 and a decrease at T3. Within the intervention group those in stage 4 increased from T1 to T2 followed by a decrease at T3 which may be a reflection of participants in the intervention group becoming more actively engaged in healthy eating as a result of the intervention between T1 and T2 and the decrease at T3 reflective of the subsequent fall of in healthy eating activity levels. In the comparison group there was a slight drop from T1 to T2 and an increase at T3. With regard to stage 5, there was a small decrease from T1 to T2 followed by a small increase at T3 in the intervention group while there was also a decrease from T1 to T2 in the comparison group followed by a small increase at T3. A chi square test for independence within the intervention group revealed no significant association between stages of change and time (see table 5.30). This was also the case in the comparison group. Also no statistical significance between groups was found (see table 5.31). Thus the hypothesis that stages of change for HE would increase from stage 1 through to stage 5 from pre intervention to post...
intervention within the intervention group and not in the comparison group was not upheld.

5.5.5: Self-Efficacy for Healthy Eating (HE)
Related Hypothesis
It was hypothesised that participants’ self-efficacy scores for healthy eating would increase between pre (T1) and post intervention (T2) and these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group.

Self-Efficacy for HE
As was the case for physical activity, self-efficacy was measured by a five item questionnaire that examined how confident participants felt about engaging in healthy eating under various circumstance e.g. when tired, etc. Scores were calculated by combining scores on each of the five areas and then the average of all five items indicated the self-efficacy. A higher score indicated greater self-efficacy and vice versa. As normal distribution was present for these scores, parametric tests were applied.

Within the intervention group, there was an increase in the mean self-efficacy score for HE between pre and post intervention and a subsequent drop between post intervention and follow up. On paired t testing, none of these changes showed statistical significance. Within the comparison group, there was a small increase in the mean self-efficacy scores for HE between pre and post intervention which remained stable at follow up. None of these changes showed statistical significance on paired t testing (see tables 5.32 and 5.33).

Neither group showed a statistical significant effect over time on one way ANOVA testing.

When mixed between within ANOVA’s were completed, there was no significant
interaction effect or main effect over time, however there was a significant between-subject effect (F (1, 53) = 5.16, P= 0.027), possibly indicating that greater fluctuations of self-efficacy scores occurred in the intervention group (see table 5.34).

Table 5.32: Descriptive statistics, T test and one way ANOVA results for Self efficacy for HE in Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>42</td>
<td>12.61</td>
<td>4.12</td>
<td>T1-T2 = .231</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
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<td>13.38</td>
<td>3.99</td>
<td>T2-T3 = .968</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>34</td>
<td>12.82</td>
<td>4.06</td>
<td>T1-T3=.713</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig=.617</td>
</tr>
</tbody>
</table>

Table 5.33: Descriptive statistics, T test and one way ANOVA results for Self efficacy for HE in Comparison group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>43</td>
<td>13.86</td>
<td>4.09</td>
<td>T1-T2 = .675</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>37</td>
<td>14.10</td>
<td>3.5</td>
<td>T2-T3 = .675</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>29</td>
<td>14.10</td>
<td>3.8</td>
<td>T1-T3=.832</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
<td></td>
<td></td>
<td>Sig = .913</td>
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</table>
Table 5.34: Mixed between within ANOVAs results for self-efficacy for HE.

<table>
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<tr>
<th>Interaction effect</th>
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<th>0. 897</th>
<th>Non Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>0.109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>.004</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main Effect</th>
<th>Sig</th>
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<th>Non Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilks Lambda value</td>
<td>.981</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks Lambda F</td>
<td>.504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.019</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Between subject effects</th>
<th>Sig</th>
<th>0.027</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks Lambda F</td>
<td>5.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Eta squared</td>
<td>0.089</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.39: Mean self-efficacy for HE in intervention and comparison groups
Summary of self-efficacy mean scores for both groups
Within the intervention group, there was an increase in the mean self-efficacy scores for HE between pre and post intervention and a subsequent drop between post intervention and follow up. While within the comparison group, there was a small increase in the mean self-efficacy scores for HE between pre and post intervention which remained stable at follow up. On paired t testing and one way ANOVAS, none of these changes showed statistical significance. Also there was no significant interaction effect or main effect over time however there was a significant between subject effect over time on mixed between within ANOVA’s.
Thus the hypothesis that self-efficacy for healthy eating levels would display significant increases from pre-intervention (T1) to post intervention (T2) and that these increases would be maintained at follow up (T3), in the intervention group but not in the control group was not upheld.

5.5.6: Social Support for Healthy Eating
It was hypothesised that participant’s perceptions of social support for HE particularly from friends would increases between pre (T1) and post intervention (T2) and these increases would be maintained at follow up (T3), in the intervention group but not in the comparison group. As was the case with physical activity, social support for healthy eating was measured by a questionnaire (Marcus and Forsyth, 2009) which comprises of a list of 13 items which friends or family might do to encourage the participant to engage in healthy eating. Participants were asked to score these items twice (once for family support and once for friends support) from 1-5, 1= none, 5 = very often. Higher scores reflect more perceived social support.

Family Social Support for Healthy Eating
As assumptions for normal distribution were met within social support scores, t tests were applied to assess for differences between T1, T2 and T3. One way ANOVA’s
were also carried out to assess effect for time within groups. This was followed by mixed between within ANOVAS to assess main effect over time, interaction effect and between subject effects.

The intervention group showed an increase in mean scores for family support for HE between T1 and T2; however this was not statistically significant on paired t testing. Mean family support scores then showed a large decrease between T2 and T3 which was statistically significant on t testing at .005. Within the comparison group a similar trend was observed whereby a small non statistically significant increase occurred between T1 and T2 which was followed by a larger statistically significant decrease between T2 and T3. On one way repeated measures ANOVA’s there was a significant effect for time in the intervention group but not in the comparison group (see tables 5.36 and 5.37). When mixed between within ANOVA’s were completed, there was no statistically significant interaction effect, no between subject effect, however there was a significant main effect over time (see tables 5.38).

Table 5.36: Descriptive statistics, t tests and one way ANOVA results for family social support for HE in Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>43</td>
<td>33.27</td>
<td>10.05</td>
<td>T1-T2 = .151</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>44</td>
<td>34.13</td>
<td>9.5</td>
<td>T2-T3 = .005</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
<td>34</td>
<td>29.02</td>
<td>11.34</td>
<td>T1-T3=.198</td>
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<td>One Way ANOVA</td>
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<td>Sig = .030</td>
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Table 5.37: Descriptive statistics, t tests and one way ANOVA results for family social support for HE in Comparison group

<table>
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<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
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<td>36.16</td>
<td>11.9</td>
<td>T1-T2 = .450</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>37</td>
<td>37.7</td>
<td>10.5</td>
<td>T2-T3 = .037</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
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<td>Sig = .098</td>
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Table 5.38: Mixed between within ANOVAs for family Social Support for HE

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<td>Walks Lambda F</td>
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<tr>
<td></td>
<td>Partial Eta squared</td>
<td>.018</td>
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<td>Main Effect</td>
<td>Sig</td>
<td>.001</td>
<td>Significant</td>
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<tr>
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<td>Wilks Lambda value</td>
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<td>Walks Lambda F</td>
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<td>Partial Eta squared</td>
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<td>Wilks Lambda F</td>
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<td>Partial Eta squared</td>
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</table>
Summary of mean family social support tests for Healthy Eating
Both groups showed a small non-significant increase in family social support initially between pre and post intervention, this was followed by a statistically significant drop from post intervention to follow up in both groups. It appears that in both groups, small increases in family social support for HE between pre and post intervention were reversed between post intervention and follow up indicating that regardless of the intervention, participants in both group perceived a decrease in family support for HE toward the end of their first year in college. Perhaps this is a reflection of students’ developing autonomy in that they are living away from home and becoming less influenced by their families as they become more independent.

Friends Social Support for Healthy Eating
The intervention group showed a small non statistically significant increase in mean scores for friends social support for HE between T1 and T2. This was followed by a statistically significant decrease between T2 and T3. Within the comparison group a small non statistically significant increase also occurred between T1 and T2 which was followed by a small non statistically significant decrease between T2 and T3. On one way repeated measures ANOVA’s there was a significant effect for time in the
intervention group (p=.026) but not in the comparison group (see Tables 5.39 and 5.40). When mixed between within ANOVA’s were completed on friends social support for HE, there was no statistically significant interaction effect or main effect over time. However there was a statistically significant effect between groups (see Table 5.41).

Table 5.39: Descriptive statistics, t tests and one way ANOVA results for friends’ social support for HE in the Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
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<td>7.38</td>
<td>T1-T2 = .340</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>44</td>
<td>28.2</td>
<td>10.5</td>
<td>T2-T3 = .008</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
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<td>23.9</td>
<td>10.10</td>
<td>T1-T3=.094</td>
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<td>One Way ANOVA</td>
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Table 5.40: Descriptive statistics, t tests and one way ANOVA results for friends social support for HE in the Comparison group

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<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
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<td>30.5</td>
<td>10.02</td>
<td>T1-T2 =.572</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
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<td>31.8</td>
<td>10.7</td>
<td>T2-T3 = .848</td>
</tr>
<tr>
<td>Time 3 Follow up</td>
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<td>30.7</td>
<td>11.09</td>
<td>T1-T3=.644</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td></td>
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<td>Sig = .688</td>
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Table 5.41: Mixed between within ANOVAs results for Friends Social Support for HE

<table>
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<td></td>
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<tbody>
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<td>Non Significant</td>
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<td>Walks Lambda F</td>
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<td>Partial Eta squared</td>
<td>0.053</td>
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<table>
<thead>
<tr>
<th>Between subject effects</th>
<th>Sig</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Significant</td>
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<tr>
<td>Walks Lambda F</td>
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<tr>
<td>Partial Eta squared</td>
<td>.120</td>
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</table>

Figure 5.41: Mean Friends social support for Healthy Eating
Summary of Mean Friends Social Support for Healthy Eating
A small non-significant increase in social support from friends for HE was seen in both the intervention and the comparison group from T1 to T2. This was followed by a small non statistically significant decrease between T2 and T3 in the comparison group. On the other hand a statistically significant decrease occurred between T2 and T3 in the intervention group. Perhaps this statistically significant fall off in friends’ social support is an indication that they had made an attempt at enhancing this during the intervention and that as the intervention ended, the will to support each other to engage in healthy eating was no longer present.

Overall Summary of Healthy Eating Outcomes:
Although the mean BMI of both groups increased between Time 1 and Time 2, the increase within the comparison group was more marked than that of the intervention group. Thus there was a statistically significant increase in mean BMI scores from T1 to T2 in the comparison group but not in the intervention group. The majority of participants within the study wished to lose weight regardless of their BMI. Using exercise as a weight loss strategy increased in the intervention group between T1 and T2 and fell off at follow up. On the other hand “using exercise” as a weight loss strategy showed a gradual decline from T1 to T3 in the comparison group. With regard to stages of change for HE, similar patterns between groups were observed particularly in stage 1. The main difference would appear to be in stage 4 whereby, within the intervention group those in stage 4 increased from T1 to T2 followed by a decrease at T3 which may be a reflection of participants in the intervention group becoming more engaged in healthy eating activity as a result of the intervention between T1 and T2 and the decrease at T3 reflective of the subsequent fall of in healthy eating.
Self-efficacy for healthy eating increased between T1 and T2 in the intervention
group; it also increased in the comparison group but to a lesser extent. While self-efficacy for HE decreased from T2 to T3 in the intervention group, it remained stable from T2 to T3 in the comparison group. None of these changes showed statistical significance on t tests or one way ANOVA’s. However there was a significant between subject effect on mixed between within ANOVA’s possibly indicating that greater fluctuations in self efficacy scores occurred in the intervention group than the comparison group. With regard to family social support for HE, both groups showed a small non-significant increase between T1 and T2. This was followed by a statistically significant decrease between T2 and T3 in both groups. Social support from friends also showed a small non statistically significant increase from T1 to T2. This was followed by a small non statistically significant decrease from T2 to T3 in the comparison group and a larger statistically significant decrease in the intervention group. Statistical significance over time in the intervention group was also shown on one way ANOVA as well as between group effect on mixed between within ANOVA’s.

5.6 Psychological Well Being
It was anticipated that the intervention would have a positive impact on participants’ psychological well-being and thus one of the study’s objectives was to compare how participants rated their psychological well-being (PWB) before and after completing the health and well-being module (intervention). A hypotheses and a research question pertaining to psychological well-being are outlined in Table 5.42 below.
Table 5.42: Hypotheses and Research Questions specific to Psychological Well Being

<table>
<thead>
<tr>
<th>Psychological Well Being</th>
<th>Hypothesis 1</th>
<th>Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Participants psychological well-being scores will increase between pre (T_1) and post intervention (T_2) and these increases will be maintained at follow up (T_3) in the intervention group but not in the comparison group.</td>
<td>Will psychological well-being scores as measured by the GP core at (T_3) be reflective of those of the WHO index. NB. (lower GP core scores represent healthy well-being whereas higher psychological well-being scores represent good psychological well-being).</td>
</tr>
</tbody>
</table>

**Back ground to the measures:**
Psychological Well Being was measured using a scale entitled WHO-Five Well-Being index, (Bech et al., 1996). The WHO-Five Well-being Index was derived from a larger rating scale developed for a WHO project on quality of life in patients suffering from diabetes. According to Bech (2004), the WHO 5 has been shown to have a high degree of acceptability and applicability in a large European study in people with diabetes. He goes on to say that it was shown that the WHO 5 was a one-dimensional scale for the measurement of positive psychological well-being. The first version of the psychological well-being index had 28 items. According to Bech (1997), psychometric analysis of the WHO well-being index isolated five items, the sum of which was a sufficient measure of the dimension of positive psychological well-being. The five items included in the WHO-5 cover positive mood (good spirits, relaxation), vitality (being active and waking up fresh and rested), and general interests (being interested in things) (Bech et al., 2001). The scale requests participants to rate their feeling over the past two weeks in five areas. Each of the five items is rated on a 6-point likert scale from 0 (= not present) to 5 (= constantly present). Thus, higher scores represent better well-being. The WHO 5 Well Being Index was utilised to
assess psychological well-being pre intervention, post intervention and at follow up. A score below 13 indicates poor wellbeing and is an indication for testing for depression under ICD-10.

The GP Core 14 was introduced at follow up in an attempt to provide a validity member check as during preliminary analysis the psychological well-being status of many participants was surprisingly poor. Thus, the GP core was added in to the third data collection episode simply as another means of assessing psychological well-being at that point and also as a means of providing some form of cross validity check for the WHO measure. The GP CORE assessment tool was derived from the Clinical Outcomes in Routine Evaluation (CORE) project. This was launched in 1998 as the result of three-year collaboration between researchers and practitioners. The aim of this project was to design an evaluation system that would help to inform the development of client care in and across psychological therapy services (Gray Mellor-Clark, 2007). The GP Core (Clinical Outcomes in Routine Evaluation) is a 14 item tool which asks participants to rate how they have felt over the past week. Examples of options include “I have felt tense, nervous and anxious”; I have felt able to cope” etc.

**Psychological Well-Being Scores**
Paired T testing revealed a statistically significant mean improvement in the psychological well-being of the intervention group between pre and post intervention (p=.019), conversely the comparison group showed a non-statistically significant mean dis-improvement between pre and post intervention. Findings between post intervention and follow up showed a small non statistically significant decrease in mean psychological well-being scores within the intervention group and a large statistically significant decrease in psychological well-being scores in the comparison
group (p=.000). Paired T testing between pre intervention and follow up in the intervention group showed an increase in mean total psychological well-being scores which although not statistically significant with a p value of .053, was approaching significance. There was a large decrease in psychological well-being scores in the comparison group between pre intervention and follow up which was statistically significant (p=.000). On one way repeated measures these changes showed a significant effect for time in both the intervention group (p=.012) and the comparison group (P=.000) (see tables 5.43 and 5.44). Mixed between within ANOVA’s showed a significant interaction effect, a significant main effect over time and a significant effect for time between groups (see Table 5.45).

Thus, the hypothesis was partially upheld in that the intervention group showed a statistically significant improvement in psychological well-being scores between pre and post intervention and the comparison group did not. However this improvement was not maintained at follow up.

Table 5.43: Descriptive statistics, t tests and one way ANOVA results for psychological well-being in Intervention group

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Pre intervention</td>
<td>44</td>
<td>14.06</td>
<td>3.2</td>
<td>T1-T2 = .019</td>
</tr>
<tr>
<td>Time 2 Post intervention</td>
<td>44</td>
<td>15.45</td>
<td>3.4</td>
<td>T2-T3 = .421</td>
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<tr>
<td>Time 3 Follow up</td>
<td>33</td>
<td>14.96</td>
<td>3.6</td>
<td>T1-T3=.053</td>
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<tr>
<td>One Way ANOVA</td>
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</table>
Table 5.44: Descriptive statistics, t tests and one way ANOVA results for psychological well-being in Comparison group

<table>
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<tr>
<th>Time Period</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Paired T. Test results</th>
</tr>
</thead>
<tbody>
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<td>3.9</td>
<td>T1-T2 = .683</td>
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<td>T2-T3 = .000</td>
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<tr>
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<td>4.08</td>
<td>T1-T3=.000</td>
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<td>One Way ANOVA</td>
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Table 5.45: Mixed between-within ANOVAs for total psychological well-being scores

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<th>Interaction effect</th>
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</tbody>
</table>
Cross tabulations and Chi Square of Psychological well-being categories across all three time periods between groups.
Mean psychological well-being scores were then collapsed into two categories representing poor or good well-being. It was anticipated that there would be an increase in the number of participants from the intervention group in the good well-being category and a reduction in the number of them in the poor well-being category as opposed to the comparison group over the course of the study. Here, within the intervention group there was a decrease from 41.5% to 29.3% in those in the poor well-being category between pre and post intervention (see Figure 5.43). This decrease remained stable (29.3%) at follow up. There was also an increase from 33.8% to 40% in those in the good well-being category between pre and post intervention. This was followed by a decrease to 26.3% at follow up. A chi square test for independence within the intervention group indicated no significant association between psychological well-being categories across time ($X^2 =1.39$, df =2, p=.493) (see Table 5.46). Within the comparison group there was a decrease in those in the poor well-being category from 36.1% to 24.6% between pre intervention and follow
up, between post intervention and follow up there was a significant increase from 24.6% to 39.3% in those in this category. There was also a small increase in those in the good well-being category from 42.9% to 44.9% between pre and post intervention. This was followed by a large decrease to 12.2% at follow up (see Figure 5.44). A chi square test for independence within the comparison group indicated a significant association between psychological well-being categories across time ($X^2 = 10.96, df=2, p=.004$) (see table 5.46).

**Figure 5.43: Psychological well-being categories in intervention group.**

**Figure 5.44: Psychological well-being categories in comparison group.**
Table 5.46: Summary Statistics relating to two category Psychological Well-Being between groups

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>Group</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>df</th>
<th>Phi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>1.39</td>
<td>.498</td>
<td>2</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>10.96</td>
<td>0.004</td>
<td>2</td>
<td>0.107</td>
</tr>
</tbody>
</table>

In summary, there was no statistical significance observed in the intervention group when chi square tests were applied to two category psychological well-being over all three time periods. However there was a statistical significant result for the comparison group in the form of an increase in those in the poor psychological well-being category and a decrease in those in the well-being category ($X^2 = 10.96$, df= 2, p=.004).

**GP Core scores for psychological well-being at follow up**
As previously stated the GP core tool was used to assess psychological well-being at T3 only. This was included as an afterthought in view of the high levels of poor psychological well-being that was noted in T1 and T2 with the WHO index. Within the scoring protocol for GP core, levels of psychological distress are classified according to scores obtained as follows,
Moderate to severe (68–84), Moderate (51–67), Mild (34–50), Low levels of psychological distress (21–33), Healthy (1–20)

**GP Core scores for psychological well-being at follow up:**
As previously stated, the tool was utilised to ascertain whether psychological well-being scores as measured by the GP core at T3 would be reflective of those of the WHO index thereby enhancing the validity of the WHO index. It is important to point out that lower GP core scores represent healthy well-being whereas higher
psychological well-being scores are reflective of good psychological well-being.

Findings here indicated that the mean score on the GP core index within the intervention group was 16.68 which falls into the “Healthy” category under this scale. On the other hand the mean score on the GP core index within the comparison group was 21.10 which falls into the “low level of psychological distress” category under this measure (see Figure 5.45). Thus, the mean GP core score for the intervention group was 16.68 representing healthy well-being and the mean score for the comparison group was 21.10 representing low level psychological distress.

Comparable scores were found with the WHO index at T3 in that the mean WHO 5 index score in the intervention group was 14.96 which corresponds with good psychological well-being, whereas the mean WHO index score for the comparison group at T3 was 9.2 which corresponds to poor well-being (see figure 5.46).

**Figure 5.45: GP Core mean scores at T3 in Intervention and Comparison groups:**

![Bar chart showing GP Core mean scores at T3 in Intervention and Comparison groups]

Two category GP core
In line with categorising the WHO index scores into categories the GP core scores were also categorised into either healthy (scores between 1-20) or low to mild distress (scores between 20-50). (See Figure 5.46)
In summary, 75% of the intervention group scored healthy with regard to the GP core psychological distress index while 25% fell into the low to mild level distress category. On the other hand 48.3% of the comparison group scored healthy with regard to GP core psychological distress index while 51.7% fell into the low to mild level distress category. A chi square test for independence between two category GP core and group indicated a significant association between two categories GP core and type of ($X^2 = 4.6$, df=1, $p=.031$) (see table 5.47). Thus a statistically significant difference was observed between groups in that significantly more of the intervention group than the comparison group were in the “healthy” category while a larger number of the comparison group were in the “low to mild level of psychological distress” category.

**Table 5.47: Chi square result for two category GP core and group at T3**

<table>
<thead>
<tr>
<th>Chi Square</th>
<th>Group</th>
<th>X2 /Z value</th>
<th>P value</th>
<th>df</th>
<th>Phi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4.6</td>
<td>.031</td>
<td>1</td>
<td>.275</td>
<td></td>
</tr>
</tbody>
</table>
Cross tabulation of psychological well-being scores and GP core psychological distress score
In an attempt to cross check the validity of the WHO index, a cross tabulation of both well-being tools was performed for follow up data (T3). This was performed to assess whether those who fell into the poor well-being category under the WHO index would fall into the low to mild psychological distress category within the GP core. Also that those who fell into the good well-being category within the WHO well-being category would also fall in to the healthy well-being category under the GP core measure.

Comparing the results of the WHO index and the results of the GP core scores
According to the WHO index 36.4% of the intervention group had poor well-being whereas 80% of comparison group had poor well-being. 25% of the intervention group were rated as low to mild distress under the GP core psychological distress measure whereas 51.7% of the comparison group fell into this category. 63.6% of the intervention group had good well-being according to the WHO index whereas 20% of the comparison group were in this category. 75% of the intervention group fell into the healthy category under the GP core scoring protocol and 41.3% of the comparison group were in this category (see figure 5.47). This would appear to indicate a certain level of cross validity for the WHO index as categories are largely reflective of each other in that those who were categorised as having poor well-being within the WHO index appear more likely to have low to mild levels of psychological distress as measured by the GP core. Thus it may be concluded that the two measures displayed a reasonable degree of consistency and comparability.
Summary of Psychological Well-being Measures.

When mean psychological well-being scores were compared, on paired t testing, the intervention group showed a statistically significant improvement in psychological well-being scores between pre and post intervention (p=.019). The intervention group’s score fell slightly at follow up but this was not statistically significant. Paired t testing on PWB scores between T1 and T3 within the intervention group was not statistically significant but was approaching significance (p=.053). The comparison group showed a slight non statistically significant increase in mean PWB scores between T1 and T2 and a large statistically significant reduction in mean psychological scores between T2 and T3 (p=.000) and also between T1 and T3 (p=.000). Both groups showed a significance effect for time on one way repeated measures ANOVA (p=.019). When mixed between within ANOVAS were applied, both groups showed a significant interaction effect, a statistically significant main effect over time and a significant effect for time between groups. When psychological well-being scores were categorised into either poor well-being or good well-being,
there was no statistical significance observed in the intervention group when chi
square tests were applied over all three time periods. However there was a statistically
significant result for the comparison group in the form of an increase in those in the
poor psychological well-being category and a decrease in those in the well-being
category \((X^2 = 10.96, \text{df}=2, p=.004)\). Thus there was a statistically significant number
of the comparison group that fell into the poor well-being category as opposed to the
intervention group. The mean GP core score for the intervention group was 16.68
representing healthy well-being and the mean score for the comparison group was
21.10 representing low level psychological distress. When the GP core scores were
categorised into either healthy (scores between 1-20) or low to mild distress (scores
between 20-50). A significant number of the intervention group were classified as
healthy as opposed to those of the comparison group. When results for the
psychological well-being index and those of the GP core well-being tool were
compared on follow up data, it appeared to indicate a satisfactory level of
comparability between both measures.

5.7 Inter-relatedness between variables
It was decided to perform a number of cross tabulations based on connections made
within the literature between the various health behaviours in questions. Cross
tabulations undertaken included the relationship with PWB and PA, the relationship
with BMI and PA, and BMI and PWB. Also an attempt was made to see if participants
were in similar stages of change for healthy eating and physical activity as suggestions
within the literature would indicate that this is often the case. Self-efficacy for PA and
HE and social support in both these areas were compared for consistencies. See Table
5.48 below for cross tabulations performed.
Table 5.4: Cross tabulations performed

<table>
<thead>
<tr>
<th>Cross tabulation</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWB and PA</td>
<td>Are those who are physically active more likely to have good psychological well being</td>
</tr>
<tr>
<td>SOC for HE and PA</td>
<td>Are participants more likely to be at the same stage of change for engaging in physical activity and healthy eating</td>
</tr>
<tr>
<td>Self-efficacy for HE and PA</td>
<td>Are participants more likely to have similar self-efficacy scores for engaging in physical activity and healthy eating</td>
</tr>
<tr>
<td>Social Support from family and friends for PA and HE</td>
<td>Are participants more likely to rate family and friends social support for PA and family social support for HE similarly</td>
</tr>
</tbody>
</table>

In order to perform crosstabulations on the above variables, Pearson’s correlation test was utilised for continuous data while Chi square tests were utilised for categorical data.

However on cross tabulations, no significant relationship was found between any of the above variables within this study.

**Summary of Findings**

**General Health Perceptions**
No significant difference was found between groups self-rating of health status across all three data collection episodes. When participants were asked what they felt they needed for better health, more time to exercise, more will power and change of weight were the top three areas cited by the intervention group. Similarly the comparison group also cited more time to exercise and more will power as their first and second choices, however less stress featured as their third most important requirement for health improvement. When participants were asked what they felt prevented them
from making improvements in their health overall, lack of time, and felt no need and lack of facilities were the most important factors within both groups.

Considerably more of the intervention group were smokers throughout the study than the comparison group and a statistically significant difference between groups with regard to smoking was shown. Generally, alcohol consumption was low with both groups being well below the recommended maximum units per week. No statistically significant difference in alcohol consumption per group was revealed. When participants were asked to rate the adequacy of their current exercise levels, a small percentage in both groups considered they were taking enough exercise pre intervention. At post intervention this increased in the intervention group and decreased in the comparison group. By follow up 18.2% of the intervention group considered they were getting enough exercise compared to 10% of the comparison group. On chi square testing no significant difference was found between group self-perceptions’ of current levels of exercise across all three data collection episodes. Also when perceptions of current diet and eating habits were compared, on Chi square testing, no significant difference was found between groups.

**Summary of Qualitative Findings**
Eight main themes were identified along with some associated sub themes. Firstly the nature of the facilitator/participant relationship emerged as a theme which was characterised by participants perceiving this relationship as being based on trust and experiencing the facilitator’s interactions as positive and individualised. The fact that ownership for change remained with the participant throughout the process was highlighted within the second theme and reinforced with the subthemes of autonomy and evocation. Thirdly the power of the group was identified as a theme and characterised by sub themes such as social support, peer pressure and motivation.
Fourthly increased knowledge and developing awareness about health behaviour change was identified as a theme, in that participants felt that they had gained valuable knowledge and awareness on healthy lifestyle behaviours. Barriers to behavioural change was identified as the fifth theme and these included inconvenience, lack of time due to college workload, affordability and adjusting to college life. The sixth theme was entitled “facilitators to health behavioural change” and included sub themes such as goal setting, feedback and monitoring, commitment, fun and the college environment. The seventh theme was entitled “stress of the student life” in particular the first semester, the demands of academic assessments. Interrelatedness of all three health behaviours was the eighth and final theme. Here effects of physical activity on psychological well-being, as well as effects of psychological well-being on healthy eating behaviours were addressed.

Summary of Quantitative Findings

Physical Activity Measures:
With regard to physical activity levels as measured by the IPQA, within this non normally distributed variable, the Friedman test showed a statistical significant difference in IPAQ scores within the intervention group (p= .023) but not in the comparison group. These differences were in the form of a large increase between time 1 and time 2 and a small decrease between time 2 and time 3. With regard to total minutes of physical activity per week, the Friedman test revealed no statistically significant difference across time in total minutes of weekly activity in either the intervention or the comparison group. Although not significant, trends were seen in median values with an increase in the intervention group between T1 and T2 and then a reduction between T2 and T3. The comparison group showed a consistent reduction in median scores across all three time periods. When compared to national physical activity...
activity recommendations, physical activity levels were very good in both groups with the majority of the group being meeting minimum recommendations across all three data collection time periods. With regard to the SOC, similar patterns were observed between groups at stages, 2 and 4 while small differences were observed across other stages. Within the intervention group, there was a decrease in those in stage 1 at T2 and an increase at T3, while in the comparison group there was a continual increase in those in stage 1 from T1 to T3. Within the intervention group, there was an increase in those in stage 3 at T2 and this was followed by a drop at T3 while the comparison group showed a slight increase at T2 and again at T3. Percentages in stage 5 remained fairly stable in the intervention group throughout the course of the study, while in the comparison group, an initial increase between T1 and T2 was followed by a drop at T3. On chi square testing no statistically significant difference was seen between the groups and stages of change for PA. Mean self-efficacy for PA scores improved within the intervention group and the comparison group between pre and post intervention and subsequently dropped between post intervention and follow up in the intervention group and showed a slight increase in the comparison group. None of these changes showed statistical significance, however an increase in self-efficacy mean scores between pre and post intervention was approaching significance (P=.064).

With regard to social support, both groups showed a non-significant increase in friends and family social support for PA between pre and post intervention, this was followed by a statistically significant drop from post intervention to follow in both groups for both family and friends social support for PA.

**Healthy Eating Measures**
Although the mean BMI of both groups increased between T1 and T2, the increase within the comparison group was more marked in that a statistically significant
increase in mean BMI scores from T1 to T2 was shown in the comparison group but not in the intervention group. The majority of participants within the study wished to lose weight regardless of their BMI. Using exercise as a weight loss strategy increased in the intervention group between T1 and T2 and fell off at follow up. On the other hand “using exercise” as a weight loss strategy showed a gradual decline from T1 to T3 in the comparison group. Some small differences between groups were shown with regard to stages of change for healthy eating, however none of these differences showed statistical significance between groups. Self-efficacy for healthy eating increased between T1 and T2 in the intervention group; it also increased in the comparison group but to a lesser extent. While self-efficacy for HE decreased from T2 to T3 in the intervention group, it remained stable from T2 to T3 in the comparison group. None of these changes showed statistically significance. With regard to family social support for HE, both groups showed a small non-significant increase between T1 and T2. This was followed by a statistically significant decrease between T2 and T3 in both groups. A significant effect over time was shown on one way ANOVA’s and mixed between within ANOVA’s. Social support from friends also showed a small non statistically significant increase from T1 to T2. This was followed by a small non statistically significant decrease from T2 to T3 in the comparison group and a larger statistically significant decrease in the intervention group.

**Psychological Well-being Measures**

When mean psychological well-being scores were compared, on paired t testing, the intervention group showed a statistically significant improvement in psychological well-being scores between pre and post intervention (p=.019). The intervention group’s score fell slightly at follow up but this was not statistically significant. Paired t testing on PWB scores between T1 and T3 within the intervention group was not
statistically significant but was approaching significant (p=.053). The comparison group showed a slight non statistically significant increase in mean PWB scores between T1 and T2 and a large statistically significant reduction in mean psychological scores between T2 and T3 (p=.000) and also between T1 and T3 (p=.000). Both groups showed a significance effect for time on one way repeated measures ANOVA (p=.019). When mixed between within ANOVA’s were applied, both groups showed a significant interaction effect, a statistically significant main effect over time and a significant effect for time between groups.

**How Qualitative and Quantitative Findings Illuminate Each Other:**
Social support from friends and family for PA and HE showed similar patterns in both groups in the areas of physical activity and healthy eating. This was in the form of small increases between T1 and T2 and then large decreases from T2 to T3 in family and friends’ social support for PA and HE. There was one exception to this trend in that there was a non statistically significant decrease in social support between T2 and T3 in the area of friends’ social support for HE in the comparison group. Thus a pattern of a decrease in social support from both family and friends appears to be an emerging phenomena. This is despite the fact that the focus group appears to value social support very highly and attribute the social support they received from their colleagues as invaluable “in getting them through” the first semester. Perhaps by follow up this level of social support had reduced or maybe the social support for psychological concerns such as stress related to assessment workload is different that the social support for PA and HE. It also may be that these students had settled into college at this point and did not perceive their need for social support to be a great as it was in semester 1. They may have become more independent and may wish to cultivate their own autonomy at this point and disengage from former social supports.
such as family. Alternatively it may be the case that social support is more useful when students are experiencing psychological distress such as stress and anxiety over exams etc. and this may be why it was reported as so beneficial from the focus group. Perhaps the motivation to provide social support to each other for psychological stress is greater than it is to provide social support to each for physical activity and healthy eating.

The increase in BMI scores between T1 and T2 within both groups may be a reflection of the interrelatedness theme within the focus group in that participants reported that when stressed preparing for exams etc., they tended to eat whatever was available and didn’t have time to exercise. On a more positive note there was a reported increase in those in the intervention group as opposed to the comparison group using exercise as a weight management strategy following the intervention. This may have assisted in minimising the weight gain in this group. As previously stated although the intervention group gained weight from T1 to T2, unlike the comparison group this was not to a statistically significant extent. As reported from the quantitative findings the majority of the intervention group wished to lose weight despite the majority of them being within the normal BMI range. However within the focus group participants claim to have developed knowledge and gained awareness with regard to healthy eating and recommended BMI levels etc.

A statistically significant increase in psychological well-being scores occurred from T1 to T2 in the intervention group and an interaction effect was shown on mixed between within ANOVA’s, thus it is likely that the intervention contributed to this significant improvement. It may also be likely that this intervention protected the intervention group from experiencing a drop in psychological well-being similar to that of the comparison group from T1 to T3. Theme seven of the focus group analysis
clearly indicates that participants in this study perceive the demands of college as very stressful and thus, it is likely that the stress these students talk about in the focus group is responsible for decreased psychological well-being. Thus, perhaps this intervention went some way in minimising the effects of this stress on the intervention group and assisted in promoting their psychological well-being as indicated by the mean PWB score falling within the “healthy category, as opposed to that of the comparison group where the mean PWB score at follow up fell into the psychological distress category.
CHAPTER SIX
DISCUSSION

6.1 Introduction
Within the following chapter, a description of the sample and their associated demographic characteristics will be discussed. As previously stated, the table in Appendix 6.1. shows how the module’s aims and learning outcomes are integrated into the aims and objectives of the study and measurement variables therein. This table will form the basis for the discussion of findings within the remainder of the chapter. In order to evaluate the impact and outcome of this intervention, a summary of quantitative findings relevant to the study objectives regarding physical activity, healthy eating and psychological well-being will be presented and discussed. Where possible these findings will be illuminated by those of the focus group and those from the general health measures section. A summary and discussion of findings relevant to the interrelationship between all three variables will then be presented. This will be followed by a discussion on the quantitative and qualitative findings relevant to the barriers and facilitators to a healthy lifestyle. Qualitative findings from the focus group not already discussed will then be presented and such findings will be examined to inform the process evaluation of this intervention. Limitations of the study will then be presented. Implications of these findings for practice, policy, education and research will then be addressed along with recommendations for future research in this area.

6.1.1 Description of Sample
It is suggested that university students are a relatively homogenous sample in terms of socioeconomic status (SES) making it easier to study processes that are subject to SES differences (Wardle and Steptoe, 1991). Although both the intervention and comparison groups were first year undergraduate students in the same college, there
were significant differences between groups in a number of areas. Firstly, significant differences were present in the areas of age and marital status, number of dependents and average weekly hours spent in part-time employment. Although the most frequently occurring age in both groups was 18, there were significantly more mature people in the intervention group. This may be attributed to the large numbers of mature people applying for the nursing degree (BNSC) as there are a number of places reserved for mature students in the BNSC recruitment process. Thus, the number of mature students within the intervention group may also account for the differences in marital status, number of dependents and time spent in part-time employment. A number of students within the intervention group also had dependents. The other areas where there was significant differences noted between groups was in the areas of socio-economic status and parental education status. Interestingly, the comparison group were significantly more likely to have come from a higher socio-economic background and to have more highly educated parents than the intervention group. Perhaps this is a reflection of the traditional trend whereby children of more working class parents choose nursing as a career option. It may also be a reflection of the Leaving Certificate points required to pursue these two courses, whereby entry points for the B.ED. programme of that year ranged from 450-465 while for the BNSC (Gen) points ranged from 345-480 and for the BNSC (ID), points ranged from 275-420. Thus it could be concluded that the comparison group were a more academic group than the intervention group at the outset. However it may also be attributed to the first issue in that students who were more mature were not assessed on points alone but on the mature entry criteria. Many studies point to a relationship between educational level and health behaviours (Karter et al., 2007; Higgins et al., 2008). With regard to socio-economic differences, there was a significant difference in socio
economic status based on fathers occupation with more of the intervention group falling in to social classes 3, 4, 5 and more of the comparison group from social class 1 and 2 (p=.001). Due to the number of mature students, consideration was given to measuring socio economic and educational status of individual students as opposed to parents, however as the majority of the population were school leavers it was decided to utilise the more traditional method of classifying students’ socio economic and educational status based on that of their parents. Many studies have shown a negative relationship between social class and health often referred to as the social class gradient whereby those in social class 1 experience better health chances and outcomes and this decreases as one goes further down the social classes towards 4 and 5 (WHO, 2008; Barry et al., 2001). Bearing this in mind it may be expected that the comparison group would have better health than the intervention group at the outset. However on main outcomes such as physical activity levels, BMI and psychological well-being this was not the case. Pre intervention physical activity levels were higher in the intervention group than the comparison group. Also 33.3% of the intervention group was either overweight or obese at the outset compared to 40.9% of the comparison group. Pre intervention, psychological well-being scores in the intervention group were 14.06 compared to 13.83 in the comparison group with higher scores indicating better well-being. Thus although the intervention group were overall from lower socio economic backgrounds than the comparison group, this does not appear to have had a particular influence on their health behaviours in these areas. In a quasi-experimental study such as this, one would hope for fewer differences in the intervention and comparison group. However, it is important to highlight the differences in both groups, so that the researcher can remain cognisant of these differences throughout the analysis and interpretative process. Although not a homogenous group of university
students as one might expect particularly with regard to socio economic and educational level, no evidence existed at baseline to suggest that the group from the higher socio economic and or educational background had any better health measures than those of the intervention group.

6.1.2 Physical Activity Measures
Findings presented here relate to objective number one which aimed to increase physical activity levels in the intervention group. Variables measures included IPAQ, stages of change for PA, self-efficacy for PA and social support for PA. (See Appendix 6.1.). Physical activity levels as measured by the IPAQ showed a statistical significant increase from T1 to T2 within the intervention group (p= .023) but not in the comparison group. A small non statistically significant decrease in IPAQ scores occurred in both groups from T2 to T3.

Thus, the intervention was somewhat effective in that a statistically significant increase in PA levels occurred within the intervention group between pre and post intervention and not in the comparison group. However this improvement was not maintained at follow up. These findings indicate that interventions involving increasing knowledge about PA, developing health awareness and motivating change by group motivational interviewing (GMI) was successful to a certain extent but improvements did not last. These findings are similar to those reported by Ferrara (2009) who found that interventions designed to increase physical activity can be effective in the college student population. However, Ferrara (2009) found that the success of these interventions appears to be limited to the duration of the intervention, with increases in physical activity not maintained after completion of the interventions. Calfas et al. (2000) reported longer lasting effects of up to two years, within the Project Grad study, where a cognitive-behavioural intervention was utilised.
to promote adoption and maintenance of PA among young adults making the transition from university to adult roles. Two years is a substantial amount of time indicating maintenance of the behavioural change. However this study included behaviourally orientated phone and mail follow up for 18 months following the initial intervention. Thus it may be concluded that initial improvements in physical activity levels will only be maintained if some form of follow up to the intervention occurs. Loughlan and Mutrie (1997) also claim that evidence exists to suggest that on-going support is needed to maintain initial increases in PA. In another study by Lowther, Mutrie and Scott (1999) findings suggested that a cognitive behavioural skills based exercise consultation process may have the best long term effects in increasing PA in individuals. Thus further interventions such as this one would need to have follow up built in to the original intervention. This may be in the form of booster group motivational interviewing workshops throughout the year and a physical fitness re-assessment one year after the initial assessment. Also information leaflets, emails, or texts containing information on benefits of PA and motivational messages could be delivered on an on-going basis throughout the year.

With regard to total minutes of physical activity per week, no statistically significant difference was found between groups. Although not significant, trends were seen in median values with an increase in the intervention group between T1 and T2 and then a reduction between T2 and T3 whereas the comparison group showed consistent reduction in median scores across all three time periods. On first glance these findings appear contradictory to those of the IPAQ measure which showed statistically significant increased activity levels between pre and post intervention. However it is important to remember that the IPQA measure is mainly measuring increases in levels of activity regardless of whether participants are engaged in an activity for the
minimum time recommendations. Also, although those who partake in vigorous exercise may accumulate very high IPQA scores, they may not be reaching 150 minutes per week activity engagement. On the other hand, these conflicting findings may lead one to question the accuracy of the IPAQ as a measure of physical activity, particularly in light of more recent studies which question the validity and reliability of this measure (Lee et al. 2011).

When compared to national physical activity recommendations, reported weekly minutes of physical activity were very good in both groups with a minimum of 70% of the entire population meeting minimum recommendations across all three data collection time periods. This is despite the fact that only a small percentage of participants felt they were taking enough exercise in both groups. Also theme four of the focus group showed how participants had increased knowledge and awareness including recommended activity levels. It is interesting to see that whilst the majority are reaching minimum recommended activity levels, only a minority consider that they are taking enough exercise, despite knowledge and awareness of physical activity recommendations. These figures are in contrast to international and national figures in this area. Ferrara (2009) found that only 40% of college students were active. From a national perspective SLAN (2007) found that 60% of 18-29 year olds were active. According to CLAN (2005) 70% of college students were physically active. Thus figures from this small sample of college students would appear to be more in line with those of the CLAN study which was the only Irish study of college students’ lifestyle behaviours. However a note of caution has to be given as different classifications were utilised to determine adequate physical activity levels. The 70% regularly active rates of the CLAN study are actually self-reports from participants when asked how active they considered themselves. Levels of physical activity
adequacy were based on twenty minutes three or more times per week which adds up to less than half of current recommendations (150 minutes per week). Also much of the literature suggests that the problem with “self-reported” measures of physical activity levels is that participants may overestimate their activity levels (Sallis and Owen, 1998; Ronda et al.). With such high figures in the current study which also utilised self-reported activity levels, there is the possibility that participants may have overestimated their activity levels based on their increased knowledge of how much physical activity they should be accumulating and a possible desire to provide a socially desirable response (Huang et al., 1998). According to Keating et al. (2005) there is an urgent need to standardise PA measures to help researchers better understand PA. They suggest that health and PA experts need to reach a consensus of measures of PA and standards for being physically active. They also point out that over the past few years minimum PA standards for accruing health benefits changed several times and may have confused the public (USDHHS, 2000; USDHHS, 1996). On a positive note, now that we have national physical activity guidelines in place since 2009, future classifications of physical activity should be more uniform. Perhaps the deterioration in physical activity levels as can be seen from international studies in this area, is not as marked in Irish students. However a larger national survey of Irish college students’ physical activity behaviours needs to occur utilising standardised tools for measuring physical activity in order to make direct comparisons within and between countries. It must also be borne in mind that what is being assessed here is minimum recommended levels of physical activity for all adults. For young adults at their peak of physical ability, minimum recommendations may not be sufficient.

With regard to the SOC, similar patterns were observed between groups at stages, 2
and 4 while small differences were observed across other stages. The intervention may have helped move some of the intervention group out of stage 1 as reflected by the decrease at T2 and it may have assisted some intervention participants into stage 3 and assisted those in stage 5 to stay there, however as statistical significance was not established it is not possible to draw these conclusions with any certainly. As stages of change is a well-established theory to indicate peoples readiness to change behaviour, in this case their physical activity, one would have expected a significant difference in the intervention group and the comparison group considering that the intervention group did improve their PA levels significantly between T1 and T2. However this is not the case within these findings. A possible reason for this may have being a difficulty with stage matching interventions in a group setting. Matching interventions to individual’s stage of change for PA has being shown to be more superior than applying motivating interventions in general regardless of stage of change (Woods, Mutrie and Scott, 1999; Loughlin and Mutrie, 1997; Keating et al., 2005; Kahn et al., 2002). At the outset of the group motivational workshops, participants were asked to identify their stage of change, then as the facilitator worked with individuals in the group setting, attempts were made to match interventions according to stage. However as within each workshop, not all participants spoke, it was not possible to ensure accurate stage matching of each individual. This may have accounted in some way for the lack of significant improvement in the stages of change in the intervention group despite significant PA improvements. Thus, perhaps if in a future initiative such as this, groups were formed based on a common stage of change, a more accurate stage matched intervention could occur. However a much larger sample would be required for such an intervention. Mean self-efficacy for PA scores improved within the intervention group and the comparison group between pre and post intervention and
subsequently dropped between post interventions and follow up in the intervention group and showed a slight increase in the comparison group. None of these changes showed statistical significance however an increase in self-efficacy mean scores between pre and post intervention was approaching significance (P=.064). Self-efficacy is seen to be an extremely important psychological construct within behavioural change literature and a key determinant to the change process (Tones and Tilford, 2001; Pender et al. 2011). Other writers have found self-efficacy to be a reliable predictor of exercise adherence (Gulliot et al., 2004; Wallace et al., 2000). On the other hand according to the ESRI report (Fahey et al., 2004), self-efficacy in one’s own sporting ability has only a small influence on participation rates and cannot be considered a major influence. Within the current study, the GMI workshops sought to enhance participant’s self-efficacy for exercise participation. Miller and Rollnick (2002) point out that building self-efficacy is a key goal of motivational interviewing. Results indicate that the intervention may have had some effect in enhancing participant’s self-efficacy between pre and post intervention but not to a significant level and whatever change occurred was not maintained at follow up. This may be a reflection of the need for on-going support in maintaining any improvements as was reflected within the physical activity levels above.

With regard to social support, both groups showed a non-significant increase in friends and family social support for PA between pre and post intervention, this was followed by a statistically significant drop from post intervention to follow up again in both groups for both family and friends social support for PA. Findings are remarkably similar for both friends and family social support. Whatever small gains in social support occurred from pre to post intervention, these certainly were not maintained and for whatever reason for this student population, perceived family and
friend’s social support for PA fell significantly throughout the course of their first year in college. A pattern of a decrease in social support from both family and friends appears to be an emerging phenomenon. A decrease in family social support may have being expected as many students are living away from home for the first time and their families are having less influence on them. On the other hand, one might have expected that as friendships grew, college friends would have a larger role in providing social support for each other. Within the focus group, the power of the group was identified as a theme and characterised by sub themes such as social support, peer pressure and motivation. Within the focus group, participants appear to value social support very highly and attribute the social support they received from their colleagues as invaluable “in getting them through” the first semester. The decrease in social support may be a reflection of the fact that these students had settled into college at this point and did not perceive their need for social support to be as great as it was in semester 1. They may also have become more independent and may wish to cultivate their own autonomy at this point and disengage from former social supports such as family. Alternatively it may be the case that social support is more useful when students are experiencing psychological distress such as stress and anxiety over exams etc. and this may be why it was reported as so beneficial from the focus group. Perhaps the motivation to provide social support to each other for psychological stress is greater than it is to provide social support to each for physical activity and healthy eating.

Within the GMI workshops, participants were encouraged to identify how and from whom they could gain social support to assist them in meeting their PA goals. In hindsight, perhaps this was not enough to leave it up to themselves to enlist social support, perhaps a better system might be to include a more formal paired system
whereby participants would be required to select a buddy who had similar PA goals and commit within the workshop to support each other in achieving their goals. Evidence of the effectiveness of a “buddy system” in supporting change is shown by Kahn et al. (2002). Thus, a formal arrangement such as this may also provide a monitoring and feedback system for each individual almost like peer assessment. It may prove interesting to discover why there was such a decrease in social support for PA throughout the first year in college. Perhaps this is a common phenomenon, thus a survey of changes in social support over the first year in college for various health behaviours may prove illuminating. Particularly in view of the evidence indicating the first year of college to be a time of high stress, it may prove interesting to see if this decrease in social support may in some way contribute to this stress.

6.1.3 Healthy Eating Measures
Although the mean BMI of both groups increased between T1 and T2, a statistically significant increase in mean BMI scores was shown in the comparison group but not in the intervention group. It can be seen that over the course of the study the intervention group’s rates for those who were either overweight or obese ranged from 33.3 to 37.3% to 36.3% and those of the comparison group ranged from 40.9 to 47.3% to 31% from T1 to T3 respectively. These figures are relatively similar to recent national figures whereby SLAN, 2007 reported that 38% of 18-29 year olds are either overweight or obese. This is in contrast to international studies which show levels of overweight and obesity to be a particular problem in college students. However it is difficult to draw definite conclusions from these figures particularly due to the fact that follow up results are based on a reduced sample due to attrition. Within the present study, both groups showed an increase in BMI between pre and post intervention, yet only the comparison group showed a statistically significant increase.
This may suggest that the intervention may have made some impact in minimising the weight gained in the intervention group. Also, from the findings above and from relevant literature in the area, it can be observed that weight gain is a common occurrence over the first year of college (Hovell et al., 1985; Levitsky et al., 2004; Mokdad et al., 2001; Ferrara, 2009). Reasons put forward for this weight gain relate to the diet and activity levels in the student population. Studies reveal that students frequently consume unhealthy diets (Grace, 1997; Brevard and Ricketts, 1996; Anding et al., 2001; Dinger and Waigandt, 1997; Haberman and Luffey, 1998). Also, fast food consumption (Thomson et al, 2004) and frequent consumption of snacks (Silliman et al, 2004) are all commonly associated with the student diet. Interestingly at the outset, the comparison group had a higher BMI than that of the intervention group. Other studies have shown that those with a raised BMI in the first place are more at risk of excessive weight gain during transition to college (Kasparek et al., 2008; Vella-Zarb and Elgar, 2009). Thus it may prove beneficial to target those who are overweight on entering college in an attempt to halt further weight gain. Studies have also shown that weight management interventions are often more successful in those who are overweight in the first place (Matvienko et al., 2001). However ethical concerns need to be taken into consideration to avoid such students feeling victimised or stigmatised by being overweight as Chang et al. (2004) suggests the stigma of being overweight results in feelings of inferiority, self-doubt, and hurt.

From the findings regarding general health measures, it was shown that the majority of participants within the study wished to lose weight regardless of their BMI. 69.1% of intervention group wished to lose weight at pre intervention, post intervention this increased to 85.7% and reduced to 80% by follow up. Within the comparison group 75.8% wished to lose weight at pre intervention, this reduced to 65.5% post
intervention and increased again to 86.4% by follow up. This was despite the fact that
the majority of them were of normal weight. Haberman and Luffey (1998) found that
50% of students who self-reported themselves as overweight were classified as
underweight on the basis of their BMI’s. Young women are often motivated not by
health but by the socially desirable slim image promoted by the mass media (Lin,
1995). Chang et al (2004) found that for many young women, the optimal goal for
body weight was to be as slim as possible regardless of whether this placed them in an
underweight category. Although, being slim is very important to most young
women, evidence suggests that not all of them practice healthy weight management
strategies in order to accomplish this aim. Studies have shown that sometimes this
pursuit of thinness leads to unhealthy weight loss strategies (Mooney et al., 2009).
With regard to weight management strategies in the present study, findings indicated
that there was a large increase in those taking more exercise in the intervention group
between pre and post intervention from 62.9% to 80%. However this increase was not
maintained and fell to 66.6% at follow up. These results reflect those found within PA
levels where there was a statistically significant increase in IPAQ levels between pre
and post intervention which fell off at follow up. Within the comparison group there
was a reduction in those taking exercise as a weight loss strategy between pre and post
intervention from 74.19% to 70% and a further reduction to 57.1% at follow up. Thus,
one could conclude that overall the intervention group increased their utilisation of the
take more exercise strategy more frequently than those in the comparison group.
Within their study Mooney et al. (2009) found that some of the adolescent girls within
their sample did use some healthy weight loss methods such as eating more fruit and
drinking water, however it was clear the girls were utilizing these methods for the
purpose of weight control as opposed to trying to actively implement the healthy
eating guidelines. Interestingly within the current study, using exercise as a weight loss strategy increased in the intervention group but not in the comparison group. Thus education and information on the benefits of physical activity to overall health may have made some impact on this intervention group. When participants were asked to consider how healthy their current diet was, the main differences between groups appeared to be an increase in the percentages of those in the intervention group who felt that their diet could be a little better between pre and post intervention (from 53.3% to 72.1%) as opposed to very little change in the comparison group. The increase in the numbers of those in the intervention group considering that their diet should be a lot better may be a reflection of their newly acquired knowledge and awareness from the intervention. Within the intervention, participants were provided with evidence based information on what constitutes a healthy diet and the benefits of a healthy diet along with the consequences of an unhealthy diet. A drop in the numbers of those in the intervention group who considered their diet needed to be a lot better from pre intervention (31%) to post intervention (14%) may also reflect participants putting some of their newly acquired knowledge into practice. However as previously stated as difference between groups did not show statistical significance on testing, it is not possible to draw definite conclusions from this data. Also the possibility of social desirability responses cannot be out ruled in that participants may have been keen to show that they were more knowledgeable and motivated following the intervention as they were aware that, that was what is was designed to do.

Some small differences between groups were shown with regard to stages of change for healthy eating, however none of these differences showed statistical significance between groups. As previously discussed under stages of change for PA, many writers have found support for using stage matched intervention for increasing PA and also,
studies have shown how stage matched interventions are effective in promoting healthy eating as well as PA (De Vries et al., 2008; Smeets et al., 2007, Prochaska and Prochaska, 2011). As mentioned earlier it was not possible within the present study to deliver interventions within the group setting and strictly adhere to stage based interventions. However previous recommendations under PA with regard to stage matching interventions would also prove interesting with regard to healthy eating.

Self-efficacy for healthy eating increased between T1 and T2 in the intervention group; it also increased in the comparison group but to a lesser extent. While self-efficacy for HE decreased from T2 to T3 in the intervention group, it remained stable from T2 to T3 in the comparison group. None of these changes showed statistical significance.

A similar trend with regard to self-efficacy for PA and HE can be observed in the intervention group. Thus a small increase between T1 and T2 was followed by a reduction at follow up. Perhaps this is a reflection of the participants feeling a little more confident, that they could achieve their healthy eating goals immediately following the intervention, however this decreased as the intervention finished. This may also be a reflection of the need for on-going follow up and support to enhance the self-efficacy for HE and increase the chances of maintenance. It is important to remember that although BMI scores increased from T1 to T2 within the intervention group, they did not do so to a statistically significant amount. Perhaps without the intervention, the increase in BMI scores in this group may have mirrored those shown in the comparison group.

With regard to social support for HE from family, both groups showed a small non-significant increase between T1 and T2. This was followed by a statistically
significant decrease between T2 and T3 in both groups. Social support for HE from friends also showed a small non statistically significant increase from T1 to T2. This was followed by a small non statistically significant decrease from T2 to T3 in the comparison group and a larger statistically significant decrease in the intervention group. Thus, similarly to the situation with family social support for PA, whatever small gains occurred from pre to post intervention, these were not maintained and for this student population, perceived family social support for HE significantly decreased throughout the course of their first year in college. Many writers have found social support to be a significant facilitator in bring about behavioural change (La Caille et al., 2011; Leslie et al., 1999; Keating et al., 2005; Wallace et al., 2000; Buckworth, 2001) Wallace et al. (2000) found that women in particular are motivated by social support especially from family. Interestingly, none of the changes for social support for HE from friends showed statistical significance in the comparison group. However social support for HE from friends showed a statistically significant decrease in the intervention group from T2 to T3. Perhaps this is an indication that participants had experienced some increase in friend’s social support immediately after the intervention and that as the intervention ended, this support dropped off as was reflected by the large decrease from T2 to T3. The initial increase may be a reflection of the enthusiasm that was evident within the motivational interviewing workshop on healthy eating, whereby participants had many common goals and talked about shopping and cooking together in order to improve their healthy eating behaviours. However, as a significance interaction effect was not shown here, there is no evidence to show that the intervention brought about these changes. Within a study reported by Le Caille et al. (2011), women identified that eating with friends who ate healthily encouraged them to do likewise as did having roommates willing to share healthy food
items. However, in common with other health promoting initiatives this enthusiasm was not maintained, as evidenced by a large statistically significant decrease in friends’ social support for healthy eating at follow up. An investigation of trends in social support from both family and friends over the first year in college may prove very interesting. Perhaps this population group have particular social support needs which researchers could become aware of, which would in turn make it possible for colleges to implement some initiatives which may provide social support relevant to this population group.

6.1.4 Psychological Well-being Measures
The intervention group showed a statistically significant improvement in psychological well-being scores between pre and post intervention (p=.019). The comparison group showed a slight non statistically significant increase in mean PWB scores between T1 and T2 and a large statistically significant reduction in mean psychological scores between T2 and T3 (p=.000) and also between T1 and T3 (p=.000). Both groups showed a significance effect for time on one way repeated measures ANOVA (p=.019). When mixed between within ANOVAS were applied, a significant interaction effect, a significant main effect over time and a significant effect for time between groups was found. Thus there was a significant interaction effect indicating that the intervention successfully improved psychological well-being in the intervention group but not in the comparison group. Within the focus group analysis, the seventh theme was entitled “stress of the student life”. Here, the stresses that students encounter on transition to college were highlighted in particular the stress of the first semester and the stressful nature of exams and course work. Also, in the general health measures section of the health behaviours questionnaire, less stress featured as the third most important requirement for health improvement in the
comparison group and the fourth in the intervention group across all three data collection periods.

It is heartening to see that the intervention did appear to have a positive effect on the PWB scores of the intervention group indicating that an improvement in their PWB took place between pre and post intervention. On the other hand a worrying trend was observed in the comparison group whereby a reduction in PWB scores occurred over the first year of college to the extent that they were at a particularly low level at follow up. Perhaps without the intervention, the intervention group would also have experienced a similar drop in PWB scores. Throughout the literature, transition to college is seen as a stressful time (Brougham et al., 2009; Giddan, 1988; Bray and Born, 2004; Adlaf et al., 2001; Steinhardt and Dolbier, 2008). Findings within the comparison group are reflected within the literature that depicts the transition to college as an extremely stressful period for students. Based on previous research, sources of stress were classified as academic, financial, family, social and daily hassles (Abouserie, 1994; Blankstein et al., 1991; Crespi and Becker, 1999; Frazier and Schauben, 1994; Larson, 2006; Printz et al., 1999; Ross et al., 1999). It can only be assumed that the drop in PWB was attributed to increased stress experienced by the students as academic workloads increased throughout the year and as they adjusted to the college environment. Anecdotal evidence from students during data collection episodes and focus group findings indicated that the cause of decreased PWB levels were indeed due to perceived heavy academic workloads and stress of teaching practice in the case of the comparison group and stress of clinical placements in the case of the intervention group. It is important to note that T2 data collection took place at the end of semester 2 (end of April) at a time when summer assessments were looming. Thus this may have been a particularly stressful time of year and may have
contributed to increased stress as verbalised within the focus group. Thus there is a need for college administrators and health promoters to be aware of this phenomenon and provide necessary support structures in an effort to promote positive mental health and well-being for its students. The ability to manage stress cannot be taken for granted and the importance of developing this ability in young adults cannot be underestimated. One cannot assume that students arrive at third level education equipped with the necessary stress management skills to manage living away from home for the first time, managing time between academic coursework and making new friends etc. Perhaps it is also incumbent on curriculum teams to ensure that a standardised workload exists across programmes at similar educational levels e.g. level 8 degree programmes where workloads are distributed throughout the year in a manner that is fair and manageable for students. Within the present study, both student groups had to cope with a practical element along with their academic course assessment workload. For the intervention group this involved the students undergoing clinical placements in a hospital setting. Many writers report on the extra stress this element places on nursing students (Edwards et al., 2010; Pulido-Martos et al., 2012). Also feedback within the focus group indicated that students felt these placements cut down on their study time and made preparation for course assessments and exams more rushed. Although acknowledging it as a very necessary component of the programme, students felt somewhat hard done by in that they had to carry a full college degree workload as well as fulfil clinical commitments unlike other degree students. Similarly the comparison group as student Home Economics teachers also had to undergo teaching placements and assessments of same along with their academic workloads contained within their B.ED. Thus both the intervention and the comparison group were subject to similar constraints and this makes them more
directly comparable. Perhaps the nature of these degree programmes where an academic qualification in the form of a degree and a recordable teaching or nursing qualification is combined is more stressful for students than a straightforward degree programme of study. Although, other tools to measure psychological well-being were explored prior to choosing the WHO index, at the time the writer felt that the WHO 5 index would be much shorter to complete and contribute to a greater response rate. However, in view of the low PWB levels in this population and high stress reported in the focus groups, in hindsight a tool specifically to measure stress such as the undergraduate stress questionnaire utilised by Crandell et al. (1992) may have proved very useful in determining the contribution stress played to participants psychological wellbeing. As previously stated the seventh theme identified in the focus group was that of “stress of the student life”. Here, the stressful nature of college life was addressed and in particular the first semester, the demands of academic assessments and coping skills were also addressed. These focus group findings help to make sense of the quantitative data with regard to psychological well-being. Many researchers have demonstrated the impact that commencing college can have on an individual’s stress levels (Sasaki and Yamasaki, 2007; Aspinwall and Taylor, 1992; Leong et al., 1997; Gerdes and Mallinckrodt 1994; Seiffge-Krenko, 2006; Adlaf et al., 2001). Giddan (1988) suggests that the first year in college is the most difficult period of adjustment a student faces. Interestingly as participants reflected on how they coped, it appears that social support featured prominently. This was in the form of talking things over between themselves and gaining support from realizing fellow students shared similar concerns and anxieties. It is interesting to see that social support appeared to work well here but not so well when it came to PA and HE. Perhaps social support is more powerful if it is allowed to evolve out of shared experiences and
concerns. It appears that although the first semester was extremely stressful, participants coped by supporting each other and this in turn was a bonding experience for them. Within the CLAN (2005) study, findings showed that by far the most important contact for undergraduate students was a friend their own age with 83% saying they would discuss with friends feelings of anxiety and depression. Within the focus group, participants themselves recommended the setting up of a support group for first year students. With regard to coping strategies, participants stated that physical activity and talking to someone or seeking support in the group were coping strategies that they had used successfully throughout their first year in college.

6.1.5 Inter-Relatedness of Health Behaviours
It was decided to perform a number of cross tabulations based on connections made within the literature between the various health behaviours in question. Cross tabulations undertaken included the relationship with PWB and PA, the relationship with BMI and PA and BMI and PWB. Also an attempt was made to see if participants were in similar stages of change for healthy eating and physical activity as suggestions within the literature indicate that this is often the case. However on cross tabulations, no significant relationship was found between any of the above variables within this study. These findings are in contrast to those of Kasparek et al. (2008) who found that students with a low frequency baseline physical activity level were twice as likely to be overweight. By contrast those reporting low intensity physical activity four or more times per week were twice as likely to have a healthy BMI. Also with regard to a relationship between stages of change for different behaviours, the study by De Vries (2008) found that respondents in the preparation stage for one behaviour were more likely to also be in the preparation stage for another behaviour. They suggest that this finding would appear to lend weight to the possible benefits of targeting healthy eating
and physical activity together. Also with regard to social support De Vries (2008) found that social support from a partner showed the highest correlation with engagement in positive behaviours. De Vries points out that if a partner is supportive about one specific health behaviour, he or she will be generally supportive for different types of health behaviours. Despite the lack of quantitative evidence of interrelationships between variable, within the focus group analysis “interrelatedness of all three health behaviours” was the eighth theme. This theme described how all three health behaviours which are the subject of this study inter relate to effect each other and how changes in one may impact on another and vice a versa. From the focus group, it could be seen that there is recognition of a synergistic relationship between different health behaviours e.g. when one is actively engaged in one healthy activity, this has a knock on effect on the other. It was also clear from the focus group that participants could see the benefits of PA on their mental and psychological health and there also existed an awareness of how stress can affect one’s eating behaviours. This awareness appears to have come from the theory sessions but also more importantly from their personal experiences. Some participants reported how exercise had improved their concentration, ability to study and to reduce their stress. According to Edwards (2006), many studies have clearly demonstrated the effectiveness of physical exercise in reducing stress, anxiety and depression (Fox, 2000; Morris and Summers, 1995; Scully et al., 1998; Weinberg and Gould, 1999). They also reported that they found that healthy eating was easier when they were physically active. This is reflective of the multiple health behavioural change approach discussed within the literature review (Prochaska and Prochaska, 2008). Participants also reported how stress sometimes leads to unhealthy eating patterns. Hudd et al. (2000) found that college students, who reported higher levels of stress also consumed more “junk
food”, were less likely to exercise and less likely to obtain adequate amounts of sleep. Participants also describe how now that this awareness of the interplay between health behaviours exists, it makes it possible for them to sometimes substitute a healthy behaviour for an unhealthy one e.g. go for a walk as opposed to snacking on biscuits. This is a reflection of “substituting alternatives” a process outlined within the stages of change model. The GMI workshops did not particularly focus on these interrelationships, thus participants appear to have made these links themselves from experiential learning. The evidence from the focus group appears to support a synergistic approach to promoting health behaviours in college students as opposed to focusing on specific behaviours. However data from the quantitative analysis does not support this evidence.

6.1.6  Barriers and Facilitators to Healthy Lifestyles
Within section 2 (general health measures) participants were asked what prevented them from making improvements in health and what they required in order to have better health at T1, T2 and T3. Similarly within the focus group, barriers and facilitators to a healthy lifestyle were identified, thus it was decided to discuss these findings together to ascertain whether similar trends occurred between the two sets of data. When participants were asked what they felt they needed for better health, more time to exercise, more will power and change of weight were the top three areas cited by the intervention group across all three data collections. Similarly the comparison group also cited more time to exercise and more will power as their first and second choice, however less stress featured as their third most important requirement for health improvement overall. When participants were asked what they felt prevented them from making improvements in their health, overall, lack of time, and felt no need and lack of facilities were the most important factors within both groups. Interestingly
both groups felt the need for more time to exercise despite the majority of the sample meeting the minimum recommendations for PA. However lack of time is seen as a common barrier throughout the literature. Also a change in weight was the third most important factor in the intervention group despite the majority of them being of a healthy weight. By contrast the comparison group cited the need for less stress as the third most important factor which may indicate that as a group they were more stressed than the intervention group or it may indicate the need for an intervention to promote their psychological well-being. Within the focus group analysis, barriers to behavioural change was identified as a theme and these included inconvenience, lack of time due to college workload, affordability and adjusting to college life. The sixth theme was entitled “facilitators to health behavioural change” and included sub themes such as goal setting, feedback and monitoring, commitment, fun and the college environment. Although one would expect the facilitators identified within the focus group to reflect what participants considered they required for better health in the general health measures section, this was not the case. Interestingly although more will power featured highly in the general health measures section, it is not reflected within the literature in the barriers and facilitators to healthy lifestyles. However this may be indirectly reflected by the facilitators identified within the focus group such as goal setting and monitoring. Also, a need for more will power may be a reflection of participants experiencing difficulty motivating themselves towards engaging in physical activity and healthy eating. If this is the case, motivational interviewing would appear to serve a useful function to enhance participants’ will power. The third area that of change in weight is reflective of other findings showing that the majority wished to lose weight regardless of BMI’s. This may be a reflection of the literature in this area which documents the pursuit of thinness as the ideal body image in young
women (Chang et al., 2004). Interestingly, within the comparison group, less stress featured within the comparison group as the third most important requirement for better health. This is a reflection of the findings on psychological well-being within this group which showed how many of the participants experienced a significant reduction in their psychological well-being over the course of this first year in college. It is also a reflection of findings within the focus group where the stressful nature of the student experience was identified. “Feel no need” was the second most frequently cited reason for not engaging in health improvement; this may be reflective of a lack of knowledge and awareness of the importance of a healthy lifestyle to overall health. It may also reflect that within a cohort of students such as this, health messages for maintaining health and preventing ill health in the future may not be perceived as directly relevant to them. At this point, they may take their health for granted and not be particularly concerned with preventing ill health in the future (Wammes et al., 2008). Interestingly lack of facilities features as the third most important area in preventing improvements in health. This is consistent with feedback in the focus group where participants voiced the need for an improvement in college facilities to enhance health behaviours. This may be a reflection of the poor facilities available on campus for physical activity and healthy eating on such a small campus. Campus facilities involve a gym available to those who live on campus only and one canteen for staff and students, a student union shop and a number of vending machines containing crisps and chocolate. Studies in this area have shown that the closer the facilities are for students; the more likely they are to engage in PA. As stated, barriers to engaging in healthy eating and physical activity identified within the focus group, included inconvenience, lack of time, affordability and adjusting to college life. Other writers in this area have found similar barriers (Le Caille et al., 2011; Devaney et al.,
2005; Artinian et al., 2010). Adjusting to college life is seen as a time whereby students are at particular risk of an unhealthy lifestyle throughout the literature (Ferrara, 2009; Mokdad et al., 2001; Fielder-Jenks, 2010; Furia et al., 2009). The participants in this focus group also found transition to college to be a barrier to a healthy lifestyle. It appears that adjusting to college occupies much of the students’ time and energy and thus there is little room to concentrate on healthy behaviours such as exercising and eating healthily. Also, participants appear to be cognisant of the fact that it costs more to eat a healthy diet, a fact borne out in research carried out for the National Food Recommendations of 2011. According to the Food Safety Authority of Ireland (2011) foods rich in fat, sugar and salt are cheaper than healthier foods. Facilitators to health behavioural change identified within the focus group included sub themes such as goal setting, feedback and monitoring, commitment, fun and the college environment. Other writers in this area have found similar facilitators (Le Caille et al., 2011; Devaney et al., 2005; Artinian et al., 2010; Shepherd et al., 2006). With regard to commitment, there appears to be a sense that a public commitment in front of a group of peers is more binding than a private commitment to yourself that nobody knows about so that if one does not succeed, the only person one is letting down is oneself. Many researchers have advocated the benefits of self-monitoring techniques such as goal setting (Artinan et al., 2010; Stretcher et al., 1995). Within the current study, during the GMI workshops, each student was given a workbook to work through a series of steps (see appendix 3.4 and 3.5). Which included goal setting and monitoring, along with an activity diary for them to use to plan towards achieving their goal. Similar to the above findings, other researchers have found that the prospect of having fun was one of the primary reasons for college students to participate in PA (Braitewaithe et al., 2003; Yoh, 2001; Huddledston et al., 2002). Within the current
study, the fact that the assignment content was so closely related to the module content appeared to have worked well as a reminder for participants which is similar to findings from De Vahl (2005). Thus the assignment proved useful as a means of rehearsing material relevant to healthy lifestyles which helped to reinforce learning gained.

6.1.7 Process Evaluation - Qualitative Data Analysis
As previously stated, where possible, findings from the focus group were integrated with those of the health behaviours questionnaire in order to provide a more comprehensive picture. However not all of the focus group themes fit directly under the three main objectives thus the remaining themes will be presented here as they provide a beneficial insight into the process of the intervention and in particular, the use of group motivational interviewing.

The first theme identified from the focus group was that of “the nature of the facilitator/participant relationship” within the group motivational interviewing context. This was characterised by trust and participants experiencing the facilitators’ interactions as positive and individualised and participants feeling valued. This theme is reflective of the underlying spirit of motivational interviewing. Miller and Rollnick (2002) point out that when carrying out MI it is fundamentally important that it is done so in a way that captures the spirit of MI. They point out that MI is a way of being with people and that its underlying spirit lies in understanding and experiencing the human nature that gives rise to that way of being. This is conveyed by key communication skills utilised within motivational interviewing which are, open-ended questioning, affirmation, reflective listening and summarizing. A trusting relationship between participants and the facilitator is fundamental to the spirit of motivational interviewing. Thus due to the facilitator using the key MI communication skills such
as open ended questions and affirmations, participants felt valued and felt they were receiving individual attention although they were part of a group. This is conveyed in a comment by one participant “everyone’s opinion mattered.” According to Miller and Rollnick (2002) it is this attitude of acceptance and respect which builds the therapeutic alliance and supports self-esteem which further promotes change. MI also conveys a positive perspective to the change process as opposed to traditional health promotion which often comes from a more negative victim blaming perspective. From the above, there appears to be a new more positive perspective with regard to health behavioural change emerging. The above reflects a positive optimistic approach to change attempts as opposed to a reluctance to attempt to make changes due to fear of failure and negative self-evaluation associated with traditional health education where failure to succeed in bringing about behavioural change is seen in a negative light and as a reflection of personal weakness and lack of commitment. It appears that through the group MI workshops, a more positive perspective is opening up for the participants which sees relapse as just another phase of the change process and a part of human nature and not a personal failing. These findings indicate that, overall an appropriate approach and atmosphere conducive to MI was achieved within the group motivational interviewing sessions. Theme 2 was entitled “ownership for change” reflecting the fact that ownership remained with the participants throughout the process. This was reinforced with the subthemes of autonomy and evocation. Thus change was elicited from within the participants themselves and responsibility for such change remained with them. The essence of MI is grounded within the humanistic principles as described by Carl Rogers (1951) in so far as each person has the right, the resource and the responsibility to make the various behavioural lifestyle changes that will allow them to live a psychologically more healthy existence.
(Tierney et al., 2011). Miller and Rollick (2002) suggest that in order to convey the spirit of MI, it is essential that the MI facilitator communicates the fundamental approach of MI which is characterised by collaboration, evocation and autonomy. Thus within the GMI workshops, the autonomy of participants was respected at all times. In many cases many of these students were living away from home for the first time and as such were only in the process of getting used to being in control of their own lives and not subject to previous parental controls. Thus the idea of being in control and having a choice may have being both empowering and liberating to the student at this point. The partnership approach characterised by collaboration conveyed a sense of working together towards this change with the participant remaining in control at each step. According to Miller and Rollick (2002) evocation implies that rather than imparting things such as wisdom or insight to the client, the facilitator’s role is to elicit these strengths from the client themselves and draw them out. It requires finding intrinsic motivation for change within the client themselves and facilitating its expression. According to Miller and Rollick (2002) people are often more persuaded by what they hear themselves say than by what other people tell them. Thus, the facilitator’s role within the GMI workshop was to provide a space for the participants to elicit their own change talk from within themselves as opposed to being prescribed from the facilitator. The fact that this took place is evident within the above focus group theme. The process of trusting the participant to manage their own lifestyle choices and merely facilitate them to talk through changes they wished to make also reflects an empowering approach, so key to any health promotion activity. In fact Mc Donald and Davies go so far as to state that if the health promotion activity under consideration is not enabling or empowering it is not health promotion (MacDonald and Davies, 1998, p.6). Thus Theme 2 represents the fact that within
GMI, ownership for change remains with the participant who is responsible and accountable for making this change or not as the case may be. The facilitator’s role is to utilise the skills and tools of MI to empower them towards making whatever change they decide. Theme 3 was entitled “power of the group” and characterised by sub themes such as social support, peer pressure and motivation. Whereby belonging to the group served as a means of providing and receiving social support for individual participants as well as in some cases peer pressure to bring about some positive behavioural change as “others were doing so”. There was a sense that participants valued being part of the group and seen the benefits of giving and receiving support from each other. Participants also perceived this as being quite motivating. Thus the group served as a motivator as one participant remarked “you feel you are being left behind as everyone is giving something up”. Miller and Rollnick (2002) point out that a person can be influenced by the success of others. Other studies have shown group based interventions to be more effective than individual based ones (Conn et al., 2002). Many studies have shown social support to be a facilitator for PA and HE, (Le Caille et al., 2011). However, the positive view of social support from the focus group is not reflected within the quantitative findings with regard to social support from friends for PA and HE. Whereby a small non statistically significant increase in friends social support for PA and HE occurred from T1 to T2 and was followed by a statistically significant decrease at T3. Increased knowledge and developing awareness about health behaviour change was identified as theme four, in that participants felt that they had gained valuable knowledge on healthy lifestyle behaviours. Improving knowledge about physical activity, healthy eating and psychological well-being was a desired aim of this intervention and it appears that this knowledge was welcome and useful to participants. This knowledge also provided
them with a yardstick from which to measure their own behaviours and this then increased their own health awareness. Participants also mentioned how learning about the stages of change proved beneficial and an understanding of relapse being part of the cycle also contributed to a more positive outlook on not maintaining a change. One participant remarked “you can always go back and start again”. Other researchers in this area have pointed to the importance of knowledge (Pender et al., 2011; Rimal, 2001) education (Murphy, 2011) and awareness (Peterson et al., 2010; Ronda et al., 2001) in bringing about positive behavioural changes. This theme also reflects the processes of change as described by Marcus and Forsyth (2009) adapted from the transtheoretical model outlined in Chapter 1. These processes involve increasing knowledge, becoming aware of risks (of the unhealthy behaviour) and comprehending benefits (or increasing PA or HE). Through the GMI process, participants became aware of their own health behaviours. Although the focus group indicted that an increase in knowledge and awareness regarding PA and HE including knowledge on healthy BMI levels and recommended levels of activity had occurred, this contradicted some of the quantitative findings. This may be due to a social desirability bias as mentioned earlier or it may be associated with participants having improved knowledge but not putting this knowledge into practice. Although the majority of participants in the intervention group wished to lose weight, most of them were within a healthy BMI range. The other contradiction was seen with regard to the fact that although most participants were meeting minimum physical activity guidelines, only a small percentage felt they were taking enough exercise. Other themes from the focus group are dealt with within the section on psychological well-being and interrelatedness (previously covered).

Overall the focus group showed that participants perceived the facilitation of the
group motivational interviewing to be positive and individualised and they experienced feeling valued. The GMI process left participants feeling that they were in charge of their own health behaviours and their autonomy was respected. The group itself was perceived to have a certain degree of power which was connected to social support, motivation and peer pressure. The focus group showed how participants felt that their knowledge and awareness on PA and HE had increased despite contradictions within the quantitative findings. The focus group showed that participants experienced similar barriers and facilitators to other students as reported in the literature. The focus group illuminated the findings on psychological well-being in highlighting how stressful participants found the first year. Finally the focus group showed how participants were able to distinguish how health behaviours were linked and had a knock on effect on each other. The main elements that the focus group illuminated were with regard to social support in that it appears that psychological social support is perceived to be more important and students have a higher need for this type of support than social support for general healthy lifestyles. Also the focus group shed light on the psychological well-being findings and made it possible to see that reduced psychological well-being scores throughout the course of the study as seen in the comparison group may be explained by increased stress experienced by first year students.

**Conclusion**

From the above discussion it can be seen that initial increases in physical activity following an intervention such as this are not maintained. Evidence from the literature reinforced here, suggest the need for follow up prompts following the main intervention to enhance likelihood of maintenance. The healthy eating element of this intervention was largely ineffective apart from the fact that it may have minimised weight gain in the intervention group. A phenomenon of decreasing social support
available to college students over the course of the first year emerged, whereby participants within this study perceived that the social support available to them from family and friends dropped significantly over the course of the first year in college. An increase in psychological well-being of the intervention group appears to indicate that the intervention group benefited from this intervention on the other hand a large decrease in psychological well-being in the comparison group over the first year may indicate that all students may benefit from psychological well-being support. Overall the focus group provided a much more comprehensive understanding of psychological well-being than the psychological well-being scores alone. The focus group illuminated our understanding of psychological distress and its relationship to the stressful nature of the student life. It also increased our understanding of the nature of social support and appears to indicate that social support in the area of psychological well-being is more prevalent among student groups than that of social support required to promote a physically healthy lifestyle. As can be seen only minimal changes occurred in the areas of physical activity and healthy eating. A possible reason for this may be that the psychological well-being needs of the first year student population are so overwhelming, that they cannot take on board any other form of health lifestyle improvement as they are at capacity coping with the transition to college and the stressful nature of this adjustment period.

To conclude, this individualised focused behavioural change intervention designed to bring about positive changes in participants physical activity, healthy eating and psychological well-being was only partially effective. Although it brought about a significant increase in physical activity levels from pre to post intervention, this increase was not maintained and it did not show any significant improvement in any other PA related measures such as stages of change, self-efficacy and social support.
No significant improvement with regard to healthy eating measures was shown. However a significant improvement in psychological well-being was shown between pre and post intervention. Findings indicate that this pilot intervention was not strong enough to bring about significant changes in the area of BMI and stages of change, self-efficacy and social support for either PA or HE.

6.2. Limitations of the Study

Data Collection:
It may have been more beneficial to include an additional data collection episode six months following the intervention as opposed to waiting for twelve months. It would be interesting to see if some of the improvements that were seen post intervention e.g. PA and PWB would have been still present at 6 months. If this was the case then the inference would be that deterioration occurred somewhere between 6 and 12 months as opposed to between 3 and 12 months. It would also indicate that improvements were maintained for at least 6 months. This type of information may assist in informing health promoters as to how long initial improvements are likely to be maintained before the need for follow up prompts occurs.

Timing of Data Collection
On reflection it may have been more favourable to run this module (deliver the intervention) in semester 1 between September and December, which appears to be the time of greatest need according to feedback in the focus group and also related literature. Also post intervention data collection occurred in April in semester 2. This was at a time when students were preparing for exams in May and completing end of semester coursework. Thus this may have being a time of particularly high stress levels and may have had some effect on low psychological well-being levels in the comparison group. However even if the module was run in semester 1, data collection would occur in December at the end of semester 1 which is also a stressful time as
students are preparing for end of semester 1 exams and coursework.

Measures Utilised
The study could have been improved by having, a stress index measure included, in that it may have clarified the assumption that psychological well-being measures were low especially within the comparison group due to high stress levels. Also it is very difficult to measure whether individuals are engaged in healthy eating or not as it is such a subjective term. However it was anticipated that the information and knowledge communicated within the module would help in achieving a relatively common interpretation of healthy eating from the participants. Other studies have used diaries where participants have to record their intake for a period of time and these diaries are then analysed by the researcher. Perhaps the use of such a diary within this study would add not only to the analysis but also in assisting participants in self-monitoring their progress which was identified as a facilitator to behavioural change within the focus group. It is also identified as a facilitator for healthy eating within the literature (La Caille et al., 2011).

Physical Activity Measure
The main instrument used to measure physical activity was that of the International Physical Activity Questionnaire (IPAQ) short version (Craig et al., 2003). Since the commencement of the study, the validity and the reliability of the IPAQ has come into question. According to Lee et al. (2011) despite the popularity of the IPAQ-SF and its widely accepted high reliability (Craig et al., 2003; Van Poppel et al.,2010) there has been no systematic review of its validity carried out. They subsequently carried out a systematic review including 23 validation studies. They found that the correlation between the IPQA and objective measures of activity or fitness in the majority of studies was lower than the acceptable standard. They also found that the IPAQ
overestimated physical activity. They concluded that the evidence to support the use of the IPAQ as a measure of physical activity is weak. The above study raises doubt about this highly popular tool, however at the time of data collection; it was the most widely utilised tool with reported high validity and relativity. It was selected for the current study in view of its widespread use, thus making it possible to compare results from various studies.

**The use of the Bonferroni correction within the data analysis procedure**

To avoid the likelihood of type 1 error (false positive), the Bonferroni adjustment was applied. This establishes more stringent criteria for significance and therefore it is often harder to achieve significance in this case. This was used to guard against the possibility of an increased Type 1 error in view of the weaker nature of non-parametric tests compared to their more robust parametric counterparts. It is acknowledged that with small samples this can be a problem as it can be very hard to find a significant result, even when the apparent difference in scores between the groups is quite large. In hindsight in this case, particularly in view of the small sample size, the use of the Bonferroni correction may have being over cautious and may have detracted from some of the findings, particularly those involving weekly minutes of physical activity.

**Researcher Bias**

Within the current study the module leader and the researcher was one in the same. The researcher also was one of the group motivational interviewing facilitators and was also the marker of students assignments attached to the module. It is important to recognise that this situation is not ideal to maintain research objectivity. However in the present under resourced climate the researcher was left with no choice. Thus, it is possible that this could have led to some bias and some social desirability responses from participants. Particularly in light of physical activity and psychological
well-being scores being based on self-reported measures, participants may have wished to show an increase in scores for reasons of “pleasing the teacher”. This risk of social desirable responses based on the power differential between module leader and student would be more concerning if all results were positive. Although a statistically significant increase for PA measures was recorded for scores at T2, this was not the case at T3. Also objective BMI scores eliminated the risk of socially desirable responses here. Throughout the research process, cognisance was taken of this situation and where possible steps were taken to keep the risks of bias to a minimum. For example, questionnaires were numbered and thus anonymous and the focus group was facilitated by an independent facilitator (lecturer not involved in the module). In the analysis of findings, cognisance was given to the need to stay alert for researcher bias particularly when findings indicated aspects of the intervention that did not work. Here the researcher remained as objective as possible in reporting findings in order to uphold the integrity of the research process.

Sample Selection
Although both groups were first year undergraduate students in the same college, as can be seen from the demographic details they differed quite markedly in a number of areas, e.g. maturity, dependents, socio economic and educational status. All of these factors have been shown to have an effect on health and health behaviours. Research suggests that obesity levels and physical inactivity are higher in lower socio economic groups. Although university students are usually from a similar socio economic and educational background, this was not the case within this sample. In fact the comparison group were found to be from a higher socio economic and a higher educational background than the intervention group. However baseline information collected at the outset showed that despite varying socio economic and educational
status differences, groups did not differ significantly on baseline health measures. On one level, it may have been easier to make direct comparisons if both groups were on the same degree programme and possessed similar demographic characteristics. However the value of getting a comparison group of first year nursing students from another college would make it difficult to make direct comparisons as the college environments would be very different. The setting where this study took place is a unique setting which would not be comparable to any other college where undergraduate nurse education takes place. One further point with regard to course differences, it could be concluded that perhaps the reason that PWB was so poor in the comparison group was that their course contained more stressors than that of the nursing programme. However as a significant interaction effect between groups was found on repeated measures ANOVA which allows for differences at baseline, it is assumed that an effect thereafter is a legitimate interactive effect.

Sample size
The sample size was small to start with due to the nature of the college intake which contained relatively small student cohorts, however the study was powered originally to assess the minimum numbers needed and assurance was obtained that numbers at the outset were sufficient. However, as attrition rates rose at each data collection episode particularly at T3, it may leave the reliability of these findings questionable.

Focus Group:
Another possible limitation was that of the focus group size and that only one focus group was carried out. The function of a focus group generally determines its size and composition. Holloway and Wheeler (2002) suggest that a group of six is generally big enough to provide a variety of perspectives and small enough not to become too unwieldy or fragmented (Holloway and Wheeler 2002). Participants for inclusion
were recruited at the end of the module on a voluntary basis. Generally, the strategy of over recruitment is promoted, as often people may not attend (Webb 2002). Thus it was anticipated that approximately 6-10 participants would form the focus group. However, Webb (2002) also warns that with the practice of over recruitment, there is always the possibility of everyone arriving, as happened in this study where thirteen participants came to the focus group session. This made for a rather large focus group, however a decision was made at the time to include all thirteen participants so as to acknowledge and not discourage such enthusiastic participation. However if the resources were available to run two focus groups at that time it would have been the preferred option and may have yielded a more comprehensive picture as all members would have had increased opportunity to contribute.

6.3 Implications of Study

6.3.1 Implications for Health Promotion Practice

The Need for Follow Up

It is clear from the findings in this study with regard to physical activity in particular that follow up prompts are required after the life of the intervention to enhance the chances of maintenance. It would be interesting to see if the introduction of prompts after the module was finished would have an impact on the overall maintenance rates of behavioural change. One important suggestion that participants actually came up with themselves was a follow up fitness assessment workshop a year after the initial one. This would give them an indication of how they were doing or indeed it may motivate them to maintain any progress they had made. They may also be motivated by trying to improve on their initial fitness assessment scores. Many studies have
shown the benefits of follow up prompts in maintaining initial improvements in physical activity e.g. behaviourally orientated phone and email follow up messages (Calfas et al., 2000; Artinian et al., 2010; Fjeldsoe et al., 2011; Wadden et al., 2009; Rothman, 2000).

**The Identification of an At-Risk Population**

Many writers report that initial BMI scores of students commencing college are highly associated with weight gain in college students (Kasparek et al., 2008; Haberman and Luffey, 1998). Kasparek et al. (2008) suggest that the promotion of lifestyle behaviours that help maintain a healthy weight are imperative for the college population, particularly in view of the evidence that at this stage, permanent weight loss is unlikely (USDHHS, 2007). Thus, those who commence college with a BMI in the overweight category are more likely to gain weight in their first year. This being the case, perhaps it may prove effective to identify those at risk by screening in year 1 and by providing appropriate dietary guidance or a nutrition course (Matvienko et al., 2001) or exercise referral (Haberman and Luffey, 1998). Ethical considerations need to be taken into account with such a recommendation to avoid the danger of stigmatisation.

**Healthy Lifestyles Workshops (Multiple Health Behaviour Change Approach)**

Reed and Phillips (2005), suggest the need to increase the opportunities for physical activity on campus. They also suggest that offering health and wellness services, such as health and fitness appraisal, nutrition counselling, individualized exercise prescription, and electronic newsletters, are also an important aspect of college health promotion.
In view of the fact that different students have different health goals, it is recommended that group motivational workshops which focus on a range of health behaviours such as diet exercise etc. be provided on a regular basis by health promotion practitioners on college campuses. These groups could simply be named healthy lifestyle groups. Researchers have found that motivational interviewing offers an evidenced based approach for enhancing adherence to behavioural interventions including dietary and PA change (Artinian et al., 2010). Also, findings from the focus group indicated that participants found the group motivational interviewing beneficial. This focus on MHBC topics would allow students to have a choice over which health behaviour to focus on as opposed to joining a weight reduction group or a stress reduction group etc. According to De Vries et al. (2008) an advantage of a lifestyle approach to behavioural change lies in the fact that some individuals might be interested in improving their health by changing their dietary behaviour while others might be more inclined to increase their physical activity. Although on quantitative analysis, the present study found no relationship between PA and BMI and stages of change for both or for PA and PWB, findings from the focus group suggest that when participants were actively engaged in health practices in one area, they found it easier to engage in health practices in another area. For example, participants spoke of finding it easier to eat healthier after exercise. Prochaska and Prochaska (2011) point out that success in one area of behaviour change has the potential to build an individual’s confidence or self-efficacy to improve health behaviours in another area of their lives where they may have low motivation.

6.3.2 Implications for Education
**Orientation Programme for First Year Students**

Findings from the present study indicate that adjusting to college is not an easy process for many students. Thus an orientation programme at the commencement of the academic year may assist first year students in coping with this transition in a positive way. Such an orientation programme could provide students with information about college life, what previous students have found beneficial and information about how to keep themselves healthy during this transitory period. This orientation programme could also provide students with information specific to their course area and its requirements. This type of programme may assist students in anticipating the demands of the college year and provide them with an opportunity to plan strategies to cope.

**Promotion of Student Support Groups**

Perhaps student services could be encouraged to facilitate the promotion of student support groups. Such workshops could provide students with an overview of the stresses other students have found on the transition to college and provide them with information on support groups, student services etc. According to Wilcox et al. (2005), there is significant evidence that students rely heavily on informal social support networks and the utilisation of these networks strongly predicts psychological adjustment. Within the current study, as PWB fell at T3, so too did social support from both friends and family, thus just when the student needs maximum social support, it is not there. This is why the university setting should promote social support and stress reduction on an on-going basis and acknowledge that this lessening of, in particular family social support is a common phenomenon and the student may need replacement social support from within the college setting.

**Mental Health Promotion to be incorporated into the Curriculum**

The first year in college is seen to be a particularly stressful time where students are
challenged by many new experiences and healthy lifestyles may not be a top priority. As the present intervention showed limited results with regard to physical health outcomes, it may prove more effective if a larger focus was placed on assisting students cope psychologically with the transition to college prior to focusing on physical health. The need for a particular focus on stress and coping within the first semester needs to be addressed along with the promotion of positive mental health and well-being. Many writers call for more input on stress reduction and coping strategies in the curriculum (Hall, 2005; Steinhardt and Dolbier, 2008) in order to enhance student resilience at this stressful time. Steinhardt and Dolbier (2008) suggest that a resilience enhancement programme may prove useful in managing and reducing stress in college students. Another possible mechanism is that of curriculum infusion mentioned earlier which Mitchell et al. (2012) described an initiative to increase faculty involvement in suicide prevention and mental health promotion within the college student population. Thus even after the first year of college, students will experience stress and threats to their mental health. Thus if faculty remained vigilant for this and had the skills to address such issues and know where to refer to, this would seem like a very useful college wide mechanism. It may be the case that students need to have their psychological needs met prior to being able to take on physical health promotion measures. From a survey of the health promotion needs of Irish college students and staff, Devaney (2005) found that stress management and healthy eating were the preferred topics and called for the prioritisation of these topics. At this time students are often challenged by living away from home for the first time and are establishing individual lifestyle habits independent from their families, thus this is an opportune time to assist them in establishing healthy habits such as healthy eating and physical activity in their college lives. Thus the incorporation of a module on healthy
lifestyles similar to the one described in the present study but with a particular emphasis on psychological health at the outset is suggested.

6.3.3 Implications for Policy

A Settings Approach
Although individual change strategies have shown some success, as have group strategies such as group motivational interviewing, it is clear something else is needed. Sometimes individuals may have the necessary knowledge and motivation to engage in healthy behaviours but be prevented from doing so by where they live, work or go to college. This is where the settings approach comes in, which has being defined as the context in which people engage in daily activities and in which environmental, organisational and personal factors interact to affect health and well-being (WHO, 1998). Dooris et al., (2012) suggests that healthy universities need to play an enabling role to embed health within the core business of the university. Thus the idea here is that the university or college becomes a healthy setting and every aspect of its day to day operation makes it possible for its staff and students to engage in healthy living. Thus the college would combine health promoting measures such as healthy options available in college restaurants and vending machines. The healthy college setting would also have facilities for exercise e.g. gym on site, walking trails around campus etc. Mental health promotion would be incorporated into college orientation and counselling services provided as needed. Thus, this environment makes it easier for individuals to exercise the healthy choice. The settings approach also aims to increase the profile of health in teaching, research and knowledge exchange and contribute to the health and sustainability of the wider community (Scriven, 2012). This reflects the notion of curriculum infusion mentioned earlier whereby health becomes integral in the curriculum. Some writers suggest that health
needs to become the core business of the university (Dooris et al., 2012). In order to become core to the college’s operation, it needs to be incorporated into the mission statement and or philosophy of the college. A settings approach such as this would provide the framework for ensuring that all relevant health policy was implemented on site e.g. obesity prevention policy, healthy eating policy, physical activity guidelines, anti-bullying policy, mental health promotion policies etc. It is also recommended that colleges and universities become part of the wider Health Promotion Colleges Network (Dooris et al., 2012), which also advocates a settings approach to health promotion and provides a framework specifically for the college setting.

**College Healthy Eating Policy**

Although the current intervention addressed healthy eating, very little evidence of its effectiveness was seen. Perhaps what is required is a college wide approach in that after providing students with knowledge and awareness, opportunities to engage in healthy eating practices would be provided on campus through college restaurant, vending machines etc. Much has been written of the negative effects on students healthy eating and weight from the “all you can eat” dining facilities popular in American colleges. In fact, some studies reported that the college environment was conducive to unhealthy eating as opposed to healthy eating (La Caille et al., 2011). On the whole, Irish colleges don’t have this style of dining facilities for its students. Cost and convenience were the most important factors in making food choices for students (La Caille et al., 2011). Inconvenience and affordability were also cited as barriers within the focus group findings. Thus is recommended that colleges endeavour to provide affordable healthy food in college facilities. Some writers have reported on the benefits of “point of selection” prompts located over healthy foods in restaurants or college canteens in improving healthy eating, (Peterson et al., 2010). Within the
current study setting this could be provided in the form of nutritional information including calorie counts located beside foods on offer.

**College Environment - Facilities**
It is recommended that there be an extension of college facilities for physical activity e.g. provision of exercise facilities. Again this would come under the broader settings approach recommendation. Many researchers have reported on the importance of exercise facilities located as convenient as possible to the student to increase physical activity (Reed and Phillips, 2005; Dinger, 1999; CLAN, 2005; La Caille et al., 2011). The setting of the current study is a relatively small rural college with limited exercise facilities on site, however, there are many country walks available that perhaps students would be motivated to take if these routes were measured out and maps were made available on different distance options. Also there is a gym with exercise equipment but as previously stated is only available to those who live on campus. Perhaps the student union could negotiate a nominal fee for all students to use this facility if they wished to do so.

**Legislation/Taxation**
Much has been written and debated with regard to legislation and taxation to promote healthy lifestyles. Indeed there exists a Special Action Group on Obesity set up by the Minister of Health in this country. The Minister has outlined the groups’ priorities which include calorie postings on menus, introduction of a tax on sugar sweetened drinks, nutritional labelling and restrictions on the marketing of food and drink to children (Houses of the Oireachtas, 2011). Despite other countries introducing taxes on high fat foods or high sugar foods, Ireland has yet to take such measures. Within the current study it is recommended that in view of the government's failure to address these issues at national level, college authorities need to address them at college level.
La Caille et al. (2011) suggest that universities need to take the lead in changing food service policies, vending contracts and creating institutional supports for healthy eating as they have done with their alcohol environment. They suggest that such policies help set up an institutional culture that is supportive of healthy choices. An example of this might be if college policy implemented a system whereby vending machines must contain a minimum number of healthy options. Other suggestions involve subsidising the cost of fruit and vegetables in the college canteen, e.g. fruit, as evidence suggests reducing the cost of healthier foods particularly fruit and vegetables increase their purchase (French and Perry, 1997). Also as vending machines on college campus usually contain a large number of sugary drinks, it is recommended that college policy could ensure a selection of sugar free beverages as well as water to be made available instead. Also Kvaavik et al. (2005) found that soft drinks consumption could be a marker for unhealthy eating behaviours and suggested that reduced soft drink consumption may reflect an increase in overall dietary quality. Policies to support physical activity include the provision of walkways and cycle paths around the college to encourage students and staff to walk or cycle to college or exercise during lunch hour. Other measures could include the promotion of active living on a day to day basis whereby prompts are provided to encourage individuals to make the active choice. An example of this is where prompts are provided at lifts to encourage individuals to take the stairs instead. Evidence suggests that this mechanism is effective in promoting physical activity (Kahn et al., 2002).

6.4. Recommendations for Research

Nationwide Survey of PA

It is recommended that a nationwide survey of college students’ physical activity
levels be undertaken. At present much is known about physical activity levels in American and Australian college students however less is known about the physical activity levels of Irish students. Also, although SLAN reports on physical activity levels of young adults, it does not differentiate between those who are college students and those who are not. Thus it would be interesting to see if specific physical activity patterns exist in Irish college students similar to those seen in other countries. Many different tools to measure physical activity have been used in the past, also many different interpretations as to what constitutes adequate levels have been used. Thus some researchers in the area suggest there is an urgent need to standardise PA measures to help researchers better understand PA (Keating et al. 2005). Thus the use of a standardised measure will go some way in reducing confusion and make results between studies more comparable. However in view of recent evidence bringing into question the validity and reliability of the IPAQ as a PA measurement tool (Lee et al., 2011); further work needs to go in to selecting the most appropriate measure.

**Healthy Eating**

**Nationwide Survey of BMI of College Students**

It is recommended that a nationwide survey of Irish college students’ BMI’s levels be undertaken in order to compare trends in Irish college students with those seen in other countries. A nationwide survey such as that proposed could help to establish a baseline for future research in this area.

**Nationwide Survey of Stress in Irish Students**

In view of the high stress levels reported within this study, it is also recommended that a survey of stress in Irish students be undertaken, causes of this stress and what students do to cope could also be included. This could be in the form of a longitudinal quantitative survey across all four years of college. It would also be interesting to have a qualitative element to the study involving a number of focus groups from colleges.
throughout Ireland. Also a cross sectional study investigating stress in students in various degree programmes would prove very interesting. It would be interesting to ascertain if some degree programmes are more stressful than others.

**Research - Psychological Concepts**

As lifestyle interventions often target constructs based on social cognitive theory, e.g. self-efficacy, self-regulation, social support etc., Artinian et al. (2010) suggest that more evidence is needed to determine whether one or the other theoretical approach may be better in specific circumstances. Although the literature highlights the importance of these psychological constructs such as self-efficacy and social support in facilitating health behavioural change, little evidence of their influence has been seen in the current study. Thus, further research into these psychological concepts is recommended to ascertain their role in mediating health behavioural changes.

**Social Support Trends**

From the current study a marked reduction in social support was seen over the course of the study. Thus an investigation of trends in social support from both family and friends over the first year in college may prove very interesting. Perhaps this population group have particular social support needs which researchers could become aware of it which would in turn make it possible to implement some initiatives which may build social support within this population group.

**Settings Approach**

On a final note a comparative study measuring health outcomes of college students on two different campus’s, one where a settings approach to healthy lifestyles exists and one where it does not, may prove interesting to see if indeed a settings approach improves the health behaviours of college students. Already much evidence exists that
a settings approach to promoting health is college students is a desirable approach. However much work needs to go in to developing individual college settings to reflect the healthy settings approach. There is a need for the development and testing of settings based interventions in this area along with the development of appropriate methodologies to evaluate such settings based interventions.
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APPENDIX 2.1
Appendix 2.1

A MODEL FOR BEHAVIOURAL CHANGE FOR COLLEGE STUDENTS IN RELATION TO HEALTHY EATING, PHYSICAL ACTIVITY AND PSYCHOLOGICAL WELL BEING.

Theoretical Background
Knowledge Attitude Behaviour Model (KAB)
Social Learning/Cognitive Theory
Theory of Reasoned Action/Planned Behaviour
TTM and Stages of Change
Motivational Interviewing

Develop self–health awareness, -Explore attitudes
Provide information & increase knowledge
Promote Self -Responsibility & Self-Empowerment
Building Self Belief and Self Efficacy
Increase Motivational Readiness to Change

Develop Practical Skills

Spirit of Motivational Interviewing
Affirmation
Collaboration
Evocation
Autonomy

Behavioural Processes of Change
Substituting alternatives
Enlisting Social Support
Rewarding Yourself
Committing Yourself
Reminding Yourself

Cognitive Processes of Change
Increasing Knowledge
Being aware of the risks
Caring about the consequences to others
Comprehending benefits
Increasing healthy opportunities

Distinguish Importance
Resolve ambivalence
Promote Social Support
Increase Motivational Readiness to Change

Key M.I. Communication Skills:
Open Questioning
Affirmation
Selective Reflection
Summarizing

Key M.I. Principles:
Express Empathy
Develop Discrepancies
Rolling with Resistance
Supporting Self Efficacy

Behavioural Change
Less healthy Behaviours

More Healthy Behaviours
APPENDIX 3.1
Appendix 3.1
BNSC Undergraduate Degree Year 1
Health and Well-Being Module Outline
Timetable and Programme Outline Semester 2 January 2009

St. Angela’s College, Sligo
Department of Nursing and Health Studies

<table>
<thead>
<tr>
<th>Title of module:</th>
<th>Health and Well Being</th>
</tr>
</thead>
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<tr>
<td>Total module Hours:</td>
<td>120 hours</td>
</tr>
<tr>
<td>Module Level:</td>
<td>Degree</td>
</tr>
<tr>
<td>Module Leader:</td>
<td>Patsy Mc Sharry</td>
</tr>
<tr>
<td>Module Code:</td>
<td></td>
</tr>
<tr>
<td>Credit weightings:</td>
<td>6</td>
</tr>
</tbody>
</table>

Aim:
- This module will introduce the students to the principles of health and the concepts of Wellness. Self-awareness skills to examine personal health and wellness behaviours in the context of recommended health behaviours will be addressed. Particular emphasis will be placed on the important contribution that physical activity, healthy eating and psychological well-being make to overall health.

Learning outcomes:
On the completion of this module students will:
- Have an understanding of the physical and mental dimensions of overall health and wellbeing.
- Have an understanding of the various factors which influence overall health and well being
- Have an understanding of how individual lifestyles influence health
- Have an understanding of the effects of physical activity/exercise on health
- Have an understanding of the effects of Nutrition and diet on health
- Have an understanding of the principles of a healthy diet
- Demonstrate an awareness of personal health and fitness status
- Identify personal barriers and facilitators to maintaining a healthy lifestyle
- Demonstrate an understanding of safe exercise practices for personal health maintenance
- Demonstrate an ability to monitor personal health status over a period of time
- Identify the components necessary for high level psychological wellbeing.
- Develop personal awareness with regard to their emotional health status.
- Explore their own responses to stress and their individual stressors.
- Explore the development of various coping strategies to help combat stress as well as other negative emotions.
- Explore their own social support resources and how they can make use of such resources.

Indicative content:
- Theory:
  - The concept of health
  - Dimensions of health
  - The concept of mental health
• Determinants of health
• Lifestyle factors influencing health
• Effects of physical activity/exercise on health
• Minimum levels of physical activity necessary to maintain health and
  prevent weight gain
• Recommendations on physical activity
• Effects of nutrition and diet on health
• Optimum levels of nutrition necessary to maintain health and prevent weight gain
• Government recommendations on healthy eating
• The concept of psychological well being
• Stress and positive coping strategies
• Managing emotions
• Dealing with conflict
• The concept of social support
• The concept of self esteem

Practical Element:
• Motivational interviewing towards healthy lifestyles based on stage matched classifications
• Exploring barriers
• Overcoming barriers
• Utilising social support networks
• Fitness assessment
• Safety aspects of exercising
• Demonstration of correct flexibility and stretching techniques
• Application of the FITT Principle (Frequency, Intensity, Time & Type)
• Resting Pulse monitoring and its relationship to activity
• Calculating target heart rate for aerobic exercise
• Positive self-talk
• Guided relaxation
• Group work on coping strategies necessary to combat stress

Teaching and Learning activities:
Lectures; Small group work in the form of motivational interviewing; Discussion; Role-play;
Practical Demonstration; Health assessments.

Mode of assessment:
Coursework - 100%
• The purpose of incorporating this module into the overall academic assessment process
  is in recognition that research has shown that an academic incentive plays a role in
  motivating participants in participating in such a programme, (De Val et al, 2005).
• Nature of Assessment Process: 100% coursework involving the maintenance of a
  reflective diary throughout the duration of the module and then submitting an assignment
  entitled:
  Discuss the contribution of physical activity and healthy eating in the maintenance
  of overall physical and psychological well-being.

Indicative Reading
Dublin: Stationery Office

<table>
<thead>
<tr>
<th>Taskforce on Obesity Dublin: Stationery Office</th>
</tr>
</thead>
</table>

*Additional reading to supplement core reading will be given by module leader.*
APPENDIX 3.2
## Appendix 3.2

<table>
<thead>
<tr>
<th>Date</th>
<th>Hours</th>
<th>Topic</th>
<th>Lecturer</th>
<th>Room Needs</th>
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<tr>
<td><strong>Mon 11th January 2010 9-11</strong></td>
<td>2</td>
<td>Introduction to module <strong>Exe1. What being Healthy means to me. Concepts and Definitions of Health</strong></td>
<td>Patsy mc Sharry</td>
<td>45 students VHLT</td>
</tr>
<tr>
<td><strong>Wed 13th Jan 2010 2-4</strong></td>
<td>2</td>
<td>Dimensions of Health (Physical, Psychological Mental etc) Determinants of Health Lifestyle Factors Influencing Health</td>
<td>Patsy mc Sharry</td>
<td>VHLT</td>
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<tr>
<td><strong>Mon 18th Jan 10 Time: 2-5pm</strong></td>
<td>2</td>
<td><strong>Theory</strong> Effects of Physical activity/Exercise on overall Health. Minimum levels of physical activity necessary to maintain health. Recommended levels of Physical Activity to maintain optimum levels of Health and Fitness</td>
<td>Patsy Mc Sharry</td>
<td>VHLT</td>
</tr>
<tr>
<td><strong>Tuesday 19th 2-4</strong></td>
<td>3 hours workshop</td>
<td><strong>Practical No.1 3 hour workshop</strong> -Individual baseline Fitness Assessment. -Safety aspects of exercising incorporating demonstration of correct flexibility and stretching techniques. -Application of the FITT principle (frequency, intensity, time and type) -Calculating Target heart rate for aerobic activity.</td>
<td>Patsy Mc Sharry and Shirley Mc Kenna and IT students</td>
<td>(Approx 22 students)</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Event Details</td>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Wed 20th Jan 10</strong></td>
<td><strong>2-5pm</strong></td>
<td><strong>Practical No.2 3 hour workshop</strong> --Individual baseline Fitness Assessment. -Safety aspects of exercising incorporating demonstration of correct flexibility and stretching techniques. -Application of the FITT principle (frequency, intensity, time and type) -Calculating Target heart rate for aerobic activity.</td>
<td><strong>Auditorium</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tues 26th 2010 2-4</strong></td>
<td><strong>2 hours</strong></td>
<td><strong>Theory</strong>  -The Components of a Healthy Diet. -Effects of Nutrition and diet on Health -Optimum levels of nutrition necessary to maintain health and prevent weight gain. -The Obesity Strategy</td>
<td><strong>VHLT</strong></td>
<td></td>
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<tr>
<td><strong>Wednesday 27th 9-11</strong></td>
<td><strong>2 hours</strong></td>
<td>Theory of motivational interviewing and stages of change.</td>
<td><strong>VHLT</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tues 23rd March 2010 Time: 11-1</strong></td>
<td><strong>2 hour workshop</strong></td>
<td><strong>Practical No.2 Motivational Interviewing workshops regarding exercise goals and/or healthy eating goals.</strong></td>
<td><strong>VHLT</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Wed 24th March 2010 11-1</strong></td>
<td><strong>2 hour workshop</strong></td>
<td><strong>Practical No.2 Motivational Interviewing workshops regarding exercise goals and/or healthy eating Goals.</strong></td>
<td><strong>VHLT</strong></td>
<td></td>
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<tr>
<td><strong>Thur 25th March</strong></td>
<td><strong>2</strong></td>
<td><strong>Theory</strong>  -The concept of psychological well being</td>
<td><strong>VHLT</strong></td>
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</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Activity</td>
<td>Instructor(s)</td>
<td>Students</td>
</tr>
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<td>---------------</td>
<td>--------------</td>
<td>---------------------------------------------------------------</td>
<td>--------------------------------------</td>
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<tr>
<td>Tues 13th Apr</td>
<td>9-11</td>
<td>2 hour workshop Practical No.3</td>
<td>Patsy Mc Sharry and Geraldine Jolley</td>
<td>22</td>
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<td></td>
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<td>Wed 14th Apr</td>
<td>11-1</td>
<td>2 hour workshop Practical No.3</td>
<td>Patsy Mc Sharry and Geraldine Jolley</td>
<td>22</td>
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<tr>
<td>Mon 19th Apr</td>
<td>11-1</td>
<td>2 Conclusion and Tutorial on upcoming Assignment.</td>
<td>Patsy Mc Sharry</td>
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</tr>
<tr>
<td>Tues 20th Apr</td>
<td>11-1</td>
<td>2 Evaluation of the Module</td>
<td>Patsy Mc Sharry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Total Hours</td>
<td>30</td>
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Appendix 3.3
By: Shirley Mc Kenna

1. Press-Up Test

<table>
<thead>
<tr>
<th>Type of Client</th>
<th>Intermediate to advanced fitness levels</th>
</tr>
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<tbody>
<tr>
<td>Equipment</td>
<td>Mat and Score Tables</td>
</tr>
<tr>
<td>Test Procedures</td>
<td></td>
</tr>
<tr>
<td>1. Start in up position, arms straight, slightly wider than shoulder width.</td>
<td></td>
</tr>
<tr>
<td>2. Full Press-Up – should be able to draw a straight line from heels to head &amp; knees to head for modified press-ups.</td>
<td></td>
</tr>
<tr>
<td>3. Lower body until there is a 90° angle at elbow – stabilise trunk by contracting abdominal muscles.</td>
<td></td>
</tr>
<tr>
<td>4. Exhale on effort (way up) &amp; inhale on down phase.</td>
<td></td>
</tr>
<tr>
<td>5. Max. no. of press-ups is recorded (with correct technique) - no time limit.</td>
<td></td>
</tr>
</tbody>
</table>

Full Press-Up

<table>
<thead>
<tr>
<th></th>
<th>20-29 yrs</th>
<th>30-39 yrs</th>
<th>40-49 yrs</th>
<th>50-59 yrs</th>
<th>60-69 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>55&gt;</td>
<td>45&gt;</td>
<td>40&gt;</td>
<td>35&gt;</td>
<td>30&gt;</td>
</tr>
<tr>
<td>Good</td>
<td>45-54</td>
<td>35-44</td>
<td>30-39</td>
<td>25-34</td>
<td>20-29</td>
</tr>
<tr>
<td>Average</td>
<td>35-44</td>
<td>25-34</td>
<td>20-29</td>
<td>15-24</td>
<td>10-19</td>
</tr>
<tr>
<td>Fair</td>
<td>20-34</td>
<td>15-24</td>
<td>12-19</td>
<td>8-14</td>
<td>5-9</td>
</tr>
<tr>
<td>Poor</td>
<td>0-19</td>
<td>0-14</td>
<td>0-11</td>
<td>0-7</td>
<td>0-4</td>
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Modified Press-Up (recommended for females)

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<tr>
<th></th>
<th>20-29 yrs</th>
<th>30-39 yrs</th>
<th>40-49 yrs</th>
<th>50-59 yrs</th>
<th>60-69 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>49&gt;</td>
<td>40&gt;</td>
<td>35&gt;</td>
<td>30&gt;</td>
<td>30&gt;</td>
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<tr>
<td>Good</td>
<td>34-48</td>
<td>25-39</td>
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<td>Average</td>
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<tr>
<td>Fair</td>
<td>6-14</td>
<td>4-11</td>
<td>3-7</td>
<td>2-6</td>
<td>1-4</td>
</tr>
<tr>
<td>Poor</td>
<td>0-5</td>
<td>0-3</td>
<td>0-2</td>
<td>0-1</td>
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# Partial Curl-Up Test

<table>
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<th>Type of Client</th>
<th>Clients with out a history of back pain</th>
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<tr>
<td>Equipment</td>
<td>Mat – Masking Tape- Ruler / Measuring Tape – Metronome – Stop Watch and Score Tables</td>
</tr>
<tr>
<td><strong>Test Procedures</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Lie supine with knees bent to 90°</td>
</tr>
<tr>
<td>2.</td>
<td>Arms extended &amp; resting on the floor, either side of body.</td>
</tr>
<tr>
<td>3.</td>
<td>Place a straight line of tape on the floor in line with finger tips &amp; place a parallel strip 8cm away from the first strip.</td>
</tr>
<tr>
<td>4.</td>
<td>Set metronome to 40 bpm. Each curl-up takes 3 seconds</td>
</tr>
<tr>
<td>5.</td>
<td>Instruct client to curl head &amp; shoulders off floor &amp; ensure finger tips slide between strips of tape.</td>
</tr>
<tr>
<td>6.</td>
<td>Movement is slow &amp; continuous in time to the metronome up</td>
</tr>
<tr>
<td>7.</td>
<td>Total no. of curl-ups is recorded (with correct technique) to a max. of 60 curl-ups (3 minutes).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>&lt;35</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>50</td>
<td>40</td>
<td>35-44</td>
<td>30</td>
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<tr>
<td></td>
<td>&gt;45</td>
<td>40</td>
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<tr>
<td>Good</td>
<td>&lt;35</td>
<td>45</td>
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<td>30</td>
</tr>
<tr>
<td></td>
<td>&gt;45</td>
<td>25</td>
<td>25</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Average</td>
<td>&lt;35</td>
<td>30</td>
<td>25</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>25</td>
<td>25</td>
<td>25-44</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>&gt;45</td>
<td>15</td>
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<td>10</td>
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<td>6</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>10</td>
<td>6</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>&gt;45</td>
<td>5</td>
<td>6</td>
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</table>
Handgrip Strength Test

<table>
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<tr>
<th>Type of Client</th>
<th>All Clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>Grip Dynamometer</td>
</tr>
</tbody>
</table>

**Test Procedures**

1. Adjust grip so the knuckle on the index finger is at 90° to grip handle.
2. Subject holds the dynamometer in one hand in line with the forearm and hanging by the thigh.
3. Ensure the dynamometer displays ‘zero’.
4. Raise the dynamometer to shoulder height & squeeze as hard as possible as the dynamometer is lowered to start position.
5. The best of two trials for each hand is recorded. The values below (in Kg) give a guide to scores expected for adults. They are the average of the best scores of each hand.

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>excellent</td>
<td>&gt; 64</td>
<td>&gt; 38</td>
</tr>
<tr>
<td>very good</td>
<td>56-64</td>
<td>34-38</td>
</tr>
<tr>
<td>above average</td>
<td>52-56</td>
<td>30-34</td>
</tr>
<tr>
<td>average</td>
<td>48-52</td>
<td>26-30</td>
</tr>
<tr>
<td>below average</td>
<td>44-48</td>
<td>22-26</td>
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<tr>
<td>poor</td>
<td>40-44</td>
<td>20-22</td>
</tr>
<tr>
<td>very good</td>
<td>&lt;40</td>
<td>&lt; 20</td>
</tr>
</tbody>
</table>

- **validity:** The validity of this test as a measure of general strength has been questioned.
- **advantages:** This is a simple and commonly used test of strength.
- **disadvantages:** The dynamometer must be adjusted for hand size, how successfully this is done will affect the accuracy of the measurement.
- **comments:** Also record whether they are left or right handed, as this may help in the interpretation of results.
Sit & Reach Test for Flexibility

This test is suitable for active individuals but not for those where the test would be contraindicated.

- **Procedure:** This test involves sitting on the floor with legs out straight ahead. Feet (shoes off) are placed with the soles flat against the box, shoulder-width apart. Both knees are held flat against the floor by the tester. With hands on top of each other and palms facing down, the subject reaches forward along the measuring line as far as possible. After three practice reaches, the fourth reach is held for at least two seconds while the distance is recorded. Make sure there is no jerky movements, and that the fingertips remain level and the legs flat.

- The score is recorded to the nearest centimeter or half inch as the distance reached by the hand. This will depend on the scale being used - see variations below. The table here gives you a guide for expected scores (in cm) for adults using zero at the level of the feet.

<table>
<thead>
<tr>
<th></th>
<th>men</th>
<th>women</th>
</tr>
</thead>
<tbody>
<tr>
<td>excellent</td>
<td>+17 to +27</td>
<td>+21 to +30</td>
</tr>
<tr>
<td>good</td>
<td>+6 to +16</td>
<td>+11 to +20</td>
</tr>
<tr>
<td>average</td>
<td>0 to +5</td>
<td>+1 to +10</td>
</tr>
<tr>
<td>fair</td>
<td>-8 to -1</td>
<td>-7 to 0</td>
</tr>
<tr>
<td>poor</td>
<td>-19 to -9</td>
<td>-14 to -8</td>
</tr>
<tr>
<td>very poor</td>
<td>&lt; -20</td>
<td>&lt; -15</td>
</tr>
</tbody>
</table>

YMCA 3-minute Step Test

- **purpose:** a step test provides a measure of cardio-respiratory or endurance fitness
- **equipment required:** 12 inch (30 cm) step, stopwatch, metronome or cadence tape, stethoscope.
- **description:** Begin by demonstrating the alternating stepping cadence to the subject. In time with the beat step one foot up on the bench (1st beat), step up with the second foot (2nd beat), step down with one foot (3rd beat), and step down with the other foot (4th beat.) Allow the subject to practice the stepping to the metronome cadence, which is set at 96 beats per minute (4 clicks = one step cycle) for a stepping rate of 24 steps per minute. The athlete steps up and down on the platform at the given rate for a total of 3 minutes. The athlete immediately stops on completion of the test and sits down and remains still. Starting within 5 seconds, the tester is to count the subject’s heart rate (ideally with a stethoscope) for one complete minute.
- **scoring:** The total one-minute post-exercise heart rate is the subject's score for the test.
### Aerobic Capacity Classification

<table>
<thead>
<tr>
<th>Age</th>
<th>&lt;36</th>
<th>36-45</th>
<th>&gt;45</th>
<th>&lt;36</th>
<th>36-45</th>
<th>&gt;45</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR O₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exc</td>
<td>81</td>
<td>54</td>
<td>84</td>
<td>53</td>
<td>90</td>
<td>43</td>
</tr>
<tr>
<td>Good</td>
<td>99</td>
<td>49</td>
<td>98</td>
<td>45</td>
<td>102</td>
<td>38</td>
</tr>
<tr>
<td>AA</td>
<td>103</td>
<td>46</td>
<td>112</td>
<td>39</td>
<td>111</td>
<td>34</td>
</tr>
<tr>
<td>Avg</td>
<td>120</td>
<td>36</td>
<td>120</td>
<td>33</td>
<td>120</td>
<td>30</td>
</tr>
<tr>
<td>BA</td>
<td>123</td>
<td>32</td>
<td>125</td>
<td>29</td>
<td>124</td>
<td>27</td>
</tr>
<tr>
<td>Fair</td>
<td>127</td>
<td>28</td>
<td>129</td>
<td>25</td>
<td>130</td>
<td>24</td>
</tr>
<tr>
<td>Poor</td>
<td>136</td>
<td>24</td>
<td>138</td>
<td>23</td>
<td>138</td>
<td>20</td>
</tr>
</tbody>
</table>

| HR O₂ |     |       |     |    |       |     |
| Exc  | 79  | 55    | 79  | 49 | 84    | 46  |
| Good | 94  | 45    | 90  | 43 | 97    | 38  |
| AA   | 109 | 39    | 106 | 37 | 108   | 32  |
| Avg  | 118 | 34    | 118 | 33 | 118   | 27  |
| BA   | 122 | 30    | 125 | 29 | 124   | 24  |
| Fair | 129 | 26    | 134 | 26 | 130   | 20  |
| Poor | 137 | 20    | 145 | 22 | 145   | 18  |


### How did I do?

#### Name:

<table>
<thead>
<tr>
<th>Test</th>
<th>Score</th>
<th>Fitness rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push Up Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curl Up Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grip Strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sit &amp; Reach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Min Step Test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3.4
Appendix 3.4.

**Motivational Interviewing Protocol for PA**

**Step 1:**
Identify a particular behavioural change goal they would like to make e.g. in relation to your physical activity:

**Step 2:**
Describe “A Typical Day’’ and how physical activity fits in to that:

**Step 3:**
Assess what stage of change you are at using the following tool:

**Physical Activity Stages of Change**
*Thinking now about regular physical activity, by that I mean:
Taking part in exercise or sports 2-3 times per week for a minimum of 20 minutes at a time, or more general activities like walking, cycling or dancing 4-5 times per week accumulating at least 30 minutes per day.

**With this in mind, could you indicate which statement best describes how physically active you have been over the last six months?**

I am not regularly physically active and do not intend to be so in the next six months  □

I am not regularly physically active but am thinking about starting to do so in the next six months  □

I do some physical activity but not enough to meet the description of regular physical activity  □

I am regularly physically active but only began in the last six months…… □

I am regularly physically active and have been so for longer than six months  □
**Step 4:**
On the below scale indicate, by placing a line at the point you think you are at, in relation to been ready to make the change in question.

Readiness to change

<table>
<thead>
<tr>
<th>0</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Ready</td>
<td>Ready</td>
</tr>
</tbody>
</table>

**Step 5**
Now, using the following scale, indicate how important making the change is to you!

<table>
<thead>
<tr>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Important</td>
<td>Most Important</td>
<td></td>
</tr>
</tbody>
</table>

Explore Importance;
Take a moment to explore why you scored what you did E.g. Explore why you scored an 8 and not a 0.

**Step 6:**
When we think about making changes most of us don’t really consider all ‘sides’ in a complete way. Instead we often do what we think we should do, avoid doing things we don’t feel like doing or just feel confused or overwhelmed and give up thinking about it all.

**Change Quadrant: (Decisional Balance)**

Below write in the reasons that you can think of in each of the boxes

<table>
<thead>
<tr>
<th>What’s good about staying the same</th>
<th>What’s bad about staying the same</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What’s good about changing the behaviour</th>
<th>What’s bad about changing the behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 7:
Now using the following scale, indicate how confident you feel about being successfully able to make the planned changes.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not-Confident</td>
<td></td>
<td>Very confident</td>
</tr>
</tbody>
</table>

**Explore Confidence:**
Take a moment to explore why you scored what you did. E.g. Explore why you scored an 8 and not a 0.

Step 8:
**Re-assess Readiness to Change:**
Review what kind of pattern has emerged in relation to both importance and confidence dimensions. E.g.

Taking all into account, reassess your readiness to change by indicating your readiness on the scale below.

**Readiness to change**

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Ready</td>
<td>Ready</td>
<td></td>
</tr>
</tbody>
</table>

Step 9:
Identify supports available to you in order to help you initiate and sustain the changed behaviour.
**Step 10**
**Make a decision, goal set and Plan:**
Take a moment to set weekly goals for yourself in relation to increasing their physical activity by using the following recording table to plan activity...
Suggestion: Write what you plan to do in pencil at the start of the week and complete what you actually do at the end of the week in pen.

<table>
<thead>
<tr>
<th>Number of minutes per day to be spent engaging in physical activity and description of type of activity</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>Weekly Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week Commencing:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigorous (e.g. Running)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate (e.g. Brisk walking)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength/Resistance (e.g. Weight training/toning)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toning//Relaxation or stretching (e.g. Yoga, Pilates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking (that you do in general activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 11
To finish, please complete the following:

Arriving at a Plan:
The most important reasons why I want to change are:

I plan to do these things in order to accomplish my goals:
Specific action:
By When:

Other people could help me with change in these ways:
Person:
Possible ways they could help

Possible obstacles to this change and how I can handle them:
Possible obstacles to change:
How to respond:

I know that my plan is working when I see these results:
1
2
3
4
5

Step 12:
Plan a review Date:
E.G... 2 week’s time
APPENDIX 3.5
Appendix 3.5.

Motivational Interviewing Protocol For HE

Step 1:
Identify a particular behavioural change goal you would like to make e.g. in relation to your healthy eating behaviour.

GOAL:

Step 2:
Write down a description of a typical day and how healthy eating fits in to that:

Typical Day and Healthy Eating:

Step 4:
On the below scale indicate, by placing a line at the point you think you are at, in relation to been ready to make the change in question.

Readiness to change

<table>
<thead>
<tr>
<th>1</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Ready</td>
<td></td>
<td>Ready</td>
</tr>
</tbody>
</table>

Explore readiness to change:
NB: Take a moment to explore why you scored what you did E.g. Explore why you scored a 5 and not a 0.
Step 5
Now, using the following scale, indicate how importance making the change is to you!

<table>
<thead>
<tr>
<th>1</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not-at-all Important</td>
<td>Most-important</td>
<td></td>
</tr>
</tbody>
</table>

Explore Importance;
Take a moment to explore why you scored what you did E.g. Explore why you scored an 8 and not a 0.

Step 6:
When we think about making changes most of us don’t really consider all ‘sides’ in a complete way. Instead we often do what we think we should do, avoid doing things we don’t feel like doing or just feel confused or overwhelmed and give up thinking about it all.

Change Quadrant: (Decisional Balance)
Below write in the reasons that you can think of in each of the boxes

<table>
<thead>
<tr>
<th>What’s good about staying the same (maintaining my current eating habits)</th>
<th>What’s bad about staying the same (maintaining my current eating habits)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What’s good about changing the behaviour (improving my current eating habits)</th>
<th>What’s bad about changing the behaviour (improving my current eating habits)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 7:
Now using the following scale, indicate how confident you feel about being successfully able to make the planned changes.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Not</td>
<td>Very Confident</td>
<td></td>
</tr>
<tr>
<td>Very confident</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explore Confidence:
Take a moment to explore why you scored what you did E.g. Explore why you scored a 4 and not a 0.

Step 8:
Re-assess Readiness to Change:
Review what kind of pattern has emerged in relation to both importance and confidence dimensions. E.g.

Taking all into account, reassess your readiness to change by indicating your readiness on the scale below.

Readiness to change

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Not Ready</td>
<td>Ready</td>
<td></td>
</tr>
</tbody>
</table>

Explore readiness to change and compare with previous score:
NB: Take a moment to explore why you scored what you did E.g. Explore why you scored a 5 and not a 0.

Step 9:
Identify supports available to you in order to help you initiate and sustain the changed behaviour.
Step 10
Make a decision, goal set and Plan:

<table>
<thead>
<tr>
<th>Planned Food Intake (in pencil) per day based on number of recommended portions and actual intake written in pen at the end of the day. Week Commencing:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Type and Number of Portions</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Fats, high fat/sugar snacks, foods and drinks: Choose</td>
</tr>
<tr>
<td>very small amounts</td>
</tr>
<tr>
<td>Meat, fish, eggs and alternatives Any 2</td>
</tr>
<tr>
<td>Milk Cheese and Yogurt Any 3</td>
</tr>
<tr>
<td>Fruit and Vegetables Any 5</td>
</tr>
<tr>
<td>Carbohydrates e.g. Bread, cereals, potatoes 6 Plus</td>
</tr>
</tbody>
</table>
Step 11
To finish, please complete the following:

Arriving at a Plan:
The most important reasons why I want to change are:

I plan to do these things in order to accomplish my goals:
Specific action:
By When:

Other people could help me with change in these ways:
Person:
Possible ways they could help

Possible obstacles to this change and how I can handle them:
Possible obstacles to change:
How to respond:

I know that my plan is working when I see these results:
1
2
3
4
5

Step 12:
Plan a review Date:
E.g. 20th April
Motivational Interviewing Protocol
Facilitator Pack 31st Mar 09

*Throughout the motivational interviewing workshop, the facilitator makes use of all or some of the MI Principles such as:

- Expressing empathy
- Developing discrepancy
- Rolling with resistance
- Supporting self-efficacy

And uses the Key MI skills of:

- O. = Open questioning
- = Affirmations,
- R. = Reflective Listening
- S. = Summarising

Step 1:
Ask each student to identify a particular behavioural change goal they would like to make in relation to their Physical Activity or Healthy Eating Behaviours:

Step 2:
Ask Student to take you through “A Typical Day” in relation to either physical activity or healthy eating:

- Follow the student’s description using simple open ended questions and reflective listening and by expressing empathy.

Step 3:
Assess what stage of change the student is at using the following tool:
Physical Activity Stages of Change Assessment tool:

*Thinking now about **regular physical activity**, by that I mean: Taking part in exercise or sports 2-3 times per week for a minimum of 20 minutes at a time, or more general activities like walking, cycling or dancing 4-5 times per week accumulating at least 30 minutes per day.

**With this in mind, could you indicate which statement best describes how physically active you have been over the last six months?**

I am not regularly physically active and do not intend to be so in the next six months  □

I am not regularly physically active but am thinking about starting to do so in the next six months  □

I do some physical activity but not enough to meet the description of regular physical activity  □

I am regularly physically active but only began in the last six months…… □

I am regularly physically active and have been so for longer than six months  □

Healthy Eating Stages of Change Assessment tool:

Thinking now, about **“Regular Healthy Eating”**, by that I mean simply eating a wide variety of food, in correct amounts, as outlined within the food pyramid recommendations (DOH&C, 2005). It also involves using the food pyramid as a guide to plan types and amounts of food you eat on most dining occasions.

**With this in mind, could you indicate which statement best describes your healthy eating practices over the last six months?**

I currently do not practice healthy eating and am not thinking about starting to do so in the next six months □

I currently do not practice healthy eating but am thinking about starting to do so in the next six months □

I practice healthy eating sometimes but not enough to meet the description of regular healthy eating □

I currently practice healthy eating but only began in the last six months □

I currently practice healthy eating regularly and have been doing so for longer than six months □

**Step 4:**
Assess the student’s readiness to change using the following tool:

**Readiness to change**

| 0 | 5 | 10 |
|-----------------------------------------------|
| Not Ready | Ready |
|------------------------------------------------|
| scratched out | scratched out | scratched out |
Step 5

Assess the importance of making the change to the student using the following importance ruler:

<table>
<thead>
<tr>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important at all</td>
<td></td>
<td>Most Important</td>
</tr>
</tbody>
</table>

Explore Importance;
E.g. Explore why the student scored an 8 and not a 0 by using simple open ended questions and reflective listening, by expressing empathy and using affirmations.

Step 6:
Develop Discrepancy by using decisional balance assessment table which further serves to explore importance.

Decisional Balance Worksheet
When we think about making changes most of us don’t really consider all ‘sides’ in a complete way. Instead we often do what we think we should do, avoid doing things we don’t feel like doing or just feel confused or overwhelmed and give up thinking about it all.

Change Quadrant: (Decisional Balance)
Below write in the reasons that you can think of in each of the boxes

<table>
<thead>
<tr>
<th>What’s good about staying the same</th>
<th>What’s bad about staying the same</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What’s good about changing the behaviour</th>
<th>What’s bad about changing the behaviour</th>
</tr>
</thead>
</table>
Step 7:
Assess the confidence that the student feels about being successfully able to make
the planned changes using the following confidence ruler:

<table>
<thead>
<tr>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Confident</td>
<td>Very confident</td>
<td></td>
</tr>
</tbody>
</table>

Build this confidence (self-efficacy)

E.g. Point out that the student scored a 6 and not a 0 and therefore must be
somewhat confident and explore what made them score a 6 and not a 2, and build
on these points by affirmations etc.

Step 8:
Re-assess Readiness to Change:
Review what kind of pattern has emerged in relation to both importance and
confidence dimensions. E.G.
By reflective listening and summarising, you can feedback to student, e.g. on a
scale of 1-10 the importance you attribute to increasing your physical activity or
your healthy eating is 8, however, and you scored 5 in relation to being confident
that you can bring about that change. This appears to indicate that you really want to
increase your activity or improve your healthy eating behaviours but you're not
sure you are able to. Is that how it is?

Taking all into account assess students readiness to change

<table>
<thead>
<tr>
<th>0</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Ready</td>
<td>Ready</td>
<td></td>
</tr>
</tbody>
</table>

Step 9:
Encourage student to identify supports available to them
E.G. Explore with student supports which could enhance their readiness to change e.g.
social supports available to them; e.g. getting friend to go for walk with them or embark
on a healthy eating regime etc.


Step 10
Promote Decision making and planning
Encourage student to set a weekly goals for themselves in relation to increasing their physical activity and use the following recording table to plan activity. NB: Goals should be consistent with current stage of change, negotiated and positive e.g. (spend less days inactive)
Encourage them to write what they plan to do in pencil at the start of the week and complete what they actually do at the end of the week in pen

<table>
<thead>
<tr>
<th>Type of activity</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>Weekly Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigorous (e.g. Running)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate (e.g. Brisk walking)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength/Resistance (e.g. Weight training/toning)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toning//Relaxation or stretching (e.g. Yoga, Pilates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking( that you do in general activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Encourage student to set a weekly goals for themselves in relation to Healthy eating and use the following recording table to plan activity. NB: Goals should be consistent with current stage of change, negotiated and positive e.g. eat more healthy foods as opposed to less unhealthy foods)
Encourage them to write what they plan to do in pencil at the start of the week and complete what the actually do in pen at the end of the week.
Planned Food Intake (in pencil) per day based on number of recommended portions and actual intake written in pen at the end of the day.

Week Commencing: __________________________

<table>
<thead>
<tr>
<th>Food Type and Number of Portions</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>Weekly Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fats, high fat/sugar snacks, foods and drinks:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very small amounts</td>
<td></td>
<td></td>
<td></td>
<td>Choose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat, fish, eggs and alternatives</td>
<td>Any 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk Cheese and Yogurt</td>
<td>Any 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and Vegetables</td>
<td>Any 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrates e.g. Bread, cereals, potatoes</td>
<td>6 Plus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Arriving at a Plan:
The most important reasons why I want to change are:

I plan to do these things in order to accomplish my goals:

Specific action:
By When:

Other people could help me with change in these ways:

Person:
Possible ways they could help

Possible obstacles to this change and how I can handle them:

Possible obstacles to change: How to respond:

I know that my plan is working when I see these results:

1
2
3
4
5

Step 12:
Plan a review Date:
Students will complete the Health behaviours questionnaire (which incorporates an assessment of physical activity levels and healthy eating behaviours) for the second time on Monday the 20th April. This will give them an opportunity to evaluate their personal progress.
Various MI Strategies to be utilised depending on individuals’ stage of Change:

<table>
<thead>
<tr>
<th>STAGE</th>
<th>Physical activity</th>
<th>Healthy Eating Behaviours</th>
<th>Motivational interviewing elements to be emphasized</th>
<th>Processes of Change:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 5 Maintenance</td>
<td>I am regularly physically active and have been so for longer than six months</td>
<td>I currently practice healthy eating regularly and have been doing so for longer than six months</td>
<td>Provide encouragement and affirmation: Discuss risks of relapse.</td>
<td></td>
</tr>
</tbody>
</table>
| Stage 4 Action | I am regularly physically active but only began in the last six months… | I currently practice healthy eating but only began in the last six months | Provide encouragement and affirmation. Explore ways of maintaining the action. | • Substituting alternatives  
• Enlisting social support  
• Rewarding yourself  
• Committing yourself  
• Reminding yourself |
| Stage 3 Preparation | Do some physical activity but not enough to meet the description of regular physical activity | I practice healthy eating sometimes but not enough to meet the description of regular healthy eating | Using open questions, discuss how to choose a Goal and give Advice if requested and provide encouragement and affirmation. | • Increasing knowledge  
• Being aware of risks  
• Caring about consequences to others  
• Comprehending benefits  
• Increasing healthy opportunities |
| Stage 2 Contemplation | Not regularly physically active but am thinking about starting to do so in the next six months | I currently do not practice healthy eating but am thinking about starting to do so in the next six months | Emphasise the benefits of increasing Physical activity and outline the risks associated with inactivity. Discuss how to choose a Goal |  |
| Stage 1 Pre-contemplation | Not regularly physically active and do not intend to be so in the next six months | I currently do not practice healthy eating and do not intend to do so in the next six months | Information about recommended levels of exercise and information on benefits of exercise. |  |
**Processes of Change**

NB: The facilitator explores the use of various processes of change with the clients at various stages, all the while being cognisant that the behavioural processes peak when in action (Skill development) whereas the cognitive strategies prove more useful in preparation and other pre action stages. (Will Development)

- **Examples of Processes of Change:**
  - **Cognitive Processes (Peak at Preparation stage) (Will Power development)**
    - Increasing knowledge: e.g. making efforts to find out more on value of physical activity.
    - Being aware of risks: e.g. what are the health consequences associated with inactivity.
    - Caring about consequences to others: concerned about children’s future health and concern about the type of role model they are being for their kids.
    - Comprehending benefits: e.g. really acknowledging and appreciating the benefits of physical activity.
    - Increasing healthy opportunities: e.g. actively seeks out opportunity to be more active, e.g. joins an exercise class.
  
- **Behavioural processes (peak at action stage) (Skill development)**
  - Substituting alternatives: e.g. Going for a walk instead of eating a chocolate bar.
  - Enlisting social support: Enrol friend or family member to go for walks with you on a regular basis.
  - Rewarding yourself: Buying a CD for yourself when you have managed to successfully managed to eat the required portions of fruit and Vegetables every day for a whole week.
  - Committing you; Make arrangements to meet someone at gym, exercise class etc.
  - Reminding yourself: Diarise physical activity along with all other commitments and Place post it notes on cupboard to remind you of planned activity.
Appendix 3.7

Instructions and Ground Rules for Motivational interviewing
Workshops BNSC1 March 2012
Health and Well Being Module:

Today’s workshop is intended to give you an opportunity to see how using the skills of motivational interviewing can assist in bringing about behavioural changes relevant to health behaviours.

It is anticipated that by you being exposed to these skills and exploring how they could be applied in your own lives, this in turn, will serve to assist you in applying these skills within your future role as health professionals.

What you need to bring to the workshop:

- A physical activity or healthy eating goal specific to you. (It does not need to be over ambitious or competitive, it is what’s realistic for you)
- An open mind
- A willingness to participate in the group work involved
- Bear in mind this is about learning and it is not about making judgements on personal health behaviours.
- Thus, give up making yourself wrong (if that’s where you are at) in order to participate fully in the group work involved.
- Self-disclosure welcomed and respected but not essential
- Voluntary Participation – No one will be forced to contribute if they do not wish to;
- Respect for each individual -One person talks at once
- Each Participant has a role in supporting other group members.
- Confidentiality principle of the group respected at all times...
APPENDIX 3.8
Appendix 3.8

- **Content Outline for Psychological Well Being Lectures and Workshop**
  - As part of the Health and Well Being Module
  - **Lecture on Psychological well being**
    - What is Psychological well-being?
    - What is mental health?
    - What is mental health promotion
    - Determinants of good psychological well being
    - Risk and Protective factors
    - Positive steps to maintaining good psychological well being
  - **Session Outline for Psychological Well Being Workshop**
    - Introduction and Welcome
    - Reminder of Ground rules
    - Recap on what is meant by Psychological Well Being and Positive Mental health.
    - **Group work 1:** Group split into 2 and Group One asked to describe the characteristics of someone with Good Psychological well-being and Group 2 asked to describe the characteristics of someone with poor psychological well-being.
    - **Feedback and facilitated discussion in main group including areas on:**
      - How to maintain good psychological well being
      - How to build Resilience to strengthen psychological well-being and Mental health
      - How the Mind and Body are connected in maintaining good psychological well beings.
      - What you can do to maintain good psychological well-being e.g. exercise, getting enough sleep, eating healthy diet etc.
    - **Group work 2:** Paired group work whereby pairs of two participants are asked to share 5 sources of stress in their lives, how they know they are stressed and what they do to cope with this stress.
    - **Feedback and facilitated discussion in main group including areas on:**
      - How our body reacts to stress
      - How we interrupt events is more stressful than the event itself
      - How our thinking creates stress
      - The effects of positive or negative thinking on our perception of stress
      - Coping strategies to help lessen stress in our lives
      - Positive and Negative coping strategies
      - The importance of relaxation to reduce stress
      - Importance of staying in the present to reduce stress
      - Mindfulness exercise
      - Conclusion and Evaluation (one thing you’ll take away)
APPENDIX 4.1
Hi Patsy
I have done some calculations using the stats given below and for 80% power you only need 21 per group with these results. However the main problem I see here is that the data is obviously not normally distributed so you might be better doing nonparametric tests e.g. wilcoxon signed rank rather than paired t-tests. You would probably need about 30 per group for the same power for these tests but it looks as though your study is reasonably powered anyway.

Hope this helps
Jean

(Email communication from Jean Saunders (Statistical Consulting Unit, Limerick))
APPENDIX 4.2
Appendix 4.2.

Full Ethical Approval

18th October 2008
Ref: 08/JUN/14

Ms Patsy Mc Sharry
Department of Nursing and Health Studies
St. Angela’s College
Lough Gill
Sligo

RE: Ethical Approval for “The impact of the inclusion of a “Health and Wellbeing Module” in the undergraduate curriculum on a predominantly female group of students.”

Dear Ms Mc Sharry

I write to you regarding the above proposal which was submitted for Ethical review. Having reviewed your response to my letter, I am pleased to inform you that your proposal has been granted APPROVAL.

All NUI Galway Research Ethic Committee approval is given subject to the Principal Investigator submitting an annual report to the Committee. The first report is due on or before 31st October 2009. Please see section 7 of the REC’s Standard Operating Procedures for further details which also includes other instances where you are required to report to the REC.

Yours Sincerely

______________________________
Dr Saoirse Nic Gabhainn
Research Ethics Committee
APPENDIX 4.3
Appendix 4.3

Letter of Invitation to participate in study:
Direct Line: 071 – 9135646

E-mail pmcsharry@stacs.edu.ie

1st December 2008

Dear Student,

I wish to request your cooperation in participating in a research study to support academic research. The intent of this study is to understand and describe the impact of the inclusion of a “Health and Well Being module” in the undergraduate curriculum on selected health behaviours of a group of students. Thus, it involves completing a questionnaire regarding your physical activity behaviours, eating behaviours and psychological well-being.

You have been selected to participate because you are registered for either the BNSC Nursing Degree or the B.ED Home Economics Degree here in St Angela’s. I have obtained your contact details from the registration department here at the college and these details will remain confidential for the purpose of selecting study participants. A separate information sheet about the study is enclosed for your information.

The most rapid decline in physical activity happens during late adolescence and early adulthood. According to the centre for disease control and prevention in the US, by college age, the number of young people participating in regular physical activity drops considerably to 36.6 percent (CDC, 2006). Reasons for this drop in activity have been attributed to students experiencing more barriers to participating in physical activity as they progress through the educational system. Barriers identified included high workload, lack of specific sports teams to join at their college and lack of transportation to facilities (Gyurcsik et al, 2006).

Closer to home, The National Taskforce on Obesity (2005) points out that the current obesity problem is becoming increasingly prevalent in younger people, particularly among the 16-24 year old-age group (DoH&C). Donatelle et al. (1998) suggests that the concept of “wellness” is the dynamic process of attaining fulfilment in several interrelated areas of life, including physical, social, intellectual, spiritual emotional and environmental health. It is believed that any change in one wellness component could jeopardize an individual’s well-being and life balance (Longfield et al, 2006).

The current researcher suggests that the area of holistic wellness and psychological well-being is often an overlooked area in curricula design. This coupled with the stress that young adults may experience on going to college was the impetus for the inclusion of psychological well-being in the present study.
Recommendations from the health promotion in third level setting’s document (HEA and HPU, 2005) recommend that institutions explore opportunities for integrating health promotion into the curricula of both health and non-health professions. A report by the HEA (1998) recommended the inclusion of a “wellness programme” in the undergraduate curriculum such as those used in American universities as part of a more comprehensive fitness and health programme.

Thus, in an attempt to explore ways of interrupting the progressive decline in activity levels, and halting the rise in obesity levels, all the while maintaining psychological well-being, the researcher proposes the current study. Using the third level college setting the researcher sets out to ascertain whether the inclusion of a “Health and Well Being module” in the undergraduate curriculum will have an impact on students’ physical activity, eating behaviours and psychological well-being.

As an undergraduate student you are one of an influential group of people. Therefore, your health behaviours are extremely important to me. I believe that the findings from this study will be of value not only to students in this college but undergraduate students in colleges throughout the country.

If you give consent to participate in this study you will be asked to complete the same questionnaire on three separate occasions commencing in January 2009 in the lecture room setting. The value of this study will be greatly increased if you can give each statement or question your considered judgement. When you have completed the questionnaire I would be grateful if you would return it to me or other nominated person before you leave the lecture room. I would like to take this opportunity to thank you for considering participating in this study and wish you every success in the future.

Yours Sincerely,

Ms Patsy Mc Sharry
Department of Nursing
St Angela’s College
Sligo
APPENDIX 4.4
PARTICIPANT INFORMATION SHEET

Title of the study:
An evaluation of the impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health behaviours of a group of students.

Invitation to participate.
You are being invited to take part in this study because you are a first year student here at St Angela’s college and I wish to elicit your perspective on health behaviours such as physical activity, eating behaviour and psychological well-being. Before you decide, it is important for you to understand why the research is being done and what it will involve. This participant information sheet will tell you the purpose, risks, and benefits of the study. If there is anything you are unclear about you can contact me directly, (contact details listed below).

What is the study about?
The overall aim of the study is to ascertain the impact of the inclusion of a “Health and Well Being module” in the undergraduate curriculum on selected health behaviours of a group of students. The health behaviours selected for the study include physical activity behaviours, eating behaviours and psychological well-being.

How was I chosen?
The chosen population for this research study involves first year students who are registered for either the BNSC Nursing Degree or the B.ED Home Economics Degree here in St Angela’s. I have obtained your contact details from the registration department here, at the college and these details will remain confidential for the purpose of selecting study participants.

What will taking part involve?
If you agree to be involved, you will be required to complete the same questionnaire in a lecture room setting facilitated by the researcher on three separate occasions commencing in January 2009. It has four main sections. Section 1 will ask you about biographical details and Section 2 will ask questions in relation to your physical activity behaviours, Section 3 will ask questions in relation to your eating behaviours and section 4 will deal with psychological well-being. The majority of questions only require you to tick a box; however instructions for individual questions’ will be given as appropriate. It will take you approximately 20 minutes to complete the questionnaire. When you have completed the questionnaire, you return it to me (the researcher) or another nominated representative, present in the lecture hall.

The Study Process:
This study involves an intervention phase consisting of the introduction of a new module in the undergraduate BNSC programme entitled Health and Well Being, immediately after the first data collection period in JAN 09. Thus in Research terms if you are a BNSC student you will be part of the intervention group (i.e. those who will undertake the Health and Well Being module) and if you are
a B.ED student you will be part of the control or comparison group (i.e. those not undertaking the Health and Well Being module, but completing the questionnaire on three separate occasions).

The second Data collection period will occur in April 09 immediately after the module is completed and the third data collection period will take place 1 year after the initial data collection period i.e. Jan 2010.

The idea is that the researcher will be able to evaluate whether or not the inclusion of this module will have any effect on selected health behaviours of those who receive the module in comparison to those who do not.

NB: If you belong to the BNSC group, there is a possibility that you may be selected to take part in a focus group interview following the intervention period to assist in evaluating the contribution of the module to overall health and well-being and its place in the curriculum. The voluntary participation nature of involvement still applies and you have the right to refuse to take part in this focus group if so desired.

What will happen to the information once collected?
After a period of about 4 weeks after each data collection period I will start the process of reading the questionnaire responses. I will extract the information I need to understand and describe physical activity behaviours, eating behaviours and psychological well-being. I will use a statistical package called SPSS to help make sense of the information.

Where will the information be stored and for how long?
The information gleaned from the questionnaires will be stored on computer as one body of information. It will be stored until data analysis has been completed. It will be stored in the form of a password protected file.

Who will have access to the information?
The only people who will have access to information will be myself, (the researcher) and as this study is in fulfilment of a PhD; my research supervisor will have limited access to the information.

Are there any negative consequences if I choose to participate?
There are no negative consequences to participating in the study. The questionnaires will be numerically coded and thus your name or other identifying features will not appear on the questionnaires.

Are there any consequences if I choose not to be part of the study?
There is no obligation on you to participate in the study. If you do not wish to participate, do not complete a consent form. Just to point out that as a BNSC student, in part fulfilment of your first year course here at St Angela’s you will be required to undertake the Health and Well Being module. However, there is no obligation on you to become involved in the research study element of the module which is the data collection process as outlined above, (thus you undergo the module as normal without completing the questionnaires).
What should I do if I want to drop out of the study?
It is up to you to decide whether or not to take part, if you decide to participate initially; you are still free to withdraw at any time without giving a reason for doing so. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of education services you receive or affect your access to facilities as a student of St. Angela’s college in any way.

Will I benefit from participating or be paid for participating?
It is anticipated that participating in this study may stimulate a process of self-reflection on your own health behaviours; however, there is no guarantee that you personally will receive any direct benefit from the research in the immediate future. However, the findings of the study should produce information that may, in the future, influence managers/policy makers in addressing issues of concern around health behaviours of undergraduate students and assist in discovering ways of improving these health behaviours in the future.

What happens at the end of the study?
Following the completion of the thesis for submission in fulfilment of PhD, the researcher will compile a report and the findings will be submitted to Journals such as Journal of Nurse Education and Health Promotion Journals. Presentations will also be made at relevant conferences.

Whom do I contact for more information or if I have further concerns?
You can contact Patsy Mc Sharry on pmcsharry@stacs.edu.ie or at 0719143580 Ext 273

If you have any concerns about this study and wish to contact someone independent and in confidence, you may contact the Chairperson of the NUI Galway Research Ethics Committee, c/o Office of the Vice President for research, NUI Galway, ethics@nuigalway.ie

Thank you for taking time to read this leaflet and for considering taking part in this study.
APPENDIX 4.5
CONSENT FORM
Consent by participant for participation in research study:

Study Title: An evaluation of the impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health behaviours of a group of students.

Principle Investigator: Patsy Mc Sharry, Lecturer, St Angela’s College, Lough Gill, Sligo.

1. I confirm that I have received a copy of the information sheet for the above study. I have read it and I understand it. I have received an explanation of the nature, purpose, duration and foreseeable effects and risks of the study and what my involvement will be.

2. I have had time to consider whether to take part in this study and I have had the opportunity to ask questions.

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my education or student status being affected.

4. I agree to take part in the above study.

____________________  __________________  __________________  Date
Name of participant:  __________________  __________________

____________________  __________________  __________________
Name of person taking consent (If different from investigator)  Date  Signature

____________________  __________________  __________________
Investigator  Date  Signature
APPENDIX 4.6
APPENDIX 4.7

Letters requesting permission for inclusion of various tools in the Health Behaviours questionnaire and the responses.
Appendix 4.7.1

Re. Letter requesting permission to use general health measures and stages of change measure as utilised within SLAN, 2007 and response.

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Professor Mc Gee
As principal investigator of the SLAN Report, I am writing to you to seek your permission to utilize some aspects of the SLAN questionnaire in a research study I am undertaking.

I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College in Sligo. I am currently engaged in studying for a PHD with the health Promotion Department, National University of Ireland, Galway.

Within the proposed study I plan to predominantly measure physical activity, eating behaviors’ and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing.

I am attaching a draft of the complete questionnaire for your attention. Section 1: of this questionnaire contains a modified version of some of the questions utilized within SLAN 2002 i.e item 1a, 1b and 1c.(see attached). Also section 2 measures Physical activity stages of change which is adopted from the SLAN 2007 questionnaire and section 3 measures stages of change with regard to healthy eating which is adapted from SLAN 2007.

Thus in conclusion, I am seeking your permission and that of the other members of the SLAN team to use the SLAN questions outlined above within the current proposed study.
Please do not hesitate to contact me should you require further information or explanation.
Looking forward to hearing from you in the near future.

Thanking you,
Yours sincerely

Patsy Mc Sharry

NB: Questions on Stages of Change were also adopted from the original SLAN questionnaire.
You are welcome to use any of the questions in SLAN 2007 for your thesis.

Professor Hannah McGee

PI, SLAN 2007
Appendix 4.7.2

Letter requesting permission to use IPAQ and response:

At 08:25 PM Thursday 8/21/2008, Mc Sharry, Patsy wrote:

Ms Patsy Mc Sharry
Department of Nursing and Health Studies
St. Angela’s College
Lough Gill
Sligo
353 (0)71 9143580 ext. 273
email: pmcsharry@stacs.edu.ie
21st August 2008

Ms Fiona Bull
Loughborough University
England

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Ms Bull,
I am writing to you as a core group member of the IPAQ development team. I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College in Sligo, Ireland. I am currently engaged in studying for a PHD with the National University of Ireland, Galway. I am writing to you to seek permission to use a modified version of your IPAQ (short version) questionnaire in the aforementioned research study. Within the proposed study I plan to predominantly measure physical activity, eating behaviors and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing. I am attaching the complete questionnaire for your attention. Section 2 of this questionnaire relates to the IPAQ. As you can see from the attached questions 1-6 and 11 constitute the IPAQ without any alteration to question type or structure. In line with current recommendations on physical activity to include strength and Resistance exercises in one’s overall fitness programmes, I have added question 7 and 8 to ascertain if participants engage in these activities on any one or more days of the week (question 7) and if so for how long would they engage in such activity. Also in line with current popularity of exercise classes such as yoga and Pilates, I felt it important to ascertain whether participants engaged in such activities (question 9) and if so, for how long they would engage in such activity (question 10). Thus in conclusion, I am requesting the permission of the IPAQ development team to adopt their tool for use within the current proposed study. Please do not hesitate to
contact me should you require further information or explanation. Also I would be very interested to hear any comments or advise you may have to offer me.

Looking forward to hearing from you in the near future.

Thanking you,
Yours sincerely
Patsy

Patsy Mc Sharry
Lecturer and PHD Student
Department of Nursing and Health Studies
St Angela’s College.
Sligo
Ireland

Reply granting permission:

From: Adrian Bauman [adrianb@health.usyd.edu.au]
Sent: 21 August 2008 11:51
To: Mc Sharry, Patsy; F.C.L.Bull@lboro.ac.uk
Cc: michael.sjostrom@ki.se; Barbara.Ainsworth@asu.edu; c craig@cf lri.ca; sallis@mail.sdsu.edu
Subject: Re: permission to use the short version IPAQ

IPAQ is designed for population surveillance as a physical activity measure internationally, and has high variance, so may not be optimal for smaller scale studies [in terms of ability to detect statistical differences]. IPAQ is also a very generic measure, and does not measure domain specific PA - unless you use the long form.

For example, in Ireland, it is used as the national measure in the SLAN health surveys.

But we dont generally recommend its use in small scale studies, although many researchers do that.

However, it is free to use and you may use it in either long or short form without any special permission

Adrian Bauman
University of Sydney
Australia
Appendix 4.7.3

Letter requesting permission to use self efficacy measure and response:

Ms Patsy Mc Sharry  
Department of Nursing and Health Studies  
St. Angela's College  
Lough Gill  
Sligo  
353 (0)71 9143580  ext. 273  
email: pmcsharry@stacs.edu.ie  
21st August 2008

Ms Bess Marcus  
Brown University Medical School

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Ms Marcus  
I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College, Sligo, Ireland.  
I am currently engaged in studying for a PHD with the National University of Ireland, Galway.  
I am writing to you to seek permission to use the scale developed by yourself and Dr Forsyth to measure self efficacy of Physical activity and Healthy eating in the aforementioned research study.  
Within the proposed study I plan to predominantly measure physical activity, eating behaviors’ and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing.  
I am attaching the complete draft questionnaire for your attention.  
Section 2 and 3 of the questionnaire contain items pertaining to self efficacy.  
Thus in conclusion, I am requesting the permission of yourself and Dr. Forsyth to utilize your “self efficacy” tool for use within the current proposed study.  
Please do not hesitate to contact me should you require further information or explanation. Also I would be very interested to hear any comments or advise you may have to offer me..  
Looking forward to hearing from you in the near future.
Thanking you,
Yours sincerely
Patsy

Patsy Mc Sharry
Lecturer and PHD Student
Department of Nursing and Health Studies
St Angela’s College.
Sligo
Ireland

Response from Professor Marcus

Patsy,
Attached is the permission letter for this, please let me know if you need anything else.

Zoe Bruno
Executive Assistant
Centers for Behavioral & Preventive Medicine One Hoppin Street Coro West, Suite 500
Providence, RI 02903

Phone: 401-793-8081
Fax: 401-793-8056
Email: ZBruno@Lifespan.org

Date: September 19, 2008
To: Ms Patsy Mc Sharry
Department of Nursing and Health Studies
St. Angela’s College
Lough Gill
Sligo

Thank you for your interest in my work. Below you will find a list of articles that you can refer to for specific information about questionnaires, scoring, and reliability and validity. Also listed below are several articles about our interventions to promote physical activity.
I would also like to refer you to my book entitled, Motivating People to Be Physically Active, which is published by Human Kinetics and available at www.humankinetics.com as well as most university libraries. It includes all the measures I have developed along with their theoretical foundations and scoring. It also includes information on conducting interventions with various populations.
This letter grants you permission to use my measures, questionnaires, and scoring keys for research purposes only. I only request that in any presentation, manuscript, or written material, the original instruments should be cited appropriately. Good luck with your research. I wish you much success!
Again, thank you for your interest.
Sincerely,
Bess H. Marcus, Ph.D.
Professor of Community Health and Psychiatry & Human Behavior

Director, Centers for Behavioral & Preventive Medicine
Appendix 4.7.4

Letter requesting permission to use Social Support measurement Scale and response:

Ms Patsy Mc Sharry  
Department of Nursing and Health Studies  
St. Angela's College  
Lough Gill  
Sligo  
353 (0)71 9143580 ext. 273  
email: pmcsharry@stacs.edu.ie  
21st August 2008

Mr J. Sallis  
Department of Psychology  
San Diego State University,  
San Diego, California,  
USA

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Mr Sallis  
I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College, Sligo, Ireland.  
I am currently engaged in studying for a PHD with the National University of Ireland, Galway.  
I am writing to you to seek permission to use the scale developed by you and your team in 1987 to measure social support in relation to Physical activity and Healthy eating in the aforementioned research study.  
Within the proposed study I plan to predominantly measure physical activity, eating behaviors’ and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing.  
I am attaching the complete draft questionnaire for your attention.  
I plan to assess the impact of social support in assisting the study participants’ maintain a health eating regime and also how it impacts on their physical activity schedule’s.
Thus in conclusion, I am requesting the permission of yourself and your team to utilize your “social support” tool for use within the current proposed study. Please do not hesitate to contact me should you require further information or explanation. Also I would be very interested to hear any comments or advise you may have to offer me..

Looking forward to hearing from you in the near future.

Thanking you,
Yours sincerely
Patsy

Patsy Mc Sharry
Lecturer and PHD Student
Department of Nursing and Health Studies
St Angela’s College.
Sligo
Ireland

Reply granting permission:

From: Jim Sallis [sallis@mail.sdsu.edu]
Sent: 22 August 2008 18:28
To: Mc Sharry, Patsy
Subject: RE:
Ms McSharry

Thanks for your interest in the social support scale. You have my permission to use this measure or any others posted on my website.

JSallis

James F. Sallis, Ph.D.
Professor of Psychology, San Diego State University
Director, Active Living Research www.activelivingresearch.org
3900 Fifth Avenue, Suite, 310, San Diego, CA 92103 USA
ph: 619-260-5535; fax: 619-260-1510
email sallis@mail.sdsu.edu PLEASE EXPECT DELAYS IN MY RESPONSES TO EMAILS
Website: www.drjamessallis.sdsu.edu
Appendix 4.7.5

Letter requesting permission to use Food Pyramid and response:

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Ms O Dwyer
I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College in Sligo. I am currently engaged in studying for a PHD with the National University of Ireland, Galway.
I am writing to you to seek permission to use a modified version of the food pyramid(DOH&C, 2005) in the aforementioned research study.

Within the proposed study I plan to predominantly measure physical activity, eating behaviors, and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing.

I am attaching a draft of the complete questionnaire for your attention. Section 3 of this questionnaire relates to the participants eating behaviors which I plan to measure with the aid of the food pyramid. I believe this will make it possible to establish direct comparisons as to actual intake and recommended intake within the analysis phase and make for a visual attractive easy to interpret representation...

Thus in conclusion, I am requesting the permission of the yourself and that of the food pyramid development team within the DOH&C to adapt this tool for use within the current proposed study. Please do not hesitate to contact me should you require further information or explanation.

Looking forward to hearing from you in the near future.

Thanking you,
Yours sincerely

Patsy Mc Sharry
Lecturer
St Angela’s College.
Reply granting permission:

From: Ursula O'Dwyer [ursulaodwyer@iol.ie]
Sent: 27 August 2008 16:29
To: Mc Sharry, Patsy
Cc: nualatully@rcsi.ie; Brian Mullen
Subject: Re: food pyramid

hi Patsy
thanks you for your email- I am happy to give permission for you to use the ammended Food Pyramid (FP) illustration- as you are not changin any info on the FP- just asking no of portions- I would appreciate if you could change the aknowledgement to 'Department of Health and Children, 2005.'
many thanks
regards
Ursula

Ursula O’Dwyer,
National Nutrition Policy Adviser,
Health Promotion Policy Unit,
Department of Health & Children

Phone: 00 353 1 635 4497
Fax: 00 353 1 635 4372
Ms Patsy Mc Sharry  
Department of Nursing and Health Studies  
St. Angela's College  
Lough Gill  
Sligo  
353 (0)71 9143580  ext. 273  
email: pmcsharry@stacs.edu.ie  
21st August 2008

Per Bech, MD  
Professor of Psychiatry,  
Head of  
The Psychiatric Research Unit,  
Frederiksborg General Hospital  
Denmark

RE: Research Study entitled "The evaluation of the impact of the inclusion of a "Health and Wellbeing Module" in the undergraduate curriculum on a predominantly female group of students."

Dear Mr Bech

I am currently a Lecturer in the Department of Nursing and Health studies here in St Angela’s College, Sligo, Ireland.

I am currently engaged in studying for a PHD with the National University of Ireland, Galway.

I am writing to you as Head of the psychiatric Research unit to seek permission to use a scale developed by your team entitled WHO (five) Well- Being index in the aforementioned research study to measure psychological well being in a group of undergraduate students.

Within the proposed study I plan to predominantly measure physical activity, eating behaviors’ and psychological well being both before and after students undergo a module of study entitled “Health and Well being” as part of an undergraduate programme of study in Nursing.

I am attaching the complete draft questionnaire for your attention.

I plan to assess how the students rate their psychological well being both before and after undertaking the proposed module.
Thus in conclusion, I am requesting the permission of yourself and your team to utilize your psychological well being scale for use within the current proposed study. Please do not hesitate to contact me should you require further information or explanation. Also I would be very interested to hear any comments or advise you may have to offer me.

Looking forward to hearing from you in the near future.

Thanking you,
Yours sincerely
Patsy

Patsy Mc Sharry
Lecturer and PHD Student
Department of Nursing and Health Studies
St Angela’s College.
Sligo
Ireland

**Reply granting permission:**

Dear Patsy Mc Sharry,

Professor Bech has asked me to reply to your mail re use of the WHO-5. I am pleased to be able to tell you that the WHO-5 is in the public domain and may freely be used for research purposes such as the study you have described in your mail.

Good luck with your project!

On behalf of Prof. Bech
Susan Søndergaard

Susan Søndergaard
Language Consultant, MA
Psychiatric Research Unit
Mental Health Centre North Zealand
DK-3400 Hillerød, Denmark
Appendix 4.8
## Appendix 4.8.

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²)</th>
<th>Principal cut-off points</th>
<th>Additional cut-off points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underweight</strong></td>
<td></td>
<td>&lt;18.50</td>
<td>&lt;18.50</td>
</tr>
<tr>
<td>Severe thinness</td>
<td>&lt;16.00</td>
<td></td>
<td>&lt;16.00</td>
</tr>
<tr>
<td>Moderate thinness</td>
<td>16.00 - 16.99</td>
<td>16.00 - 16.99</td>
<td></td>
</tr>
<tr>
<td>Mild thinness</td>
<td>17.00 - 18.49</td>
<td>17.00 - 18.49</td>
<td></td>
</tr>
<tr>
<td><strong>Normal range</strong></td>
<td>18.50 - 24.99</td>
<td>18.50 - 22.99</td>
<td>23.00 - 24.99</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>≥25.00</td>
<td>≥25.00</td>
<td></td>
</tr>
<tr>
<td>Pre-obese</td>
<td>25.00 - 29.99</td>
<td>25.00 - 27.49</td>
<td>27.50 - 29.99</td>
</tr>
<tr>
<td><strong>Obese</strong></td>
<td>≥30.00</td>
<td>≥30.00</td>
<td></td>
</tr>
<tr>
<td>Obese class I</td>
<td>30.00 - 34.99</td>
<td>30.00 - 32.49</td>
<td>32.50 - 34.99</td>
</tr>
<tr>
<td>Obese class II</td>
<td>35.00 - 39.99</td>
<td>35.00 - 37.49</td>
<td>37.50 - 39.99</td>
</tr>
<tr>
<td>Obese class III</td>
<td>≥40.00</td>
<td>≥40.00</td>
<td></td>
</tr>
</tbody>
</table>

(WHO, 2005)
Appendix 4.9.1
Appendix 4.9.1

Focus Group – Students:  Background information:–

Evaluation of Health and well being module:

Aim of the Module:

- This module is designed to introduce students to the principles of health and the concepts of Well Being. Self-awareness skills to examine personal health and wellness behaviours in the context of recommended health behaviours will be addressed. Particular emphasis will be placed on the important contribution that physical activity, healthy eating and psychological well being make to overall health.

Aim of the Research Study:

- The aim of the study is to evaluate the impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health behaviours of a group of students.
- The selected health behaviours in question involve physical activity behaviours, eating behaviours and psychological well being.

Reminder of Module Content:

<table>
<thead>
<tr>
<th>Lecture Content:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures on Definitions, Dimensions and Models of health</td>
</tr>
<tr>
<td>Lecture on benefits of physical activity (Shirley Mc Kenna)</td>
</tr>
<tr>
<td>Lecture on Healthy eating (Elaine Mooney)</td>
</tr>
<tr>
<td>Lecture on promoting positive mental health (Mike Reinsford)</td>
</tr>
<tr>
<td>Lecture on the Theory of Motivational interviewing (Patsy Mc Sharry)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workshop content:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workshop number 1</strong> Physical activity fitness assessment (with Sean Mooney and Patsy Mc Sharry)</td>
</tr>
<tr>
<td><strong>Workshop number 2</strong> Motivational interviewing on Physical activity (With Mary Cooke and Tom O Grady or with Patsy Mc Sharry and Ursula Gilrane)</td>
</tr>
<tr>
<td><strong>Workshop number 3</strong> Psychological well being and promoting positive mental Health (with Mike Reinsford and Patsy Mc Sharry or with Geraldine Jolly and Mary Cooke)</td>
</tr>
<tr>
<td><strong>Workshop number 4</strong> Motivational interviewing on Healthy Eating with Ursula Gilrane and Patsy Mc Sharry or with Helen Mc Gloin and Mary Cooke)</td>
</tr>
</tbody>
</table>
Appendix 4.9.2
Appendix 4.9.2

Focus Group Topic Guide:

- **Introduction to Focus Groups:**
  - I am interested in your views on the process of how various elements of this module were implemented. I am interested in finding out whether the activities involved within the module were appropriate and acceptable to you as participants.

- What part of the module did you find most enjoyable and why?
- What part of the module did you find least enjoyable and why?
- Were there areas of the module that you were uncomfortable with?
- Not everyone showed up for the various workshops! Why do you think that was?
- What part of the module did you find most useful in helping you to adopt healthier behaviours?
- What part of the module contributed least to you in adopting healthier behaviours?
- In your opinion, are some areas easier than others to bring about healthier lifestyle changes in?
- Are there other supports that could be put in place at college level which would help people like yourselves and other third level students to maintain motivation in sustaining positive health behaviour changes more long term?
Appendix 4.9.3
Appendix 4.9.3

Ground Rules for Focus Group

✓ Voluntary Participation – No one is forced to contribute if they do not wish to

✓ Respect for each individual - One person speaks at once and each person is entitled to their individual opinion.

✓ Confidentiality – What is said within the group remains in the group.

✓ Both positive and negative feedback welcomed

✓ Anonymity- Individual contributions will not be identifiable in the final report.
Appendix 4.10
Follow up email to participants who were not present for scheduled data collection

25th April 2009

Hi all

As a follow up today’s session, I would like to sincerely thank you all for your attention and interest. For those of you who were not present for today’s briefing session I am attaching a letter of invitation to take part in a research study I am undertaking. Also I am attaching a document which provides potential participants with more detailed information on the study and includes implications of taking part. Also there is a consent form attached which you are required to complete if you wish to take part in the study. After reading all the study information and if you are satisfied that you are happy to participate, please sign the attached consent form and return it to me

Thanks

Patsy

Patsy Mc Sharry
Lecturer
Department of Nursing and Health Studies
St Angela’s College
Sligo
071 9135614
Appendix 6.1
Appendix 6.1
The integration of the module aims and learning outcomes with the aims and objectives of the study.

<table>
<thead>
<tr>
<th>Aims and Objectives of Study</th>
<th>Aim of the Module and Learning Outcomes</th>
<th>Theoretical Content of Module</th>
<th>Practical Content of Module</th>
<th>Expected Outcomes</th>
<th>Study Variable measures</th>
</tr>
</thead>
</table>
| The aim of this study was to: Evaluate the impact of the inclusion of a “Health and Well Being Module” in the undergraduate curriculum on selected health outcomes of a group of students. | This module will introduce the students to the principles of health and the concepts of Wellness. Self-awareness skills to examine personal health and wellness behaviours in the context of recommended health behaviours will be addressed. Particular emphasis will be placed on the important contribution that physical activity, healthy eating and psychological well-being make to overall health. Learning Outcomes On the completion of this module students will:  
• Have an understanding of the physical and mental dimensions of overall health and wellbeing.  
• Have an understanding of the various factors which influence overall health and well being  
• Have an understanding of how individual lifestyles influence health | Lectures on:  
Effects of physical activity (PA)  
Benefits of PA  
Effects of Inactivity  
Recommended levels of PA. | Workshop 1  
Physical Fitness assessment and demonstration: Individual baseline physical assessments carried out in small groups.  
Workshop 2  
Group Motivational Interviewing on physical activity goals carried out with groups of 15 facilitated by two trained MI facilitators. | Physical activity levels will increase in the intervention group relative to the comparison group.  
Stages of Change for physical activity will increase in the intervention group relative to the comparison group  
Self-efficacy for | • International Physical activity Questionnaire (IPAQ).  
• Stage of Change for physical activity (PA)  
• Self-efficacy for |
2. To compare participants' Healthy Eating behaviours before and after completing a tailored educational programme on “Health and Well Being” by measuring (see column on far right).

<table>
<thead>
<tr>
<th>Lectures on:</th>
<th>Workshop 3</th>
<th>PA will increase in intervention group relative to the comparison group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Eating</td>
<td>Group Motivational Interviewing on Healthy Eating goals carried out with</td>
<td>Social Support for PA will increase in intervention group relative to</td>
</tr>
<tr>
<td>Components of a healthy diet</td>
<td>groups of 15 facilitated by two trained MI facilitators.</td>
<td>the comparison group especially from friends</td>
</tr>
<tr>
<td>Recommended healthy eating</td>
<td></td>
<td>A reduction in Mean BMI scores in the intervention group relative to</td>
</tr>
<tr>
<td>practices etc.</td>
<td></td>
<td>the comparison group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stages of Change for Healthy Eating will increase in the intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>group relative to the comparison group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-efficacy for HE will increase in</td>
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<td></td>
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<tr>
<td>Have an understanding of the</td>
<td></td>
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<tr>
<td>effects of physical activity/exercise on health</td>
<td></td>
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<tr>
<td>Have an understanding of the</td>
<td></td>
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<tr>
<td>effects of Nutrition and diet on health</td>
<td></td>
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<tr>
<td>Have an understanding of the</td>
<td></td>
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<tr>
<td>principles of a healthy diet</td>
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<tr>
<td>Demonstrate an awareness of</td>
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<tr>
<td>personal health and fitness</td>
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<td>status</td>
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<tr>
<td>Identify personal barriers and</td>
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<tr>
<td>facilitators to maintaining a</td>
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<tr>
<td>healthy lifestyle</td>
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<tr>
<td>Demonstrate an understanding of</td>
<td></td>
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<tr>
<td>safe exercise practices for</td>
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<tr>
<td>personal health maintenance</td>
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<tr>
<td>Demonstrate an ability to</td>
<td></td>
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<tr>
<td>monitor personal health status</td>
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<td>over a period of time</td>
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<tr>
<td>Identify the components necessary for high level psychological wellbeing.</td>
<td></td>
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<tr>
<td>Develop personal awareness with</td>
<td></td>
<td></td>
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<tr>
<td>regard to their emotional health status.</td>
<td></td>
<td></td>
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<tr>
<td>Explore their own responses to</td>
<td></td>
<td></td>
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<tr>
<td>stress and their individual</td>
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<tr>
<td>stressors.</td>
<td></td>
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<tr>
<td>Explore the development of</td>
<td></td>
<td></td>
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<tr>
<td>various coping strategies to</td>
<td></td>
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<tr>
<td>help combat stress as well as</td>
<td></td>
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<tr>
<td>other negative emotions.</td>
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<tr>
<td>PA</td>
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<tr>
<td>Social support for PA.</td>
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<tr>
<td>BMI</td>
<td></td>
<td></td>
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<tr>
<td>Stage of Change for Healthy Eating (HE)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy for HE.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. To compare how participants rate their psychological well-being both before and after completing a tailored educational programme on “Health and Well Being” by measuring (see column on far right).

<table>
<thead>
<tr>
<th>Lectures on:</th>
<th>Workshop 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>The concepts of: Positive Mental Health Psychological well-being Mental Health Promotion.</td>
<td>Psychological well-being promotion workshop. Facilitated workshops on promoting positive mental health and psychological well-being in groups of 15 and facilitated by Mental health promotion officer and module leader.</td>
</tr>
</tbody>
</table>

| intervention group relative to the comparison group. |
| Social Support for HE will increase in intervention group relative to the comparison group especially from friends |

<table>
<thead>
<tr>
<th>HE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Social Support for HE.</td>
</tr>
<tr>
<td>• Psychological well-being via WHO Psychological Well-being Index at T1, T2 and T3)</td>
</tr>
</tbody>
</table>