

Article

The Recognition of Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorder and Conduct Disorder in Adolescents and Adults—Assessing Differences in Mental Health Literacy

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Abstract: This was a Mental Health Literacy (MHL) study looking at three disorders, part of a systematic research programme on MHL using vignette methodology to examine lay people's knowledge and recognition. The study compared the recognition of the disorders in children and adults. In all 485 participants, aged 18–69 years, read three vignettes describing a person with Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), and Conduct Disorder (CD). Vignette characters were described as either a child (aged 8yrs) or adult (aged 28 yrs). Participants attempted to label the disorder and then rated perceived seriousness and likelihood of disorder. Results from a 2 (sex) × 3 (disorder) way analysis of variance showed that CD was significantly perceived as the most serious disorder. ADHD was significantly considered more likely to be a disorder in adults yet recognised more in children. Younger participants correctly recognised ADHD, yet gave lower seriousness ratings. ASD was considered more serious in children. Women and highly educated individuals perceived ASD more seriously and recognised it more. Parents incorrectly identified CD but considered all disorders more seriously than non-parents. Clinical behaviours are more likely to be perceived as a disorder if they occur in adults, rather than children.

Keywords: ADHD; autism; conduct disorders; mental health literacy



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1. Introduction

Mental Health Literacy (MHL), first termed by Jorm, Korten, Jacomb, Christensen, Rodgers, and Pollitt [1], is an expanding field of research that aims to identify the knowledge and beliefs, the general public possess regarding Mental Health (MH) disorders. These beliefs are important as they highlight ignorance and misconceptions, which can help programmes designed to educate the general public [2,3]. This is now a fast-growing research area with a number of reviews of the literature [4–7].

This paper is part of a systematic research programme [8–10] and concerned with the recognition of, and reactions to, three disorders in children and adolescence. It is also concerned whether MHL for these disorders is associated with participants' age, education, gender, parental status and personal experience of mental illness.

It is probably true to say that this area of research is not driven by a strong theoretical perspective. The aim is usually much more applied and therapeutic in that it aims to identify where the general public is poorly informed about mental health and thence makes attempts to rectify this situation.

MHL literacy concerning depression and schizophrenia have been extensively researched [11]. Recognition rates tend to be much higher for the former compared to the latter [12–14]. Recognition for other disorders shows very different results: Panic disorder and Generalised Anxiety disorder (50%) [12], Psychosis (25%) [15], Social Phobia (9.2%) [14], and various Personality disorders (7%) [16].

This study is concerned with MHL and three disorders not, to our best knowledge, hitherto much investigated in this important and expanding literature [7]. Recent exceptions, however, are the work of Godfrey Born et al. [9], Rim et al., [17] and Vovou et al. [18] on ASD.

It seems unclear why some disorders (i.e., depression, schizophrenia) attract so much attention in the MHL literature while others are comparatively overlooked.

1.1. Personal Factors

Whilst there are inevitably occasional inconsistencies many studies have shown systematic individual difference in MHL. These include age, gender, education and any experience of the disorder.

Age: Older people seem less well informed for a variety of reasons, but mostly due to educational and experiential differences. In comparison, young people are more aware that negative stigma and self-reliance can have a harmful impact on help-seeking and seem much better informed about all aspects of mental health. Moreover, being better educated about social factors, younger people appreciate the positive influence social support can have on mental health [19].

Gender: Women tend to have greater MHL than males. Almost twice as many women participants recognised depression, compared to men in a number of studies done across the globe [4]. Men are also less likely to suggest the person should seek professional help when suffering from psychosis. Women are more likely to discuss problems they are experiencing with relatives, in comparison to males who are less likely to express themselves. Many studies on many different psychiatric disorders have confirmed this.

Education: The more highly educated express less negative attitudes towards mental disorders of any kind [20]. Participants are more likely to recognise almost all disorders if they had a higher level of education, particularly post-school education [14].

Experience of mental illness: Experience can be personally suffering from a disorder, or merely knowing someone who suffers. Studies have shown patients, their relatives, and friends all inevitably become better informed about specific disorders and indeed disorders in general. An interest and career in mental health and personal treatment experience increases recognition [21]. Furthermore, spending time with a relative who has experienced a disorder and sought professional help also increases recognition [22].

1.2. Childhood Disorders

Childhood disorders have been somewhat neglected in the MHL literature, despite 50% of all adult mental disorders emerging in adolescence [23–27]. Often undiagnosed clinical behaviours lead to children being labelled as a problem or a “naughty child”. Furthermore, the parents are labelled as neglectful or too lenient, these labels are exacerbated by the media [28]. Negative labelling can result in children falling behind academically [29].

In this study, we focus on three disorders. For each disorder, there is a vast academic literature, which cannot be reviewed here. Whilst there are inevitably differences and disagreements about the aetiology, diagnosis, and treatment of these disorders there is now sufficient agreement to be able to note where popular beliefs differ from those of experts.

First, ADHD, which is characterised by excessive activity, difficulty paying attention and controlling behaviour. For 30–50% of children diagnosed, the condition continues into adulthood [30]. In one salient study, when questioned about the disorder, teachers were more accurate in their beliefs than undergraduates [31]. If experience is a predictive factor for MHL [21,22], the experience of raising children will presumably improve MHL of childhood disorders.

The second is Autism Spectrum disorder (ASD) which is characterised by impaired social interactions and communication, ritualistic and repetitive behaviour. 1.5% of children and 1.1% of adults have ASD [32]. Yet one study showed only 45.8% of participants identified autism described in a child [33], this rate of recognition parallels that of other anxiety disorders [12]. However, in one comparable study participants with less knowledge

of autism endorse external theories of cause such as luck and religion, rather than academic theories [34].

Thirdly, we looked at Conduct disorder (CD) which is characterised by persistent behaviour which violates social norms or the basic rights of others. The behaviour can evolve into adulthood, whereby it is classified as antisocial personality disorder [35]. CD is predictive of antisocial and borderline personality disorder as an adult [36]. There has been little research on the attitudes towards CD [25,37].

This present study focused on these disorders which are among the most common in children and which have been neglected in the literature. We were particularly interested in the extent to which they are more easily identified in a child vs. an adult because of the likelihood of children with these serious disorders being misdiagnosed.

Furthermore, this study investigates factors which may influence attitudes towards both childhood and adulthood disorders. These factors include age, gender [38], education [20], experience [21], and parental status [31]. There are a number of papers concerned with attitudes to those with these disorders [39], and the information sources of these disorders but far few papers in the MHL vignette methodology tradition [40,41].

The literature on the recognition of some mental health disorders has not been well established. In this study, therefore, we set out to determine whether lay people can distinguish between three related disorders.

Based on the previous literature we tested eight hypotheses: (1) CD will be considered as a more serious disorder than ADHD and ASD. (2) Adulthood MH will be considered as more serious than childhood MH. (3) Adult MH will be rated as more likely to be a clinical disorder than childhood MH. (4) Younger participants will have more accurate perceptions of MH, than older participants. (5) Women will have more accurate perceptions of MH, than males. (6) Parents will have more accurate perceptions of MH, than non-parents. (7) Highly educated participants will have more accurate perceptions of MH, than less educated participants. (8). Participants with experience of MH will have more accurate perceptions of MH, than participants without experience.

2. Materials and Methods

2.1. Participants

There were 485 participants, the age ranged from 18–69 years ($M = 36.16$, $SD = 13.41$). The sample included 74 (15.3%) men, and 295 (60.8%) women. The majority of participants were British (89%) educated to undergraduate degree level (32.2%), followed by AS/A level (12th Grade) (28.6%), closely GCSE level (10th grade) (26.6%), followed by postgraduate degree level (12.2%), the remaining participants did not specify (0.4%). The vast majority of participants had direct or indirect experience with MH (79.2%), a proportion did not (19.6%), and the rest would rather not disclose this information (1.2%).

This number was sufficient according to a power analysis. To detect a small/medium between participants effect ($f = 0.20$) with power of 0.999, and assuming a correlation between the three measures of 0.50, G*Power indicates that a total sample size of 428 is required. To detect a very small within-subjects effect ($f = 0.10$) with power of 0.999 and again assuming a correlation between the measures of 0.50, G*Power indicates that a total sample size of 488 is required. This is the same sample size needed to detect a very weak ($f = 0.10$) within-between participants interaction.

There was some, but relatively little, missing data as always occurs. Rather than case-wise deletion or mean substitution, we analysed the data as it was presented and which accounts for slightly different numbers for each analysis.

2.2. Instrument

Six vignettes were created based on a fictional character experiencing symptoms from the DSM-5 [35] criteria for ADHD, ASD, and the overlapping symptoms of CD and antisocial personality disorder, as CD is specific to children. The length of each was 98–110 words, written at a comprehension level accessible to the general population. Each

was shown to a MHL researcher and a clinical psychologist for verification. They are shown in Appendix A.

Each disorder had two vignettes, differing only on the age of the subject. Male names were used for all vignettes, so as not to add sex as another possibly confounding variable. Using sex as a criteria would have increased the number of participants greatly; furthermore, sex of vignette character has rarely been shown to effect the disorder recognition [7].

2.3. Procedure

A 3 (type of disorder) \times 2 (age of character) mixed design was used, with type of disorder as the within-subject's factor and age as the between subject's factor. The dependent variable was the two ratings. This analysis allowed us to test the hypotheses. Where appropriate following statistical advice we added a regression to attempt to ascertain how much variance was accounted by the two factors. Childhood ($n = 249$) and adulthood ($n = 236$) were the two between subject's conditions. Participants were randomly assigned to either condition by the software. They attempted to identify the vignette characters disorder as well as ratings of seriousness of the behaviour and the likelihood the person has a disorder: essentially, this means do participants think the targets have had, or should have had a clinical diagnosis. The latter were measured on a scale of 0–100, indicated by a slider. This method has been used before and is sensitive to subtle differences [7]. Thirdly, the correct identification of the disorder, measured as either as a technically "correct response". A No response was taken as an incorrect response. Acceptable answers and abbreviations for each disorder were decided beforehand. For ADHD, an accepted alternative was "Attentional Deficit Disorder" or "ADD". For ASD, accepted alternatives were "Autism", "Asperger's", and "Sensory Deficits". For CD, accepted alternatives were "any conduct type disorder". If we erred in this task, it was on the side of false positives. Responses were coded by two independent researchers (post-graduate psychologists) for ADHD ($\kappa = 0.91$, $p < 0.001$), ASD ($\kappa = 0.88$, $p < 0.001$) and CD ($\kappa = 0.98$, $p < 0.001$), showing high inter-rater reliability.

Ethical permission was sought and granted from the departmental committee: Reference CEHP/2013/514. The study ran in Qualtrics 2016 (<https://www.qualtrics.com/>, accessed on 1 January 2017), as an online survey, and part of a slightly longer study on related issues. Participants were recruited from the departmental panel (50%) and two platforms (AmazonTurk and Prolific) because they tend to attract different groups and we wanted as representative a sample as possible. Each was paid £1.50 for participation. We used standard departmental approved wording and they agreed to have their anonymous results analysed and published. As is standard policy, they were not debriefed. We tried to get British nationals and asked a question about nationality.

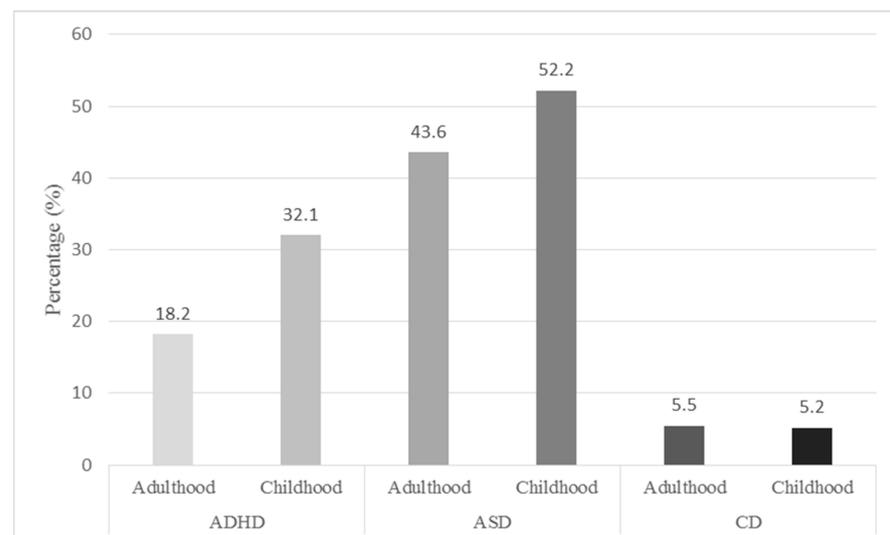
3. Results

Data were first cleaned and a number of participants were dropped for incomplete responses, suspicions about inattention, or faking. See Table 1 and Figure 1 for a summary of seriousness and likelihood of disorder rates across all conditions, including mean values and standard deviations in parentheses.

Overall CD ($M = 79.74$, $SD = 19.61$) was rated significantly more serious ($t(484) = 14.12$, $p < 0.001$, $d = 0.64$) than ADHD ($M = 64.52$, $SD = 19.70$), which was also rated significantly more serious ($t(483) = 9.38$, $p < 0.001$, $d = 0.43$) than ASD ($M = 54.54$, $SD = 23.83$). Participants rated CD as the most serious, followed by ADHD, and finally ASD as the least serious. This supports hypothesis 1.

Table 1. Ratings of seriousness and likelihood of disorder means, standard deviations for each condition.

		Dependent Variables	
		Seriousness	Likelihood of Disorder
ADHD	Adulthood	$M = 64.53$ ($SD = 18.67$)	$M = 62.73$ ($SD = 24.25$)
	Childhood	$M = 64.52$ ($SD = 20.67$)	$M = 53.00$ ($SD = 27.01$)
ASD	Adulthood	$M = 50.53$ ($SD = 23.83$)	$M = 56.20$ ($SD = 28.37$)
	Childhood	$M = 58.35$ ($SD = 23.24$)	$M = 59.75$ ($SD = 27.19$)
CD	Adulthood	$M = 79.99$ ($SD = 20.08$)	$M = 59.27$ ($SD = 30.50$)
	Childhood	$M = 79.49$ ($SD = 19.20$)	$M = 55.78$ ($SD = 27.89$)

**Figure 1.** Recognition rates for each disorder in childhood and adulthood.

3.1. ADHD

There no significant difference between adulthood ADHD and childhood ADHD ratings of seriousness ($F < 1$), this does not support hypothesis 2. There was a significant difference between adulthood ADHD ($M = 62.73$, $SD = 24.25$) and childhood ADHD ($M = 53.00$, $SD = 27.01$) ratings of likelihood of disorder ($F(1, 481) = 16.50$, $p < 0.001$, $\eta_p^2 = 0.033$), supporting hypothesis 3. There was a significant difference between adulthood ADHD (18.2%) and childhood ADHD (32.1%) recognition rates ($F(1, 481) = 13.74$, $p < 0.001$, $\eta_p^2 = 0.028$).

Age had a significant effect on ratings of seriousness ($F(1, 481) = 14.98$, $p < 0.001$, $\eta_p^2 = 0.030$) and correct identification ($F(1, 481) = 4.90$, $p = 0.027$, $\eta_p^2 = 0.010$). There was no effect of age on ratings of likelihood of disorder. Age and seriousness were significantly positively correlated ($r(485) = 0.17$, $p < 0.001$). This supports hypothesis 4. Age and correct identification were significantly negatively correlated ($r(485) = -0.10$, $p < 0.028$).

Gender did not have an effect on seriousness, likelihood of disorder, nor correct identification, for ADHD, not supporting hypothesis 5. Participants in the adulthood condition considered ADHD more likely to be a disorder, than those in the childhood condition. Yet, participants identified ADHD more often in the childhood condition. The older participants rated ADHD as more serious than the younger participants, yet did not correctly identify it as often as the younger part

Tables 2–4 show a summary of seriousness and likelihood of disorder rates across each demographic group, including mean values and standard deviations in parentheses. Figures 2–4 show recognition rates across each demographic group.

Table 2. Ratings of seriousness and likelihood of disorder means, standard deviations within each demographic group for Attention Deficit Hyperactivity Disorder (ADHD).

		Dependent Variables	
		Seriousness	Likelihood of Disorder
Parental Status	Parents	$M = 67.51$ ($SD = 19.47$)	$M = 58.30$ ($SD = 26.52$)
	Non-parents	$M = 59.88$ ($SD = 19.21$)	$M = 56.86$ ($SD = 25.58$)
Education Level	GCSE/10th Grade	$M = 66.93$ ($SD = 20.36$)	$M = 57.40$ ($SD = 28.42$)
	AS/A level	$M = 63.94$ ($SD = 21.35$)	$M = 58.10$ ($SD = 25.09$)
	12th Grade	$M = 62.13$ ($SD = 17.80$)	$M = 57.94$ ($SD = 25.11$)
	Undergraduate	$M = 66.83$ ($SD = 18.83$)	$M = 58.19$ ($SD = 26.03$)
Experience	Post graduate	$M = 65.11$ ($SD = 19.32$)	$M = 58.74$ ($SD = 25.89$)
	Experience	$M = 62.86$ ($SD = 20.94$)	$M = 53.6$ ($SD = 26.79$)
	No experience		

Table 3. Ratings of seriousness and likelihood of disorder means, standard deviations within each demographic group for Autism Spectrum Disorder (ASD).

		Dependent Variables	
		Seriousness	Likelihood of Disorder
Parental Status	Parents	$M = 56.73$ ($SD = 24.14$)	$M = 57.94$ ($SD = 28.08$)
	Non-parents	$M = 51.15$ ($SD = 22.99$)	$M = 58.15$ ($SD = 27.43$)
Education Level	GCSE/10th Grade	$M = 54.98$ ($SD = 22.85$)	$M = 56.33$ ($SD = 25.90$)
	AS/A level	$M = 52.86$ ($SD = 25.45$)	$M = 57.47$ ($SD = 29.24$)
	12th Grade	$M = 52.71$ ($SD = 22.50$)	$M = 59.44$ ($SD = 27.19$)
	Undergraduate	$M = 63.69$ ($SD = 22.97$)	$M = 61.17$ ($SD = 28.66$)
Experience	Post graduate	$M = 55.29$ ($SD = 24.34$)	$M = 58.38$ ($SD = 27.82$)
	Experience	$M = 51.46$ ($SD = 21.72$)	$M = 56.18$ ($SD = 28.25$)
	No experience		

An ANOVA comparing seriousness rating between parents ($M = 67.51$, $SD = 19.47$) and non-parents ($M = 59.88$, $SD = 19.21$) showed a significant difference ($F(1, 483) = 17.95$, $p < 0.001$, $\eta_p^2 = 0.036$), there were no significant differences for education level nor experience. A significant regression ($R^2 = 3.9\%$, $F(4, 472) = 4.76$, $p < 0.001$) indicated having children ($\beta = 0.19$, $t(4, 472) = 4.14$, $p < 0.001$) was the only significant predictor of seriousness ratings, supporting hypothesis 6.

An ANOVA revealed no significant differences in ratings of likelihood of disorder for parental status, education level, nor experience. Using the enter method, a significant regression ($R^2 = 4.2\%$, $F(4, 472) = 5.14$, $p < 0.001$) indicates the condition ($\beta = -0.18$,

$t(4, 472) = 4.08, p < 0.001$) was the only significant predictor of likelihood of disorder ratings, as shown by the ANCOVA. This does not support hypothesis 7, nor 8.

Table 4. Ratings of seriousness and likelihood of disorder means, standard deviations within each demographic group for Conduct Disorder (CD).

		Dependent Variables	
		Seriousness	Likelihood of Disorder
Parental Status	Parents	$M = 81.24$ ($SD = 19.49$)	$M = 59.60$ ($SD = 29.06$)
	Non-parents	$M = 77.55$ ($SD = 19.57$)	$M = 54.15$ ($SD = 29.19$)
Education Level	GCSE	$M = 79.82$ ($SD = 21.09$)	$M = 60.24$ ($SD = 29.64$)
	AS/A level	$M = 80.08$ ($SD = 20.30$)	$M = 56.94$ ($SD = 30.93$)
	Undergraduate	$M = 80.57$ ($SD = 16.50$)	$M = 56.56$ ($SD = 26.61$)
Experience	Post graduate	$M = 77.14$ ($SD = 22.23$)	$M = 56.36$ ($SD = 30.56$)
	Experience	$M = 79.84$ ($SD = 19.49$)	$M = 58.24$ ($SD = 29.15$)
	No experience	$M = 78.99$ ($SD = 20.18$)	$M = 54.27$ ($SD = 29.76$)

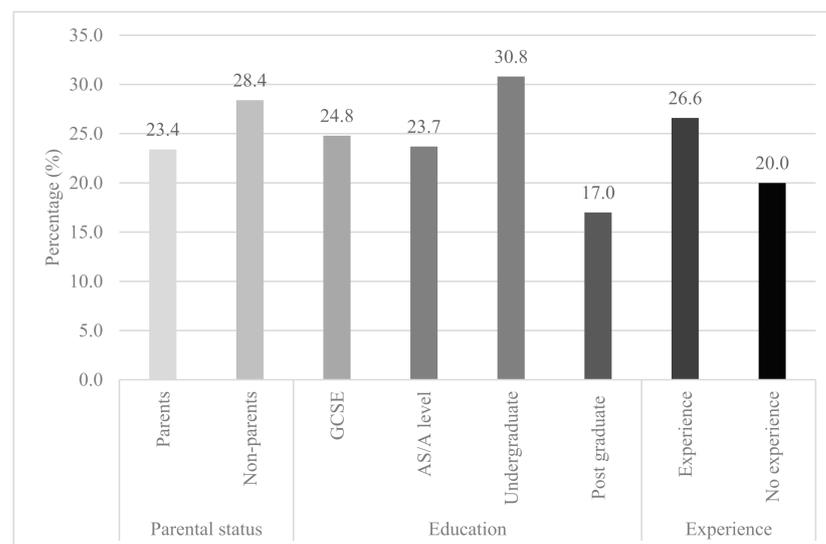


Figure 2. Recognition rates within each demographic group for ADHD.

An ANOVA revealed no significant differences in recognition for parental status, education level, nor experience. A significant regression ($R^2 = 3.2\%$, $F(4, 472) = 3.94$, $p = 0.004$) indicates the condition ($\beta = 0.16$, $t(4, 472) = 3.58$, $p < 0.001$) was the only significant predictor of participants correctly identifying the disorder, as shown by the ANCOVA. This does not support hypothesis 6, 7, nor 8. Participants with children rated ADHD as more serious than those without children, in both the adulthood and childhood condition.

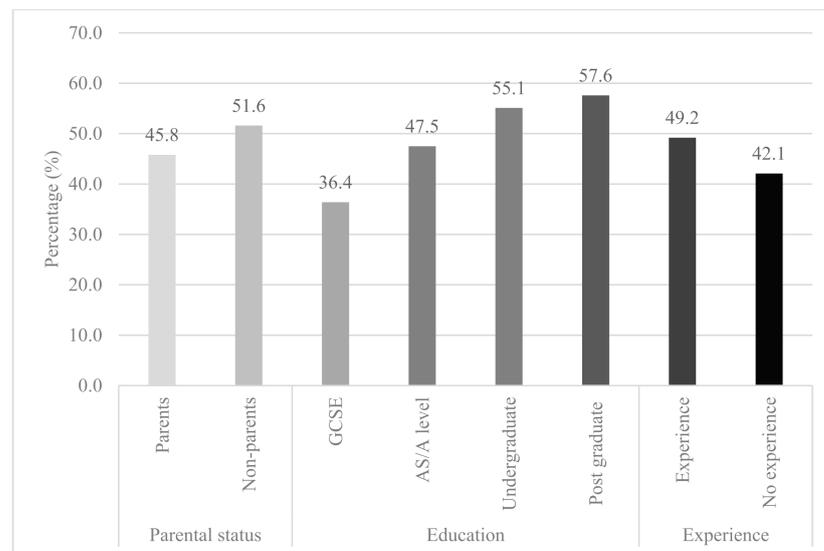


Figure 3. Recognition rates within each demographic group for ASD.

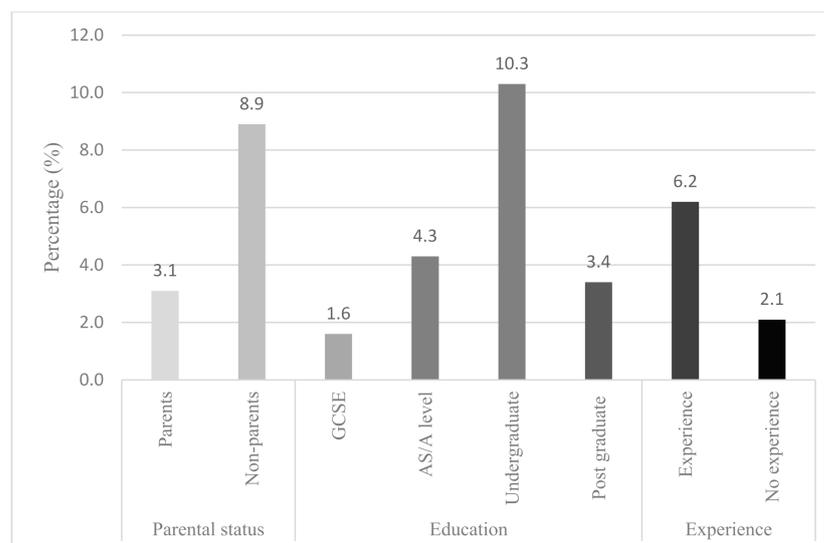


Figure 4. Recognition rates of each demographic group for CD.

3.2. ASD

There was a significant difference between adulthood ASD ($M = 50.53$, $SD = 23.83$) and childhood ASD ($M = 58.35$, $SD = 23.24$) ratings of seriousness ($F(1, 480) = 11.32$, $p = 0.001$, $\eta_p^2 = 0.023$), supporting hypothesis 2. There was no significant difference between adulthood ASD and childhood ASD ratings of likelihood of disorder ($F < 1$), this does not support hypothesis 3. There was no significant difference between adulthood ASD and childhood ASD percentage of participant correctly identifying the disorder ($F < 1$).

Age had no effect on seriousness, likelihood of disorder, or correct identification, for ASD ($F < 1$), this does not support hypothesis 4. Gender had a significant effect on ratings of seriousness ($F(1, 480) = 6.08$, $p = 0.014$, $\eta_p^2 = 0.013$) and recognition rates ($F(1, 480) = 5.12$, $p = 0.024$, $\eta_p^2 = 0.011$). There was no effect of gender on ratings of likelihood of disorder. Gender is positively correlated with seriousness ratings ($r(484) = 0.13$, $p = 0.004$) and correct labelling ($r(485) = 0.11$, $p = 0.016$), supporting hypothesis 5. Participants in the childhood condition rated ASD as more serious, than those in the adulthood condition. Women participants rated ASD as more serious and more often correctly labelled it, than men participants.

An ANOVA comparing seriousness rating between parents ($M = 56.73$, $SD = 24.14$) and non-parents ($M = 51.15$, $SD = 22.99$) found a significant difference ($F(1, 482) = 6.04$, $p = 0.012$, $\eta_p^2 = 0.013$). In addition, comparing seriousness rating between GCSE ($M = 54.98$, $SD = 22.85$), AS/A level ($M = 52.86$, $SD = 25.45$), undergraduate ($M = 52.71$, $SD = 22.50$), and postgraduate ($M = 63.69$, $SD = 22.97$) found a significant difference ($F(3, 478) = 3.53$, $p = 0.015$, $\eta_p^2 = 0.022$). Contrasts revealed a significant difference ($p = 0.002$) between undergraduate and postgraduate seriousness ratings. There were no significant differences for experience. A significant regression ($R^2 = 5.7\%$, $F(4, 471) = 7.06$, $p < 0.001$) indicates the condition ($\beta = 0.17$, $t(4, 471) = 3.74$, $p < 0.001$), having children ($\beta = 0.15$, $t(4, 471) = 3.17$, $p = 0.002$), and education level ($\beta = 0.10$, $t(4, 471) = 2.08$, $p = 0.038$) were significant predictors of seriousness ratings. This supports hypothesis 6, and 7.

An ANOVA revealed no significant differences in ratings of likelihood of disorder for parental status, education level, nor experience. An ANOVA comparing percentage of correct identification between GCSE (36.4), AS/A level (47.5), undergraduate (55.1), and postgraduate (57.6) found a significant differences ($F(3, 479) = 4.17$, $p = 0.006$, $\eta_p^2 = 0.025$). Contrasts revealed a significant difference ($p = 0.007$) between GCSE and postgraduate recognition rates. There were no differences for parental status nor experience. Using the enter method, a significant regression ($R^2 = 3.7\%$, $F(4, 472) = 4.51$, $p = 0.001$) indicates the condition ($\beta = 0.10$, $t(4, 472) = 2.23$, $p = 0.026$), and education level ($\beta = 0.15$, $t(4, 472) = 3.27$, $p = 0.001$) were significant predictors of correct identification. This supports hypothesis 7.

Participants with children, and a higher education rated ASD as more serious than those without children or with a lower level of education, in the childhood condition. Those with a higher education are less likely to have children. Participants with a higher education correctly identified ASD, again in the childhood condition.

3.3. CD

There was no significant difference between adulthood CD and childhood CD ratings of seriousness ($F < 1$), this does not support hypothesis 2. There was no significant difference between adulthood CD and childhood CD ratings of likelihood of disorder ($F < 1$), this does not support hypothesis 3. There was no significant difference between adulthood CD and childhood CD recognition rates ($F < 1$). Neither age nor gender had an effect on seriousness, likelihood of disorder, or correct identification, for CD ($F < 1$), this does not support hypothesis 4 or 5.

An ANOVA comparing seriousness ratings between parents ($M = 81.24$, $SD = 19.49$) and non-parents ($M = 77.55$, $SD = 19.57$) found a marginally significant difference ($F(1, 483) = 4.46$, $p = 0.035$, $\eta_p^2 = 0.009$). There were no significant differences for education level nor experience. The condition, level of education, and experience were not significant predictors of seriousness ratings ($F < 1$), however, having children was a marginally significant predictor ($\beta = 0.18$, $t(4, 472) = 2.17$, $p = 0.030$) despite a non-significant model overall.

An ANOVA comparing likelihood of disorder ratings between parents ($M = 59.60$, $SD = 29.06$) and non-parents ($M = 54.15$, $SD = 29.19$) found a significant difference ($F(1, 482) = 4.04$, $p = 0.045$, $\eta_p^2 = 0.008$). There were no significant differences for education level nor experience. The condition, level of education, and experience were not significant predictors of likelihood of disorder ratings ($F < 1$), however, having children was marginally significant predictor ($\beta = 0.09$, $t(4, 471) = 2.00$, $p = 0.047$) despite a non-significant model overall.

An ANOVA comparing recognition rates between parents (3.1) and non-parents (8.9) found a significant difference ($F(1, 475) = 8.30$, $p = 0.004$, $\eta_p^2 = 0.017$). In addition, comparing recognition rates between GCSE, AS/A level, undergraduate, and postgraduate found a significant difference ($F(3, 479) = 3.99$, $p = 0.008$, $\eta_p^2 = 0.024$). Contrasts revealed a significant difference between AS/A level and undergraduate ($p = 0.023$), and marginally undergraduate and postgraduate ($p = 0.045$). There was no significant difference for experience. A significant regression ($R^2 = 2.6\%$, $F(4, 472) = 3.19$, $p = 0.013$) indicated having children ($\beta = -0.11$, $t(4, 472) = 2.43$, $p = 0.016$) was a significant predictor of participants

not correctly identifying the disorder. This does not support hypothesis 6. Education was not a significant predictor, despite significant difference.

Participants with children incorrectly identified CD more often than those without children, in both adulthood and childhood conditions. Participants with children rated CD as more serious and more likely to be a disorder than those without children.

4. Discussion

CD was considered more serious than both ADHD and ASD, supporting hypothesis 1. This could be attributed to the nature of CD as those with CD often violate the rights of others [35]. The impact it has on others may inflate perceptions of seriousness, as people might assess the effect it would have on themselves as well as the individual, more so than with both ADHD and ASD.

Additionally, CD is difficult to manage and treat. Symptoms can also worsen, and behaviours that result tend to be more violent and destructive [36,42]. The manifestation of ADHD and ASD may change, but it is relatively stable [30]. ADHD and ASD can be managed, and families can cope relatively well with the disorders. Thus, higher ratings of seriousness may reflect the instability and treatment-resistant nature of CD, though this hypothesis needs to be tested.

There was no difference between seriousness ratings of childhood and adulthood disorders, for ADHD and CD. This does not support hypothesis 2. However, unexpectedly, ASD was considered more seriously in children, rather than adults. A possible explanation for this is people may feel uncertain towards children with this problem. Young children are impulsive and struggle to regulate their behaviour as part of normal development, and if this is exacerbated by MH, children may be perceived as particularly unpredictable. Similar to this study, childhood depression was rated as more serious than adulthood depression, with a tendency for children to be considered more violent than adults.

ADHD and, although non-significant, CD were rated as more likely to be a disorder in adults than in children, supporting hypothesis 3. The same behaviours seen in children may be attributed to normal child development, and not of a clinical disorder. However, recognition was higher for childhood ADHD and ASD than adulthood. A stereotypical and popular view of these disorders is that they usually affect children. Although this may be the case, they also occur in adults [30,32,36,42], but this manifestation is a less typical presentation of the disorder.

Older participants perceived all disorders more seriously, which was not hypothesized, but the younger participants had higher recognition rates, which supports hypothesis 4. Young people were better at recognising the disorders, possibly because they are growing up in a time in which awareness of MH is increasing [43]. Availability of information may have also sparked a greater interest in young people, than there is in older people.

Women viewed the disorders as more serious, and were better at recognising disorders than men, supporting previous research and hypothesis 5 [38]. Women were more successful at giving the appropriate and correct label for a set of behaviours [22]. It has been proposed that women are more aware of MH due to an increase in discussion about emotional difficulties in social groups and families [44]. Again, this explanation warrants empirical verification.

Being a parent increased how serious a person perceives clinical behaviours, across all disorders, supporting hypothesis 6. This finding remains significant when age, education and experience are taken into account. Spending a significant and prolonged amount of time with children may heighten awareness of normal development and behaviours [31], and this awareness is not diminished for adult MH disorders. For ASD, having children increased seriousness ratings for the childhood disorder. Parents presumably draw on their own experience of raising children, and use this as a standard for assessing behaviour. They can understand how parenting behaviour affects a child, and that some factors are beyond their control, which may require professional support [28,45].

Surprisingly, parents did not recognise CD as often as non-parents. This seems counterintuitive given the previous findings. They are, however, aware it is serious but do not recognise the disorder. CD differs from that of ADHD and ASD in terms of the violence and aggressive nature. This difference may have altered parent's perception of what disorder it may be.

A higher level of education predicts perceiving childhood ASD as more serious, and recognising the disorder, supporting hypothesis 7. This remains significant when age, parental status and experience are taken into account. Both of these findings suggest education at a postgraduate level increases perceptions of seriousness and recognition of a disorder. Generally, higher level of education improves perceptions of MH. The effect of education may reflect a wider understanding and awareness of MH, as an individual progresses through higher education [20].

The effect of education did not emerge from ADHD, nor adulthood ASD. ASD had the highest rate of recognition overall (47.9%), supporting previous research [33]. CD had an incredible low rate of recognition (5.4%) [25]. ASD has a more distinct manifestation when compared to other disorders. When symptoms of ASD present themselves, there are fewer alternative explanations, in comparison to CD for instance. As previously mentioned, ASD may stereotypically be seen as a childhood disorder. Therefore, it seems logical that ASD would have the highest rate of recognition in childhood, allowing the differences in education level to become clear.

There was no evidence found for that claim that experience with MH leads to more accurate perceptions of MH, this does not support hypothesis 8. The lack of support is unusual compared to the robust findings in the literature [21,46]. Previous research has asked for further details, such as the name of the disorder, and have found a significant effect [22]. This may account for differences between various studies and the non-significant findings here.

Like all others, this study had limitations. There are recognized problems with vignette methodology [47]. Further, we may have been overly strict in classifying a response as "correct", which may not represent actual lay understanding in this area. All vignettes were male, and this could have had an effect on the recognition rate, though other studies in this area have rarely shown that disorder recognition is strongly affected by patient gender. The samples were large but not representative of the population, with a heavy bias towards women, who are often better at MHL than men. Further, we did not collect comparative data on their recognition of depression and schizophrenia to have some understanding of their comparative level of MHL.

5. Conclusions

It is not until comparatively recently that there have been a few MHL studies on ASD [9,17,18], though none has looked at recognition as a function of the age of the person. We found that MHL about these disorders was indeed a function of both the age of the vignette character but also the characteristics of the participant, notably their gender and education.

A major implication for this research concerns public education about mental disorders. Indeed, there are organisations made up of patient groups who try to educate the public on recognising the symptoms of various disorders so that people can be diagnosed and helped more effectively. These results may help such groups identify areas of public ignorance and misconceptions which they may attempt to rectify.

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Appendix A

ADHD

John, an (8/28) year old male, has recently become very inattentive, and appears not to listen in both social and important situations, despite being a capable person. However, relatives have also described John as restless, and this causes him to make careless mistakes. He cannot sit still for a long period of time, and will abandon tasks, leaving them uncompleted. At night time, John finds it very difficult to sleep. It has led to relatives avoiding engaging with him. Furthermore, he can act very impulsively, and has excitable outbursts. John frequently complains of losing possessions, but relatives believe it is because he is unorganised and doesn't take care of them.

ASD

Mark, an (8/28) year old male, often does not respond to social interactions, including the back-and-forth of conversation and sharing of interests, despite having many interests and hobbies. Mark finds it difficult to adjust to different contexts, and relatives describe his behaviour has slightly ritualized. However, people who do not know him very well do not notice this. Mark has a keen interest in trains, and enjoys sharing facts about them with friends. However, he does not like the sounds that trains make, and appears very distressed by them, yet has no medical problems that would cause this.

CD

Joseph, an (8/28) year old male, has become very aggressive towards other people, including acting physically violent on a few occasions. This has resulted in peers feeling intimidated by him. Recently, Joseph used a baseball bat to threaten a friend. Furthermore, he deliberately damaged a family member's car, but lied and denied it when confronted. Friends have described Joseph as not very nice, and a bad influence. There have been a few accusations made against him regarding stolen items, however he has denied this and it has not been proven. This type of behaviour has been persistent for a year, however aside from the aggressive outbursts, Joseph's personality is unchanged.

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