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The effect of implementation intentions on testicular self-examination using a demonstration video

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The current study aimed to test the effectiveness of a testicular self-examination (TSE) demonstration video intervention, with and without implementation intentions, in improving TSE rates. It also tested the utility of a 'boosting exercise' where participants were asked to renew their implementation intentions at first follow-up. A three-group randomised controlled trial was carried out with three data collection time-points. Ninety-three male students watched a TSE demonstration video at baseline; Group 1 \((n = 32)\) only watched the video. Groups 2 \((n = 31)\) and 3 \((n = 30)\) also formed implementation intentions. Group 3 carried out the ‘boosting exercise’ by renewing implementation intentions four weeks later. Performance of TSE was measured at the three time-points. The results showed that TSE performance increased from baseline (20.4%) to first follow up (81.8%) and remained high at second follow up. It was concluded that implementation intentions added no benefit over watching a demonstration video alone, suggesting that the video was a highly effective intervention.

**Keywords:** health promotion; testicular self-examination; implementation intentions

**Introduction**

Testicular cancer is a leading cause of death in young men next to accidents and suicide (Barling & Lehmann, 1999). It is the most common cancer in 15- to 44-year-old men and has a 5-year mortality-rate of 5% with an incidence rate of 6.6 per 100,000 males (Cancer Research UK, 2011). When caught more intensive treatments can be avoided. Testicular self-examination (TSE) is a simple, highly effective procedure to identify early symptoms of testicular cancer when conducted properly by men in the high-risk group (15–44 years) on a monthly basis, significantly improving disease outcomes for these men (Cook, 2000; Wynd, 2002). Reported rates of TSE practice are increasing, though they remain low. In 1990, 19.9% of respondents from a sample of 282 Irish students reported ever carrying out TSE as part of a large \((N = 4322)\) European survey (Wardle et al., 1994). For the overall European sample, Wardle and colleagues report that only 3.1% state that they regularly perform TSE. In a similar survey conducted in 2000, the percentage of Irish males reporting having ever conducted TSE had risen to 34.8% among a sample of 95 students (Evans, Steptoe, & Wardle, 2006).

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Interventions to increase TSE

Early intervention designed to increase TSE highlighted that providing men with information increases knowledge of the disease and, in some cases, self-examination behaviour (Evans et al., 2006). However, other studies have shown that it is not the information in isolation which increases TSE performance (Dachs, Garb, White, & Berman, 1989). Consequently, it has been suggested that additional strategies are needed to facilitate the initiation and maintenance of health behaviour (Steadman & Quine, 2004).

Gollwitzer (1993) proposed a two-phase model, including a deliberative phase, during which individuals weigh up the costs and benefits of carrying out a particular behaviour, and the implemental phase, in which goals developed during the deliberative phase are translated into actions. Encouraging the formation of implementation intentions has been shown to increase the chance of health behaviour being performed (Gollwitzer, 1993). Implementation intentions are a type of goal intention whereby the how, when and where components of a specific behaviour are stated. Implementation intentions link situations (e.g. drying oneself after a shower) with a response (e.g. TSE). This link is postulated to delegate control of the goal-directed response away from the person and onto the anticipated social cue. This cue then allows the behaviour to be carried out automatically (Gollwitzer, 1999). Implementation intentions have been described as a theoretically sound approach that provide simple, applicable intervention techniques that target behaviour directly rather than through distal predictors (Gollwitzer & Sheeran, 2006).

Interventions using implementation intentions have successfully increased breast self-examination (Orbell, Hodgkins, & Sheeran, 1997), healthy eating (Verplanken & Faes, 1999), attendance for cervical screening (Sheeran & Orbell, 2000) and exercise behaviour (Milne, Orbell, & Sheeran, 2002). Gollwitzer and Sheeran (2006) conducted a meta-analysis of implementation intention interventions on health behaviours in which they found a medium effect size. Several rigorous studies have also reported not finding an effect. These include studies of antenatal screening (Michie, Dormandy, & Marteau, 2004), fruit and vegetable consumption in cardiac patients (Jackson et al., 2005) and mammography uptake (Rutter, Steadman, & Quine, 2006). It has been suggested that the mixed findings could be down to the differing complexity of health behaviours as well a difference between laboratory-based and applied work (Sniehotta, 2008).

The use of implementation intentions has also been extended to TSE in a study by Steadman and Quine (2004). In an intervention that provided all participants with TSE-related information, performance rates of TSE at three weeks follow-up increased to 40% for the non-implementation intentions group but by significantly more (to 65%) for the implementation intentions group.

One problem associated with implementation intentions is maintenance, with effects likely to wane after periods of longer than a month (Koestner et al., 2006). Koestner et al. (2006) suggest that this effect can be reduced by employing a self-efficacy boosting exercise in conjunction with implementation intentions.
Current study

The current study aimed to examine the effect of implementation intentions, in conjunction with an instructive demonstration video, on increasing and maintaining practice rates of TSE. The study aimed to build on the work of Steadman and Quine (2004) by testing the utility of a ‘boosting exercise’ where one group was asked to renew their implementation intentions on a second occasion, that is, re-state when and where they will carry out TSE.

A demonstration video was included in the intervention to provide TSE instruction. The combination of video-demonstration with implementation intentions was a novel approach to an intervention designed to increase TSE performance. It has previously been used to good effect to increase preventive health behaviours such as condom use in Hispanic groups in New York and breast self-examination among a group of women (O’Donnell, San Doval, Duran, & O’Donnell, 1995; Wood, 1996). It was thought that the provision of a behavioural model through the medium of video would provide participants with a more salient cue to perform the target behaviour than the paper-based information of past studies, (e.g. Koestner et al., 2006; Krouse, 2001; Steadman & Quine, 2004;). However, Chasteen, Park, and Schwarz (2001) have argued that implementation intentions are less effective when cues to action are more salient.

The current study examined a sample of young males regarding intention to perform and performance of TSE at three time-points. All participants were shown the demonstration video at time 1. Two of the three groups were then asked to form implementation intentions (Groups 2 and 3); those in Group 1 were not. At time 2 only participants in Group 3 were asked to renew their implementation intentions. It was expected that both intention to perform and performance of TSE would be higher at time 2 than at time 1 for all groups. It was also expected that this increase in intention to perform and performance of TSE would be higher in Groups 2 and 3 than in Group 1. It was further thought that intention to perform and performance of TSE at time 3 would be highest in Group 3. Finally, it was expected that intention to perform and performance of TSE would be lower in Groups 1 and 2 at time 3 than at time 2.

Method

Design

This study was a three-group randomised control trial with measurement at baseline and two follow-up time-points, after four and eight weeks. Group and time were the independent variables. The dependent variables were knowledge of testicular cancer at baseline and intention to perform TSE and self-reported TSE performance at all three time-points. Table 1 shows the design of the current study.

Participants

Participants were 93 students at university in Galway, Ireland, aged between 18 and 32 years. They were recruited through lectures in all of the college’s faculties by public address. They were randomly allocated to one of three groups with the first participant assigned to Group 1, the second to Group 2, the third to Group 3, fourth to Group 1, etc.
The baseline questionnaire consisted of questions about testicular cancer knowledge, intention to perform TSE and TSE performance. The knowledge measure was utilised by Steadman and Quine (2004). It was included to control for the possibility of different levels of testicular cancer knowledge between the three groups pre-intervention. Participants were required to answer ‘true’ or ‘false’ to nine items, for example, ‘Leukaemia is more common than testicular cancer in young men’ (false). Steadman and Quine (2004) report a moderate Cronbach’s alpha of 0.59 for these nine knowledge items. In the current study the Cronbach’s alpha coefficient was 0.69.

The intention to perform TSE measure which was also used by Steadman and Quine (2004) was adapted from Conner and Sparks (1996). This consisted of five similar items pertaining to intention to perform TSE: ‘I intend to/plan to/would like to/want to/it is likely that I will… carry out TSE in the next month’. This was measured on a 5-point scale ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5). The rationale provided by Conner and Sparks (1996) for having multiple items is that it provides increased reliability. The Cronbach’s alpha for this measure was highly reliable at 0.95. The self-report measure of TSE performance asked participants ‘how many times have you performed TSE in the last four weeks’? The possible answers were ‘not at all’, ‘once’, ‘twice’, ‘three+ times’.

Implementation intentions

At time 1, Groups 2 and 3 were asked to form implementation intentions after watching the video. They were provided with a sheet that included the message: ‘TSE is an important monthly behaviour. In order to achieve their goals, such as performing TSE, some people find it useful to specify the time and the place in which they will perform the behaviour. I would like you to do this. For example, you may find it useful to carry out TSE after your morning or evening shower or bath. In the space below, I would now like you to commit yourself to when and where you will carry out TSE in the next four weeks’. Beneath this message, the questions, ‘when will you carry out TSE?’ and ‘where will you carry out TSE?’ were printed with space provided to write the answer.
At time 2, only participants in Group 3 were asked to form a new implementation intention. The instruction was slightly different from time 1 and stressed the importance of TSE as a regular, monthly behaviour; ‘Testicular self-examination, (TSE), is an important behaviour for the protection of young men’s health. It should be performed as a regular monthly habit. I would now like you to commit to when and where you will perform TSE on a continuing monthly basis’. Below this message, participants were asked to type when and where they would perform TSE.

**Demonstration video**

The video was downloaded from Youtube (The Family GP, 2007) and was 3 minutes, 37 seconds long. A doctor demonstrates and describes the performance of TSE on a young man. He explains what the testicles should feel like as well as where a lump would be most likely to occur and what it would feel like.

**Procedure**

At time 1, participants attended a session and completed a questionnaire about testicular cancer knowledge, intention to perform TSE and self-reported performance of TSE. They were shown a short video-demonstration of TSE. Participants in Groups 2 and 3 were handed out a further sheet directing them to form an implementation intention as to when and where they would perform TSE in the next month.

At the second and third time-points participants were e-mailed a link to a shorter version of the time 1 questionnaire (i.e. TSE intention and performance without the knowledge scale). This link took participants directly to the questionnaire on Surveymonkey (an online questionnaire design and administration package). At time 2, Groups 1 and 2 completed identical questionnaires. The questionnaire for Group 3 included a unique section requiring participants to form another TSE implementation intention. At time 3 participants in all groups completed the same online questionnaire.

**Data analysis**

Data analysis was carried out using SPSS Version 15. A ‘total knowledge’ variable was created and a one-way between-subjects ANOVA conducted to examine group differences in cancer knowledge.

The five ‘intention to perform’ items were transformed and summed to create the ‘total intention’ variable. This was analysed for differences between groups and time-points in intention to perform TSE, with a mixed ANOVA.

The performance of TSE was collapsed into two responses: yes (1) or no (0). Differences between the groups’ reported performance of TSE at each of the three time-points were examined by way of three chi-squared tests, with Bonferroni adjustment applied ($p < 0.05/3 = 0.0125$).

**Results**

The mean age of the sample was 20.77 years (SD = 2.86, range 18–32 years). Of the 93 participants who completed the time 1 measures, 88 completed time 2, while 78
completed all time-points. This was an attrition rate of 16.1%. T-tests revealed no difference between completers and non-completers on any of the variables.

Comparing groups at baseline
A chi-square test was carried out to compare TSE performance between the three groups at baseline. There was no significant difference between any of the groups in TSE performance. There were also no differences between the groups in knowledge of testicular cancer, (Group 1: M = 6.22, Group 2: M = 6.23, Group 3: M = 5.63, F = 2.48), intention to perform TSE (F = 0.36) or age of participants (F = 1.27), which were checked using ANOVA.

Intervention results
The mean levels of intention to perform TSE were high (M = 18.2/20) at baseline in all three groups. The trend was for these means to remain high across the three time-points, as shown in Table 2.

A 3 x 3 mixed ANOVA examined whether there were any changes in intention levels over the three time-points and also if there were any differences between groups. The within-subjects factor was time with three levels (baseline, time 2 and time 3). The between-subject factor was group with three levels (Groups 1, 2 and 3). The test revealed no main effect for time, (F(2, 150) = 1.13, p = 0.33), where intention levels at time 1 (M = 18.22, SD = 5.48), time 2 (M = 17.99, SD = 5.79) and time 3 (M = 19.15, SD = 4.08) did not differ significantly. The main effect for group (F(2, 150) = 0.36, p = 0.7) and the interaction effect (F(4, 150) = 0.19, p = 0.94) did not reach significance.

The percentage frequencies of reported TSE performance are shown in Table 3. Reported performance was low for all groups at baseline with just over 20% of the sample reporting TSE performance in the four weeks prior. Across the groups at time 2, however, 82% reported performing TSE since baseline. This persisted across all groups at time 3 with 82% reporting TSE performance between time 2 and time 3.

Two chi-square tests were carried out. The first of these analysed the performance data from the three groups at time 2. The expectation that performance would be higher in Groups 2 and 3 than in Group 1 at time 2 was not supported, \( \chi^2 (2, N = 88) = 1.65, p = 0.09 \).

The second chi-square tested for differences in TSE performance between the three groups at time 3. The suggestion that performance of TSE would be highest in Group 3 at time 3 was not supported \( \chi^2 (2, N = 78) = 1.22, p = 0.14 \).

Table 2. Means and standard deviations (SD) on intention to perform TSE for the three groups at three time-points.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th></th>
<th>Group 2</th>
<th></th>
<th>Group 3</th>
<th></th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Time 1</td>
<td>32</td>
<td>18.16</td>
<td>5.77</td>
<td>31</td>
<td>18.41</td>
<td>5.29</td>
<td>30</td>
</tr>
<tr>
<td>Time 2</td>
<td>30</td>
<td>17.72</td>
<td>6.59</td>
<td>30</td>
<td>18.52</td>
<td>5.15</td>
<td>28</td>
</tr>
<tr>
<td>Time 3</td>
<td>25</td>
<td>19.8</td>
<td>5.07</td>
<td>29</td>
<td>19.34</td>
<td>3.42</td>
<td>24</td>
</tr>
</tbody>
</table>

Note: Intention to perform ranged from a possible low of 5 to a high possible high of 25.
The current study showed a significant increase in the performance of TSE from baseline to post intervention for all groups. This is similar to past studies despite methodological differences (e.g. Evans et al., 2006; Wardle et al., 1994). Performance rates rose to 81.8% at time 2 and remained high at time 3 (82.1%).

In the Steadman and Quine study, performance levels at time 1 were not reported. However, at time 2 they report performance increase to 40% in the control group and 65% in the intervention group. In both groups, performance was significantly increased; however, performance levels in the intervention group were significantly higher than in the control group. This was taken to show the benefits of implementation intentions to increasing TSE performance. However, in the current study, performance was higher than 65% in all groups at time 2 and 3, including Group 1 who had never been asked to form implementation intentions. A reasonable interpretation of the lack of effect shown by the implementation intentions in this study as compared to the Steadman and Quine study could be due to the different qualities of the two forms of instruction, that is, video as opposed to paper-based instruction. The increase in performance of TSE may have been too great to notice any effect of implementation intentions, however, with the nominal dependent variable (performance/non-performance), this is merely speculation.

Chasteen et al. (2001) have argued that implementation intentions are less effective when cues to action are more salient. This could have been the difference between the paper-based information of the Steadman and Quine study and video-demonstration of the current intervention.

The literature in the area includes examples whereby implementation intentions had a significant effect on health behaviours as well as cases where no effect was found. These have been mentioned earlier. Sniehotta (2008) concludes that while the effect of implementation intentions might be well understood in the laboratory, much more research is needed to understand their utility in applied settings. This conclusion goes some way to summarising the mixed findings.

The current study is limited by its reliance on self-report data which is open to socially desirable responding. However, a more objective form of measurement is not possible. TSE is a behaviour that is intended to be carried out in private, and cannot be measured by the submission of a form or attendance at a meeting as some health behaviours can be. Participants were assured at baseline that their data were confidential to minimise the possibility of socially desirable responding.

Another limitation of the current study is the lack of a control group to assess the effect of the demonstration video. This group would be given paper-based information on TSE rather than video-modelling. It would be expected to see lower performance than the intervention group, and this could be compared to the performance of Group 1 who had never been asked to form implementation intentions.

Table 3. Percentage of participants reporting performing TSE in the three groups at the three time-points.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Performing TSE (%)</td>
<td>25</td>
<td>19.4</td>
<td>16.7</td>
<td>20.4</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>31</td>
<td>30</td>
<td>93</td>
</tr>
<tr>
<td>Time 2 Performing TSE (%)</td>
<td>80</td>
<td>76.7</td>
<td>89.3</td>
<td>81.8</td>
</tr>
<tr>
<td>n</td>
<td>30</td>
<td>30</td>
<td>28</td>
<td>88</td>
</tr>
<tr>
<td>Time 3 Performing TSE (%)</td>
<td>84</td>
<td>86.2</td>
<td>75</td>
<td>82.1</td>
</tr>
<tr>
<td>n</td>
<td>25</td>
<td>29</td>
<td>24</td>
<td>78</td>
</tr>
</tbody>
</table>
rates of TSE performance in the paper-based control group than any of the video-modelling groups at both follow-ups. The results suggested that the demonstration video was highly successful and a large improvement on the paper-based information provided traditionally, however we need to treat this conclusion with caution. The efficacy of a demonstration video over paper-based information, by including a control group could be addressed with future research. A further limitation is the lack of information on the psychological profile of those who were resilient to the video of the performance of TSE. It would be of interest to understand more about the sub-group and their resistance to change.

Future research could also extend the timeline to see how performance changes over a longer time lapse, perhaps up to one-year post intervention, when one might reasonably presume that those reporting performance of TSE could be taken to have adopted the behaviour as a regular health habit (Morrison & Bennett, 2006).

The implications of the current research are that a simple cost-effective means of presentation can be used to very good effect to increase the performance of TSE. This valuable health behaviour seems to be something that young men are willing to adopt once they know how to perform it. Currently, a big obstacle to performance seems to be a lack of clarity on how to carry out TSE. Perhaps addressing this should be the first major step in making the behaviour more widespread. This could possibly be done by administering an intervention in a school setting when young men are just coming into the high-risk category for testicular cancer. Implementing the intervention at this stage would also have the beneficial side effect of de-stigmatising TSE as a health behaviour.

References


