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An investigation of Gelotophobia in individuals with a diagnosis of high-functioning Autism
Spectrum Disorder.

Geraldine Leader¹

Susan Grennan¹

June L. Chen²

Arlene Mannion¹

1. Irish Centre for Autism and Neurodevelopmental Research (ICAN), School of Psychology,
National University of Ireland, Galway.

2. Department of Special Education, Faculty of Education, East China Normal University,
Shanghai, China.

Corresponding author: Geraldine Leader, Ph.D., Irish Centre for Autism and
Neurodevelopmental Research, School of Psychology, National University of Ireland,
Galway, Ireland. Tel: 00353 91 493434, Fax: 00353 91 521355.

Abstract

Samson, Huber, and Ruch (2011) conducted the first empirical investigation examining the fear of being laughed at (gelotophobia) and its prevalence in individuals with high-functioning autism spectrum disorder (hfASD). The present research examined gelotophobia in relation to social functioning, perceived social support, life satisfaction and quality of life (QoL) in individuals with hfASD, including past experiences of bullying and the presence of comorbid psychopathology. Participants were 103 adults with a clinical diagnosis of hfASD and 137 typically developing controls. Individuals with hfASD presented with higher rates of gelotophobic symptomatology in comparison to controls (87.4% vs. 22.6% respectively). It was also found that social functioning, past experiences of bullying, anxiety and life satisfaction were predictors of gelotophobia amongst individuals with hfASD.

Key words: Gelotophobia, High-functioning autism spectrum disorder, Fear of being laughed at, Teasing, Laughter

An investigation of Gelotophobia in individuals with a diagnosis of high-functioning autism spectrum disorder.

1. Introduction

Asperger Syndrome was originally defined by Hans Asperger as autistic psychopathy (Asperger, 1944). It has since been largely defined and classified under the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000) as a pervasive developmental disorder illuminated by autistic social deficits and restricted, stereotypical patterns of behavior. In 2013, however, the DSM-5 was introduced whereby Asperger Syndrome was subsumed under the umbrella term autism spectrum disorder (ASD), which is now used to categorise all discrete autistic disorders previously classified separately under the DSM-IV (Woods, Mahdavi, & Ryan, 2013). The DSM-5 now divides clinical aspects into a dyad of impairments: (1) persistent deficits in social and communication issues and (2) restricted, repetitive behavior, and/or fixated interests and activities (Tanguay, 2011). Despite their linguistic and cognitive abilities, individuals with high-functioning autism spectrum disorder (hfASD) tend to demonstrate difficulty in the development of reciprocal social skills and normative social functioning (Volkmar & Klin, 2000).

Individuals with hfASD indeed are known to demonstrate marked deficiencies in social cognition such as a reduced Theory of Mind (ToM) capacity, which hinders the ability to distinguish between one's own mental state i.e. one's own beliefs, thoughts, and emotions, and those of others (Baron-Cohen, 1989; 2001; Baron-Cohen, Leslie, & Frith, 1985; Woods et al., 2013). As a result, individuals with hfASD may experience greater difficulty understanding and compartmentalising their own emotions and conveying these to others (Woods et al., 2013). They may also demonstrate difficulty in understanding non-verbal cues

such as body language (Asperger, 1944; Attwood, 2000), reciprocal interaction and initiating appropriate non-verbal communication (Frith, 2004; Wing, 1981). These have been identified in the literature as likely contributors to the impaired social functioning of individuals with hfASD (Frith, 2004; Muris et al., 1999), and have been shown to make difficult the establishment and maintenance of meaningful relationships with others (Gilchrist et al., 2001; Green, Gilchrist, Burton, & Cox, 2000).

There is also empirical evidence to suggest that as a further consequence of their deficiency in social cognition, individuals with hfASD may experience a greater magnitude of bullying in comparison to typically developing controls (Attwood, 2004; Cappadocia, Weiss, & Pepler, 2012; Carter, 2009; Little, 2002; Rowley et al., 2012; Wing, 1981). Deviant behavior and incongruity to normal activity indeed are known sources of laughter in the literature (Ferguson & Ford, 2008; Martin, 2007). The unconventional and often inappropriate reactions and behaviors of individuals with hfASD subsequently make them more prone to social isolation and bullying (Samson et al., 2011). Their restricted and often unusual range of interests and repetitive behaviors can also cause them to stand out as ‘different’ to others, thereby compounding their isolation and further exacerbating their susceptibility to bullying and rejection (Carrington & Graham, 2001).

Abundant cases of those with hfASD have been identified who had been laughed at and ridiculed during childhood as a result of their social naivety, perceived peculiarities, and behavior that seems awkward and aloof to other individuals (Asperger, 1944; Asperger, 1991). Preliminary findings from more recent case and peer reports have also evidenced this higher incidence of bullying experiences amongst individuals with hfASD. Little (2002) found that children with hfASD were four times more likely to have been victims of bullying than their typically developing peers (55% vs. 13% respectively), whilst a subsequent study

of 34 parents of children with hfASD aged 5-21 years indicated that approximately 65% of their children had been bullied by peers (Carter, 2009).

Very few people enjoy being laughed at, and it usually evokes negative emotions such as anger, sadness, shame, disgust and fear (Platt, 2008; Platt, Proyer, & Ruch, 2009). There is also evidence to suggest that the long-lasting consequences of being laughed at situations are significant, especially for individuals with hfASD. Findings from peer reports have illustrated that hfASD victims of bullying may lack friends, experience rejection by their peers, and may be at an increased risk for developing internalizing problems such as depression (Olweus, 1993). There is also increasing evidence from experimental settings (Ruch, Altfreder, & Proyer, 2009; Samson et al., 2011), clinical practice (Titze, 2009), and single case studies (Titze, 1996) which indicate that being the subject of intense and repeated episodes of ridicule may serve as a factor in the development of the conditioned fear of being laughed at, a term recently defined as gelotophobia—from the Greek term “gelos” for laughter and “phobia” for fear (Ruch & Proyer, 2008a; Titze 2009). Gelotophobia refers to the conditioned fear of appearing to one’s social partners as an object of disparagement laughter and ridicule (Ruch & Proyer, 2008a; Titze, 1996). It is measured on a dimensional scale ranging from no fear to high fear, deriving from an individual’s conviction that he/she is intolerably ridiculous (Platt, 2008; Platt et al., 2009). It is therefore a specific variant of shame-bound anxiety which serves as a long-lasting consequence of prior exposure to ridicule and mockery (Platt, 2008; Titze, 1996; 2009).

The implications and consequences of gelotophobia on one’s functioning are significant. Gelotophobic individuals ultimately have been shown to suffer feelings of inferiority and self-contempt, and are inclined to perceive themselves as being unconnected to others (Proyer, Platt, & Ruch, 2010). They subsequently tend to become suspicious and very observant when others engage with them through laughter, as they perceive this as

laughter as a personal vendetta aimed at putting them down rather than a shared mechanism of social interplay (Platt, 2008; Titze, 2009).

Gelotophobia is therefore typical of a social anxiety in that occurrences of laughter are experiences which uproot anxiety for individuals (Ruch & Proyer, 2008a). Irrespective of their interaction partner's intentions, gelotophobes tend to react aversively to vocalisations constituting laughter by expressing non-verbally that they feel uneasy and fear humiliation (Platt, 2008). This has been observed in clinical (Titze, 1996; 2009) and experimental settings (Ruch et al., 2009) for several different types of laughter and smiles, whereby the gelotophobic individual's emotional response pattern has been shown to consist primarily of shame, anger and fear (Platt, 2008). Physiological symptoms may also arise, such as a racing heartbeat, muscle twitches, blushing, trembling and speech impediments (Titze, 2009). Papousek et al. (2014) found that individuals with gelotophobia showed heart rate deceleration in response to laughter. When exposed to repeated insulting statements, individuals in the gelotophobic group responded with significant differences in heart rate acceleration than individuals without gelotophobia (Papousek et al., 2014). As an extreme consequence, observations have also shown that gelotophobic individuals may avoid social interplay as a means to compress and escape these feelings, and remove themselves from any potential instances of being laughed at or ridiculed (Platt, 2008; Ruch et al., 2009; Titze, 2009).

Whilst a relatively new phenomenon –having originated from the clinical work of Titze (1996) and introduced as an individual difference variable by Ruch and Proyer (2008a; 2009), gelotophobia is receiving increasing attention in the literature (See Ruch, Hofmann, Platt, & Proyer, 2014, and Ruch, 2009 for reviews). In the past few years more than thirty studies have been published examining gelotophobia in a variety of contexts; the majority of which suggesting the crucial role of prior exposure to ridicule and bullying as predictors in its

onset (e.g. Forabosco, Ruch, & Nucera, 2009; Platt, 2008; Proyer, Ruch, et al., 2009; Ruch, 2009; Ruch et al., 2009). Platt et al. (2009) demonstrated that the expression of gelotophobia was a potent predictor of remembered incidents of having been bullied in the past, whilst Proyer, Hempelmann, and Ruch (2009) found that gelotophobes recalled being laughed at situations with a higher intensity of feelings. It is unsurprising, therefore that evidence has been found of individuals with hfASD demonstrating higher gelotophobic symptomatology in comparison to controls, as these individuals tend to experience significantly more bullying situations than their peers. Research conducted by Samson et al. (2011) was the first empirical investigation to apply gelotophobia to a population of those with hfASD, and found that there was an exceptionally higher incidence of gelotophobia amongst individuals with hfASD in comparison to typically developing controls (45% vs. 6% respectively).

Similar rates have been reported in other clinical populations. Gelotophobia was reported in 40% of individuals with eating disorders, 35.7% of individuals with personality disorders (Forabosco et al., 2009), and 24.5% of shame-bound neurotics exceeded the threshold for having at least a slight form of gelotophobia (Ruch & Proyer, 2008a). However, the rate of gelotophobia demonstrated by individuals with hfASD serves as the highest percentage in a particular population ever found in the literature, thereby suggesting that gelotophobia is an important but understudied area of investigation in the hfASD population.

Nonetheless, whilst the prevalence of gelotophobia in this population has been determined (Samson et al., 2011), the relationship between gelotophobia and other potent psychosocial variables in individuals with hfASD is an area which has not yet been investigated. To expand on Samson et al.'s research (2011), the present study therefore endeavours to examine quality of life (QoL), life satisfaction, perceived social support, social functioning and comorbid psychopathology in relation to gelotophobia, also taking into

account past experiences of bullying. Furthermore, it aims to determine as to whether an association exists between these variables for individuals with hfASD compared to typically developing controls.

Research by Jennes-Coussens, Magill-Evans, and Koning (2006) evidenced that individuals with hfASD rated their QoL as significantly lower than typically developing controls, whilst subsequent research has demonstrated that perceived social support serves as a significant contributor to QoL in individuals with hfASD (Renty & Roeyers, 2006). It is therefore hypothesised that there will be a relationship between gelotophobia, QoL and perceived social support amongst individuals with hfASD, whereby those who emerge with higher gelotophobia levels will emerge with lower QoL and perceived social support levels. Social consequences commonly associated with gelotophobia include social withdrawal, avoidance of social interplay, and the experiencing of anxiety in situations where laughter arises (Platt, 2008; Ruch & Proyer, 2008a; Ruch et al., 2009; Titze, 1996; 2009). Because individuals with hfASD are known to demonstrate difficulty with normative social functioning (Engstrom, Ekström, & Emilsson, 2003), it is also expected that those with hfASD who emerge with high levels of gelotophobia will similarly show evidence of poorer social functioning relative to the typically developing population, and that social functioning may serve as a predictor of gelotophobic symptomatology.

Furthermore, whether or not there is relationship between individuals with hfASD presenting with comorbid psychopathology and gelotophobia is also of interest. Comorbidity can be defined as the simultaneous occurrence of two or more disorders within the same individual (Matson & Nebel-Schwalm, 2007). Previous research has established that comorbid psychopathology amongst individuals with hfASD is high. Lugnegard, Hallerbäck, and Gillberg (2011) for example reported that 50% of individuals with hfASD presented with recurrent major depression, whilst 56% of individuals with hfASD met the criteria for having

an anxiety disorder. Similarly, gelotophobia has been associated with co-occurring mental disorders (Weiss et al., 2012). Weiss et al. (2012) reported that 80% of individuals in the gelotophobic group had a co-occurring diagnosis of social phobia and/or Cluster A personality disorder. Carretero-Dios, Ruch, Agudelo, Platt, and Proyer (2010) investigated the relationship between gelotophobia and social phobia. It was found that Social Anxiety and Distress and Fear of Negative Evaluation scale overlapped with gelotophobia, yet gelotophobia cannot be fully accounted for by these scales.

The aim of the current study is therefore to determine whether QoL, life satisfaction, perceived social support, social functioning and comorbid psychopathology, also taking into account past experiences of bullying, predict gelotophobia, whilst also investigating any effects which may present themselves between individuals with hfASD in comparison to typically developing controls.

2. Method

2.1. Participants

Participants of the hfASD group were 103 adults with a diagnosis of hfASD, and were recruited through support groups for individuals with hfASD. Diagnoses were provided by a licenced psychologist independent of the study. The participants received their diagnosis as a result of the formal diagnostic protocol which employs multiple diagnostic measures. Information on professional diagnosis, diagnostic setting/organization and professional(s) who made the diagnosis was obtained.

Participants of the control group were 137 neurotypically developing adults recruited in the University setting in exchange for course credit. Data from 240 participants was therefore analysed in the present research. The mean age of the hfASD group was 37.03

years ($SD = 12.38$) ranging from 18 to 64 years. The mean age of the control group was 20.31 years ($SD = 4.04$) ranging from 18 to 47 years. The hfASD group was 64.1% female ($n = 66$) while the control group was 60.6% female ($n = 83$).

The inclusion criteria for the control group was that participants were requested not to participate if they had a diagnosis of hfASD. There were no inclusion /exclusion criteria for the hfASD group aside from the fact that it was required they had a formal diagnosis of hfASD. Sixteen participants from the hfASD group were omitted from the analysis as they did not meet the criterion score set by the screening tool for hfASD, the Autism Spectrum Quotient (AQ), which was used with the hfASD participants in order to control for there being validity of hfASD diagnosis amongst the group.

2.2. Measures

2.2.1. Demographic information. A self-constructed questionnaire provided information on participant age, gender, level of education, occupation, and whether or not they had a current diagnosis of any comorbid psychopathology.

2.2.2. The Retrospective Bullying Questionnaire. The Retrospective Bullying Questionnaire (Schäfer et al., 2004) is a 44-item scale consisting mostly of multiple choice questions which assess one's subjective experiences of victimization in school. It looks at six types of victimisation; two physical, two verbal, and two indirect. It measures the frequency, seriousness, and duration of these victimisations through 5-point scales, followed by a 5-item trauma subscale of intrusive and recurrent recollections of victimization. A final section asks if individuals have ever been bullied in the workplace, and on the frequency of this on a 6-point scale. This scale has demonstrated high test-retest reliability and validity (Schäfer et al., 2004).

2.2.3. The Geloph<15>. The Geloph<15> (Ruch & Proyer, 2008b) is a 15-item questionnaire designed for the subjective assessment of gelotophobia. It contains items relating to gelotophobic symptomatology (e.g., “When people laugh in my presence I get suspicious”). All items are positively keyed using a four-point answer scale (1 = ‘strongly disagree,’ 2 = ‘moderately disagree,’ 3 = ‘moderately agree,’ 4 = ‘strongly agree’). Scores exceeding 2.50 are interpreted as indicating a slight expression of gelotophobia; those exceeding 3.00 indicate a marked expression of gelotophobia; whilst those of 3.50 and higher indicate an extreme expression of gelotophobia. The Geloph<15> has been translated into over 40 languages and previous research has demonstrated the scale to be a valid and reliable unidimensional instrument for the assessment of gelotophobia (Ruch & Proyer, 2008b). Internal validity for this scale has been documented as .87.

2.2.4. The World Health Organisation Quality of Life-Brief Version (WHOQOL-BREF). The WHOQOL-BREF (WHOQOL Group, 1998) is a 26 item, widely used self-report scale. It is an abbreviated version of the WHOQOL-100, with one item taken from each of the 24 facets and an additional two items measuring global quality of life. It consists of four psychometric subscales: Physical Health (e.g. How satisfied are you with your health?), Psychological Health (e.g. How often do you have negative feelings such as blue mood, despair, anxiety, depression?), Social Relationships (e.g. How satisfied are you with the support you get from friends?), and Environment (How satisfied are you with the conditions of your living place?), as well as a Global Estimate. Items are scored on a five-point scale where some items require reverse coding. Higher scores indicate a higher quality of life. The authors of this scale have demonstrated high test-retest reliability, and previous research has shown its validity (Yang, Kuo, Su, Wang, & Lin, 2006).

2.2.5. Satisfaction With Life Scale (SWLS). The SWLS (Diener, Emmons, Larsen, & Griffin, 1985) is a 5-item scale measuring one’s global cognitive judgments of life

satisfaction (e.g. 'In most ways my life is close to my ideal') on a 7-point scale that ranging from 7 = strongly agree to 1 = strongly disagree. Higher scores indicate a higher perception of life satisfaction. Evidence for favourable psychometric properties of the SWLS has been documented including internal consistency, reliability, and predictive validity. It is also regarded as suitable for use with a wide range of age groups and applications (Pavot, Diener, Colvin, & Sandvick, 1991).

2.2.6. Interpersonal Support Evaluation List (ISEL-12). The ISEL was developed by Cohen, Mermelstein, Kmack, and Hoberman (1985) and provides a global measure of the perceived availability of social support. A shortened 12-item version was used in the present study, which investigates four domains (belonging, self-esteem, appraisal, and tangible help) rated on a four-point scale from 'definitely true' to 'definitely false' e.g. 'When I need suggestions on how to deal with a personal problem, I know someone I can turn to.' Scores range from 0-36 whereby higher scores reflect a greater level of perceived informal support. The ISEL has demonstrated reliability and validity across social support studies using a diverse range of participants (Cohen & Hoberman, 1983; Cohen & Wills, 1985). Retest reliability for the full measure has been reported as .87, and retest reliability for the subscales ranges between .71-.87 (Cohen & Hoberman, 1983).

2.2.7. Social Functioning Questionnaire (SFQ). The SFQ is an 8-item self-report instrument measuring an individual's perception of social functioning, adapted from the longer Social Functioning Schedule (SFS); a semi-structured interview (Tyrer et al., 2005). This eight-item questionnaire covers the areas of work and home tasks, financial concerns, relationships with family, sexual activities, social contacts, and spare time activities. Items are rated on a four-point scale (e.g. 'I complete my tasks at work and home satisfactorily' most of the time; quite often; sometimes; not at all). The total SFQ score ranges from 0 to 24, whereby scores above 10 indicate poorer social functioning. Reliability and construct

validity has been shown to be good (Remington & Tyrer, 1979). The SFQ also has good test-retest and inter-rater reliability (Tyrer et al, 2005).

2.2.8. Autism Spectrum Quotient (AQ). This is a self-administered questionnaire developed by Baron-Cohen, Wheelwright, Skinner, Martin, and Clubley (2001) providing a continuous measure of autistic traits in adults with normal intelligence. It includes 50 items selected on the basis of them being representative of the characteristics of hfASD (deficits in communication and social interaction, the presence of restricted and repetitive behaviors), as well as associated cognitive styles commonly observed in individuals with hfASD (e.g. attention to detail, preference for sameness). The AQ includes five subscales: Social Skill; Attention Switching; Attention to detail; Communication, and Imagination. Participants indicate on a four point scale the extent to which they agree with each item (strongly agree to strongly disagree). Baron-Cohen et al. (2001) reported moderate to high internal consistency for the subscales, ranging from 0.63 for Attention to Detail to 0.77 for Social Skill. Test-retest reliability was also good ($r = 0.70$).

2.3. Procedure

Individuals over the age of 18 with a hfASD diagnosis (hfASD group) and individuals over the age of 18 without a diagnosis of hfASD (Control group) were invited to participate in this study. For the hfASD group, participants were made aware of the study through support groups for individuals with hfASD. If participants wished to participate in the study, they were provided with a consent form to complete. Once consent was obtained, the informants were provided with the battery of the above questionnaires to complete in their own time. Rating scales were completed by participants independently according to the instructions which were printed on the top of each questionnaire. Individuals with hfASD completed the Autism Spectrum Quotient (AQ) as a screening tool to indicate the 'caseness'

of hfASD which they presented with. For the control group, participants were made aware of the study through a research participation system for university students in exchange for course credit.

3. Results

Table 1 presents descriptive and inferential statistics for participant demographic information. The hfASD group and the control group differed significantly in educational status, occupational status and some types of psychopathology which they presented with. They did not differ significantly regarding gender.

---Insert Table 1 about here---

Using independent *t*-tests, the hfASD group was compared with the control group on all key study measures. The significant differences observed were in the predicted direction. Table 2 illustrates that the individuals with hfASD demonstrated a significantly higher prevalence of gelotophobia (medium effect size) and past experiences of bullying (large effect size) relative to the control sample, which was in line with our hypotheses.

---Insert Table 2 about here---

Furthermore, the hfASD group emerged with lower levels of quality of life, life satisfaction (large effect sizes), social functioning, and perceived social support (small effect sizes) in comparison to controls, which was also expected. Levene's test for equality of variance was not significant for gelotophobia score, quality of life score and past experiences of bullying ($p \geq .05$) therefore ensuring homogeneity of variance. However, it was significant ($p \leq .05$) for all other variables, thereby violating the assumption of equality of variance.

Pearson's chi-squared test was conducted to determine the number of participants who exceeded the cut-off point for the various forms of gelotophobia. Only 22.6% of controls exceeded the cut-off point of 2.5, which indicates having at least a slight fear of being laughed at. In the hfASD group 87.4% exceeded this threshold, which as expected was significantly higher than the control group ($\chi^2 = 128.46, p < .001$). Of this 87.4% of individuals with hfASD, 24.3% presented with a slight form of gelotophobia (in comparison to 19.7% of controls), 34% demonstrated symptomatology for a marked form of gelotophobia (in comparison to 2.2% of controls), whilst the final 29.1% of individuals with hfASD compared to only .7% of controls presented with symptomatology indicating an extreme form of gelotophobia.

Table 3 illustrates the Pearson correlation matrix for the main study measures.

---Insert Table 3 about here---

Pearson's Product-Moment correlation coefficients were conducted to evaluate the bivariate associations between the predictor variables and the continuous measure of gelotophobia for both the hfASD and control group. In line with our hypotheses, all of the psychological predictors were significantly associated with gelotophobia, and were also in the predicted direction. Table 4 illustrates this correlation matrix. As expected, there was a significant negative correlation between gelotophobia and quality of life, life satisfaction, perceived social support, depression and anxiety, whilst a significant positive correlation was observed between gelotophobia and personal involvement in bullying and social functioning. According to Cohen's criteria (1992), effect sizes were mostly in the small to medium range ($r > 0.10$ and $r < 0.30$) with the exception of social functioning, which had a large association with gelotophobia i.e. $r > 0.50$.

---Insert Table 4 about here---

In order to examine the predictors of gelotophobia in the hfASD group and the control group, a stepwise multiple regression was conducted. Gelotophobia was entered as the criterion variable, whilst perceived social support, social functioning, life satisfaction, presence of psychopathology (anxiety or depression) and experiences of bullying (physical, verbal and indirect forms) were added as the predictor variables. No strong relationships were observed between the predictor variables ($r < .9$). VIF values (< 10) and Tolerance values ($> .1$) for all predictor variables were also adequate, thereby demonstrating that there was no issue with multicollinearity in the data. The Pearson's correlation statistics are displayed in Table 4.

Using the stepwise method, the regression equation with the predictors social functioning, perceived social support, life satisfaction, anxiety, and experiences of verbal bullying were significantly related to gelotophobia ($F_{(1, 234)} = 283.50, p < .001$). Taken together, the results show that the overall regression model accounted for 64% of the variance of gelotophobia. Social functioning in Model 1 accounted for 54% of the variance and was significant ($\beta = .74, p < .001$). Model 2, in which experience of verbal bullying was added explained an additional 5% of the variance ($\beta = .25, p < .001$). The addition of anxiety in Model 3 accounted for a further 2% ($\beta = -.17, p < .001$). Model 4, in which life satisfaction was added explained another 2% of the variance ($\beta = -.20, p < .001$). The final addition of perceived social support accounted for an additional 1% of the variance explained ($\beta = -.17, p < .001$). Physical bullying ($\beta = .04, p = .36$), indirect bullying ($\beta = .09, p = .09$) and depression ($\beta = -.07, p = .131$) were not significant predictors in this model. Table 5 presents a summary of the stepwise multiple regression analysis for predictors of gelotophobia.

---Insert Table 5 about here---

4. Discussion

The present research inspected the frequency of gelotophobic symptomatology (i.e. the fear of being laughed at) and its relationship with prior exposure to bullying in individuals with hfASD compared to typically developing controls. In addition, the relationship between the above variables and the psychosocial constructs of quality of life (QoL), life satisfaction, social functioning, perceived social support and comorbid psychopathology were also investigated between individuals in the hfASD group and individuals in the control group.

As hypothesised, the findings from the present study revealed that individuals with hfASD reported a significantly higher magnitude of having been a victim of bullying in the past in comparison to typically developing controls. Using standardised instruments, the present research therefore supports Asperger's (1944) report and more recent empirical findings (Carter, 2009; Little, 2002) which suggest that individuals with hfASD are more prone to bullying experiences than are their typically developing peers.

It was also found that individuals with hfASD presented with significantly higher levels of gelotophobic symptomatology than did controls, which was positively correlated with prior exposure to bullying situations. Specifically, past experiences of verbal bullying served as the most potent predictor of gelotophobia over physical and indirect forms of bullying. There were also significant differences regarding the severity of gelotophobic symptomatology which the hfASD and control individuals presented, whereby those with hfASD displayed significantly more cases of marked and extreme forms of gelotophobia than did controls. Taken together, these results therefore suggest that gelotophobia and hfASD are closely linked. These results also replicate findings from previous investigations (Samson et al., 2011), whereby individuals with hfASD have been shown to present with significantly higher levels of gelotophobia than any other population or clinical group in which it has been investigated (Forobosco et al., 2009; Ruch & Proyer, 2008b).

Interestingly however, the present study found that the prevalence rates of gelotophobia amongst individuals with hfASD were almost double those found by Samson et al. (2011). A possible reason for this may relate to the fact that Samson et al. (2011) did not investigate as to whether any psychopathologies such as anxiety disorder were present in their participants. The present research included this variable, and found that 49.5% of hfASD participants had a diagnosis of an anxiety disorder. Because gelotophobia is typical of social phobia in that situations where laughter arises uproot symptoms of anxiety for individuals, it is possible that the higher rate of gelotophobia found in the present study relates to the fact that a large number (approximately half) of our hfASD participants also had a comorbid diagnosis of anxiety. The presence of an anxiety disorder was found to be a predictor of gelotophobic symptomatology in this study, thereby suggesting its intricate link with gelotophobia and indeed the possibility that those with anxiety disorder may be more prone to experiencing gelotophobic symptomatology in general.

The present research also found that of those who demonstrated high levels of gelotophobia, these individuals similarly presented lower subjective reports of their overall quality of life (QoL), life satisfaction, social functioning and perceived social support. Whether or not these individuals presented with a form of psychopathology was also positively correlated with the above psychosocial variables. Moreover, as expected there was a significant difference between these variables amongst individuals with hfASD and controls, whereby those with hfASD presented with lower subjective reports of their QoL, life satisfaction, social functioning, and social support, and reported significantly more cases of having a form of psychopathology than did control participants.

These key findings are analogous with previous empirical investigations of similar constructs. Jennes-Coussens et al. (2006) and Renty and Roeyers (2006) illustrated that individuals with hfASD reported their QoL and levels of perceived social support as

significantly lower than typically developing controls, whilst Lugnagard et al. (2011) demonstrated the high prevalence of comorbid psychopathology amongst individuals with hfASD. The present research adds to the literature by providing evidence that these variables correlate significantly with gelotophobia, and indeed serve as predictors of gelotophobia in individuals with hfASD.

Based on these findings, it is therefore fair to suggest that past experiences of bullying alone do not comprehensively account for the high prevalence of gelotophobic symptomatology amongst individuals with hfASD. As hypothesised, the findings of the present research illustrated that social functioning was a significant predictor of gelotophobia, and served to be more statistically significant in predicting gelotophobia than bullying experiences. It is therefore conceivable that individuals with hfASD may fear being laughed at not only because they were exposed to more bullying situations in the past, but also because of their deficits in social functioning and social awareness (Engstrom et al., 2003; Frith, 2004).

It is important in social communication to be able to differentiate between playful good-natured teasing and mean-spirited bullying, and also to be able to correctly interpret acts of pretence (Platt, 2008). However, because individuals with hfASD commonly demonstrate deficiencies in social cognition (Woods et al., 2013), this causes difficulty in the correct interpretation of social interaction experiences, and impairs normative social functioning (Engstrom et al., 2003). This is particularly the case in the interpretation of non-literal speech such as irony and sarcasm (Asperger, 1944; Attwood, 2004), which may be important in discriminating between innocent, playful forms of laughter and mean-spirited scenarios.

The inability to discriminate between innocent laughter and laughter as a personal attack indeed is one of the main characteristics of gelotophobia (Platt, 2008; Ruch & Proyer, 2008a). As a result, it is therefore possible that individuals with hfASD may be more prone to demonstrating gelotophobic symptomatology because their impaired social functioning and deficiencies in social awareness make them unable to discriminate between laughter intended as an expression of positive affect and laughter arising from mean-spirited scenarios (Platt, 2008; Titze, 1996; 2009). The psychosocial variables of life satisfaction and perceived social support were also identified as significant predictors of gelotophobia. This is not surprising, as the consequences shown to be commonly associated with gelotophobia include feelings of inferiority, self-contempt and perceiving oneself as unconnected to others (Proyer et al., 2010; Titze, 2009).

Nonetheless, despite the overall significance of the findings, some limitations of the present study must be discussed. Firstly, the correlational design of this research cannot be equated with causality in any way. Adding to this, is the limitation that the present research was heavily reliant on self-report data. This may have resulted in incidences of social-desirability bias amongst some participants. Moreover, because the present research requested individuals to report remembered situations of past experiences of bullying, reports may also have been compromised by age-related memory loss. Future research may therefore consider implementing other methods of directly investigating the influence of prior exposure to bullying. For example, it may be possible to collect not only self-report but also peer-reports of bullying incidents (e.g., by teachers, employers, parents, siblings etc.) in order to more comprehensively and validly encapsulate the potent influence of bullying exposure on gelotophobia.

Nevertheless, the above limitations do not discredit the fact that some important conclusions emerge from this research. The present data revealed a higher rate of

gelotophobia and past experiences of bullying amongst individuals with hfASD in comparison to controls, thereby supporting findings of a previous endeavour (Samson et al., 2011). Taking into consideration its high frequency and indeed the implications and consequences associated with gelotophobia such as social anxiety and social withdrawal (Titze, 1996; 2009), this phenomenon appears to be an important issue in individuals with hfASD regarding the need for intervention and prevention techniques.

However, the current research serves as only the second empirical investigation applying gelotophobia specifically to individuals with hfASD. Moreover, it is the first of its kind to explore its relationship between other psychosocial constructs and the presence of psychopathological disorders in individuals with hfASD. Therefore, there is a paucity of existing literature available on gelotophobia in individuals with hfASD and subsequently, there is little empirical evidence to allow for the development of adequate prevention and intervention techniques for the treatment of gelotophobia in individuals with hfASD.

A small amount of literature exists which focuses specifically on strategies to reduce bullying (Attwood, 2004; Dubin, 2007). However, the present research identified that there were other active variables aside from prior exposure to bullying that served as significant predictors of gelotophobia (social functioning, life satisfaction, and the presence of psychopathology, specifically anxiety disorder). Significant correlates of gelotophobia also included quality of life and perceived social support. This therefore suggests that gelotophobia calls for specific prevention interventions and therapeutic treatment in individuals with hfASD. These may include sensitisation to the differentiation between teasing and mocking, and strategies which may help individuals with hfASD to disentangle harmless teasing from hostile bullying (Attwood, 2004).

With regard to increasing the quality of life and life satisfaction of individuals with hfASD, this may involve use of a person-centred plan based on empirical research and the individual's own input (Jennes-Coussens et al., 2006; Renty & Roeyers, 2006). Nonetheless, it must be stressed that gelotophobia is an extremely new area in the literature; especially in relation to hfASD. Therefore, it must receive further empirical investigative work in order to support its prevalence and further determine its characteristics, symptomatology and consequences, which can in the future allow for the development of specific intervention and preventative strategies for its treatment in the applied domain.

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Table 1.

Participant demographic information

	High-functioning autism spectrum disorder (hfASD) Group (<i>n</i> = 103)	Control Group (<i>n</i> = 137)	Pearson Chi χ^2
Chronological Age	<i>M</i> 37.03 <i>SD</i> 12.38 Range: 18-64	<i>M</i> 20.31 <i>SD</i> 4.05 Range: 18-47	
Gender	%	%	.31
Male	35.9%	39.4%	
Female	64.1%	60.6%	
Education level			38.69**
Second level	46.6%	12.4%	
Third Level	51.5%	87.6%	
University	1.9%		
Other			
Occupation			130.15**
Employed	37.5%	12.4%	
Unemployed	31.3%	.7%	
Student	15.5%	86.9%	
Other	15.5%		
Diagnosis of Psychopathology			
ADHD	15.5%	.7%	19.58**
Major Depression	39.8%	2.9%	52.51**
OCD	16.5%	1.5%	18.27**
Bipolar Disorder	5.8%	0%	8.19*
Tourette's Disorder	1%	.7%	.04
Anxiety	49.5%	4.4%	66.14**
PTSD	3.9%	0%	5.41*
Schizophrenia	1.9%	0%	2.68

** $p < .001$, * $p < .005$

Participants who chose 'other' option for occupation gave responses such as self-employed, retired, volunteering and not working due to disability.

Table 2.

Means and Standard deviations for hfASD participants (n = 103) and controls (n = 137) and results of independent t-tests

	hfASD Group		Control Group		<i>t</i>	Effect Size (Cohen's <i>d</i>)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Geloph<15>	3.16	.54	1.96	.62	-15.76*** ^a	.58 (medium)
Physical bullying (elementary school)	.69	.47	.11	.31	-10.93*** ^b	.38 (small)
Verbal bullying (elementary school)	.58	.50	.34	.48	-3.77*** ^b	.49 (small)
Indirect bullying (elementary school)	.88	.32	.40	.49	-9.15*** ^b	.42 (small)
Physical bullying (secondary school)	.50	.50	.10	.30	-7.03*** ^b	.40 (small)
Verbal bullying (secondary school)	.78	.42	.26	.44	-9.12*** ^a	.43 (small)
Indirect bullying (secondary school)	.85	.35	.29	.45	-10.93*** ^b	.42 (small)
Physical QOL	48.79	21.68	71.61	14.33	9.27*** ^b	.90 (large)
Psychological QOL	42.48	21.19	60.22	17.82	6.87*** ^b	.87 (large)
Social QOL	40.13	25.26	66.85	22.06	8.72*** ^a	.88 (large)
Environmental QOL	53.31	19.42	69.85	15.38	7.13*** ^b	.91 (large)
Overall QOL	3.14	1.17	4.16	.78	7.69*** ^b	.98 (large)
SWLS	16.37	8.20	23.60	6.45	7.38*** ^b	1.18 (large)
SFQ	13.31	4.03	7.27	3.32	12.36*** ^b	.43 (small)
ISEL	14.30	8.76	27.43	5.56	13.32*** ^b	.42 (small)

*Interpretation of scores: Geloph<15>: higher scores reflect higher gelotophobic symptomatology, Bullying subscales: higher scores reflect higher bullying experiences, QOL subscales: higher scores reflect better quality of life, SWLS: higher scores reflect higher life satisfaction, SFQ: higher scores reflect lower social functioning and ISEL: higher scores reflect higher levels of perceived social support.

** $p < 0.001$

^aEqual variances assumed (Levene's test)

^bEqual variances not assumed (Levene's test)

Table 3.

Pearson correlation matrix for main study measures

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.Geloph													
2.QoL	-.56**												
3.SWLS	-.63**	.73**											
4.SFQ	.74**	-.68**	-.70**										
5.ISEL	-.67**	.56**	.51**	-.72**									
6. Bullying	.43**	.31**	-.29**	.37**	-.40**								
7.Maj. Dep	-.49**	.48**	.45**	-.48**	.42**	.20**							
8.Anxiety	-.45**	.28**	.27**	-.41**	.47**	.29**	.41**						
9. Physical Bullying (1)	.49**	.35**	-.39**	.44**	-.40**	-.42**	.35**	-.32**					
10.Verbal Bullying (1)	.18**	.12**	-.17**	.22**	-.21**	-.29**	-.09**	-.11**	.31**				
11.Indirect Bullying (1)	.46**	.38**	-.36**	.46**	-.39**	-.46**	-.34**	-.31**	.49**	.46**			
12.Physical Bullying (2)	.43**	.34**	-.32**	.40**	-.40**	-.30**	.24**	-.19**	.52**	.21**	.30**		
13.Verbal Bullying (2)	.51**	.40**	-.34**	.41**	-.43**	-.48**	-.28**	-.22**	.49**	.32**	.49**	.56**	
14.Indirect Bullying (2)	.51**	.38**	-.28**	.48**	-.47**	-.37**	-.24**	-.29**	.44**	.24**	.52**	.48**	.60**

** $p < .001$

*Interpretation of scores: Geloph<15>: higher scores reflect higher gelotophobic symptomatology, Bullying subscales: higher scores reflect higher bullying experiences, QOL subscales: higher scores reflect better quality of life, SWLS: higher scores reflect higher life satisfaction, SFQ: higher scores reflect lower social functioning and ISEL: higher scores reflect higher levels of perceived social support.

* (1) = elementary school, (2) = secondary school

Table 4.

Pearson correlation matrix between predictor variables and criterion variable gelotophobia

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Gelotophobia									
2. SWLS	-.63**								
3. SFQ	.73**	-.70**							
4. ISEL	-.67**	.51**	-.72**						
5. Anxiety	-.45**	.27**	-.41**	.47**					
6. Depression	-.49	.45	-.48	.42	.41				
7. Indirect Bullying (2)	.525	-.38	.48	-.47	-.29	-.24			
8. Physical Bullying (2)	.43	-.32	.40	-.40	-.19	-.24	.48		
9. Verbal Bullying (2)	.51**	-.34**	.41**	.43**	-.22**	-.28**	.60**	.56**	

** $p < .001$

* (1) = elementary school, (2) = secondary school

*Interpretation of scores: Geloph<15>: higher scores reflect higher gelotophobic symptomatology, Bullying subscales: higher scores reflect higher bullying experiences, QOL subscales: higher scores reflect better quality of life, SWLS: higher scores reflect higher life satisfaction, SFQ: higher scores reflect lower social functioning and ISEL: higher scores reflect higher levels of perceived social support.

Table 5.

Summary of stepwise multiple regression analysis for predictors of gelotophobia

Variable	Model 1			Model 2			Model 3			Model 4			Model 5		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE(B)</i>	β	<i>B</i>	<i>SE(B)</i>	β
SFQ	.13	.01	.74**	.11	.01	.64**	.10	.01	.57**	.07	.01	.43**	.06	.01	.33**
Verbal Bullying				.41	.08	.25**	.39	.07	.24**	.37	.07	.22**	.33	.07	.20**
Anxiety							-.33	.08	-.17**	-.34	.08	-.17**	-.27	.09	.14**
SWLS										-.02	.01	-.20**	-.02	.00	-.20**
ISEL													-.02	.01	-.17*
R^2		.54			.59			.62			.64			.65	
F for change in R^2		283.50**			29.48**			14.67**			13.54**			8.48**	

** $p < .001$, * $p < .005$

*Interpretation of scores: Geloph<15>: higher scores reflect higher gelotophobic symptomatology, Bullying subscales: higher scores reflect higher bullying experiences, QOL subscales: higher scores reflect better quality of life, SWLS: higher scores reflect higher life satisfaction, SFQ: higher scores reflect lower social functioning and ISEL: higher scores reflect higher levels of perceived social support.