

Breaking the Practice: Negative Attitudes Towards Autism.

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Dedication

For my parents, there will never be enough ways to say thank you and I truly appreciate everything.

Acknowledgments

To my supervisor, Dr. Conor Nolan thank you for your ongoing support, guidance, understanding and patience.

My friends, thank you for your belief and encouragement all the way through.

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Abstract

Background

There is little existing research on attitudes towards autism in an undergraduate population. This study aims to assess implicit attitudes (IA) towards individuals with autism while observing gender differences on empathy scores and knowledge of autism with an undergraduate population.

Method

The current study involves 27 females and 26 males. The Autism Awareness Scale measured knowledge towards autism, the Toronto empathy questionnaire measured empathy. The Implicit Association Test measured IA based on reaction times.

Results

No differences were found between males and females on empathy or autism knowledge. Similarly, negative IA correlated with lower empathy, autism knowledge and frequency of contact but non-significantly.

Conclusion

This study contrasts with previous research indicating females score higher on autism knowledge and empathy. Findings indicate more research is needed on the impact of higher levels of empathy, knowledge and frequency of contact on positive IA towards individuals with autism within the undergraduate population.

Table of Contents

| | |
|--|----|
| Introduction..... | 8 |
| Methods..... | 26 |
| Participants..... | 26 |
| Measures..... | 26 |
| Design..... | 31 |
| Statistical Analysis..... | 31 |
| Procedure..... | 32 |
| Results..... | 34 |
| Discussion..... | 37 |
| References..... | 48 |
| Appendix..... | 67 |
| (A) Toronto Empathy Questionnaire (TEQ)..... | 67 |
| (B) Demographic form..... | 69 |
| (C) Autism Awareness Scale (AAS)..... | 70 |
| (D) Information Sheet..... | 71 |
| (E) Informed Consent..... | 73 |
| (F) Debriefing..... | 74 |
| (G) Services form..... | 75 |

Breaking the Practice, Negative Attitudes Towards Autism.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder defined by impairments in social communication and limited repetitive behaviour patterns, which materialize within the early developmental stage (American Psychiatric Association, [APA] 2013). Here in Ireland, it is estimated that 1 in every 65 children have ASD, which is an increase from 1 in 100 children (Bond, Symes, Hebron, Humphrey & Morewood, 2016). Without accounting for outside individuals this equates to 14,000 students. There is a lot of research available as to why the surge exists. The substantial increases may have developed because of better awareness of ASD from parents (Wing & Potter, 2002). Thus, increasing the likelihood their child would be assessed. The epicentre of this increase is commonly located with improved diagnostic criteria (Matson & Kozlowski, 2011). This evidently contrasts with previous research numbers, suggesting inadequate diagnosis (Leonard et al., 2010).

Interaction with diagnosed individuals with ASD is more frequent now and societal systems must adapt to meet the needs of individuals with ASD. For the lay man and woman, what is their own knowledge base and how do they recruit this information? People tend to rely on non-credible information from the world wide web and social media (Bain, Brown & Jordan, 2009). Due to the limited evidence on the specific aetiology of ASD (Szatmari, 2003) non-credible information sources often report pseudoscientific interventions which may lead to misguided support of these interventions and confuse people (Bain et al., 2009). This provides an opportunity for lay beliefs to fester leading to potential strengthening of previous negative attitudes (Gray, 1995).

This may occur via the availability heuristic—a mental shortcut that bases judgments on immediate information and knowledge that comes to a person's mind when evaluating a

topic—rather than search for alternative information (Tversky & Kahneman, 1974). Due to individual's reliance on information from the internet surrounding ASD, it is likely this information would be retrieved with ease. This is important because information that is easier to retrieve has a stronger effect on attitude formation in favour of this information (Rothman, & Schwarz, 1998; Wanke, Schwarz, & Bless, 1995). Thus, negative information retrieval surrounding ASD may potentially strengthen negative attitude development. Moreover, what people think they know is a very important aspect influencing attitudes because it may shape the type of interactions they have with individuals with ASD (Ferguson & Bargh, 2004; Gillespie-Lynch, Brooks & Someki, 2015).

Similarly, how informed society is on disabilities is vital due to the power of stigma and its internalizing properties for individuals with disabilities. Stigma readily affects individuals with disabilities leading to decreased self-esteem and demoralization (Corrigan et al., 2003). Continuous research is necessary for a comprehensive analysis on the prejudice facing these individuals to decrease negative attitudes and the harmful effects that result from stigma. Employers reported perceiving people with disabilities as unable to work and less skilled (Fraser et. al., 2010). These perceptions sustain the negative stream of stigma. Considering this, the way in which people react and intervene to challenging behaviour from individuals with disabilities can have strong consequences on the reduction of this behaviour (Williams & Rose, 2007).

Levels of empathy are also important in guiding people's behaviour (Eisenberg & Miller, 1987). Empathy is a crucial component when considering reactions. Empathy is the ability to comprehend what other people are feeling from their personal view point (Bellet & Maloney, 1991). It involves harvesting reactions to one's own internal states and the ability to discriminate between one's own and others internal states (Tomova, von Dawans, Heinrichs,

Silani & Lamm, 2014). This interaction involves people forming and using existing attitudes. An attitude is a relatively stable group of beliefs or feelings. They impact behavioural habits towards socially important groups, actions, or symbols (Hogg & Vaughan, 2005). Lack of empathy for out-group members—a social group in which individuals do not categorize themselves as belonging (Tajfel, 1969)—is damaging (Hein, Engelmann, Vollberg & Tobler, 2016). Therefore, stretching the ingroup effect of empathy whereby people psychologically identifying as a member of a group and prefer that group which is similar to themselves is important (Tajfel, Billig, Bundy & Flament, 1971).

Capitalizing on empathy may improve negative attitudes towards members of stigmatized or out-groups. For example, by inducing an empathetic state for a recorded interview with a homeless man, attitudes towards this group improved greatly (Batson et al., 1997; Batson, Chang, Orr & Rowland, 2002). Although the studies lacked ecological validity, as empathy can be much more readily controlled in an experimental setting than in a real-world setting, the findings still merit credibility, as two different experimental settings were also used to test their hypotheses. The additional settings provided more reliability, researchers induced empathy for a woman with AIDS and incarcerated murderers. Across all three experiments empathy was manipulated in two conditions. A ‘low’ condition which asked participants to be objective and not think about how the interviewee felt and a ‘high’ condition which asked participants to imagine how the interviewee felt and how the situation affected their life. After each interview ended participants in each condition filled out a measure of empathic feeling, consisting of various adjectives describing emotional states. They were then asked to rate from 1 – *not at all*, to 7 – *extremely*, how much each emotion was experienced during the interview. Across all three conditions the ‘high’ empathy groups had higher levels of empathy and reported more empathic feelings. Therefore, through the consistent use of the same materials and various settings, reliability was strong. This research

demonstrated a powerful tool to reduce bias and encourage people to draw on more helpful behavior towards individuals, whether they are liked or not. Implications for this research may point towards the need for deeper engagement with emotional empathy.

To increase empathy within student populations it may be beneficial to look at possible interventions. Empathy for members of an outgroup increased after individuals experienced help from a member of that outgroup (Hein et al., 2016). This showed a possible learning mechanism that may be applied anywhere and can change outgroup empathy effect. This potentially is an inexpensive method to achieve a wider ingroup effect towards individuals with ASD thus reducing prejudice (Konrath & Grynberg, 2013). Very little research exists surrounding empathy towards ASD and even fewer studies exist on the topic of empathy, students and ASD. However, Barr (2013) showed student empathy levels were an important factor in the shaping of attitudes towards such individuals. Students with higher levels of empathy reported elevated positive attitudes. Females also scored higher on self-reported empathy than males on emotional concern and perspective taking. This study points towards the need for more empathy related attitude research. This interpersonal quality appears to heavily influence attitude formation within the student population towards individuals with disabilities.

Likewise, nursing college students who engaged in disability empathy activities for example students using a wheelchair on a playground, had significantly higher scores than a control on the Attitudes Towards Disabled Person Scale (ATDP) with higher scores indicating more positive attitudes (Geçkil, Kaleci, Cingil & Hisar, 2017). Although this study was a pilot study with 116 participants, it was conclusive with a 6 month follow up reflecting the same results. This research strengthens the importance of empathy in the formation of attitudes specifically towards individuals with disabilities.

Similar results have been reported, Pettigrew and Tropp (2008) found intergroup contact (individuals from different social groups interact and enter one another's social world) reduced prejudice this effect was revealed through the 3 most researched mediators: knowledge, anxiety, empathy and perspective taking. They found contact reduced prejudice due to 3 reoccurring factors: 1) strengthening knowledge about the group, (2) decreasing anxiety surrounding intergroup contact, and (3) increasing empathy. By increasing intergroup contact, the ability to comprehend and empathize with other people's concerns was likely to develop intergroup attitudes. Both anxiety reduction and empathy enhancement had the strongest effects. In relation to attitudes, Matthews and Goldberg (2015) found that while participants displayed positive behavioural and cognitive attitudes, participants did display negative affective attitudes towards individuals with ASD. It is feasible that to have a positive affective attitude towards an individual with ASD, one must have high levels of empathy.

Numerous results have been gathered through self-report studies in validation of gender differences in empathy research, women appear to have higher levels of empathy than men (de Corte et al., 2007; Eisenberg & Lennon, 1983; Rueckert, Branch & Doan, 2011; Toussaint & Webb, 2005). Rueckert and colleagues (2011) reported significant gender differences across empathy. This study evaluated empathy via self-report scores next to emotional reactivity scores. Their findings suggested self-reported empathy differences may be due to emotional responsiveness differences. This suggestion may be because females scored higher across emotional empathy and females levels of empathy are more readily affected by the relationship they have with people. Likewise, females revealed significantly scoring 3 times higher than males on a measure considered highly empathetic across a general population sample (Baron-Cohen & Wheelwright, 2004). This study involved a new functionable measure of empathy in that it used 'filler' questions to distract the participant from empathy concentration. This helped reduce the likelihood of bias. Women presented

higher levels of empathic concern than men in a study using the Interpersonal Reactivity Index (Davis, 1980) to investigate empathy and age-related differences (O'Brien, Konrath, Grühn & Hagen, 2013). However, researchers acknowledged that these gender differences may have resulted from incentive differences such as the importance of self-concept rather than from differences in empathic ability (Cross & Madson, 1997).

Gender disparities across empathy and knowledge are equally important. Cross and Madson (1997) showed women valued interpersonal abilities like empathy as more important to their self-concept than men. Women were also more successful than men on the comprehension of how another individual felt (Klein & Hodges, 1998; Klein & Hodges, 1999). Thus, females may generate more empathic effort due motivational differences (Klein & Hodges, 2001). This could potentially impact interactions when faced with individuals in need of greater understanding, such as individuals with ASD. Although it is important to consider gender orientation, as people with high femininity regardless of gender showed greater empathy levels (Karniol, Gabay, Ochion & Harari, 1998). Miller (2010) still indicated differences in empathetic levels in men and women may explain the discrepancies found on their ATDP scores, as women scored higher than men.

Gender differences on knowledge are also important because males tend to show lower rates of knowledge on ASD in comparison to women, this appears to affect their view on the capabilities individuals with ASD can achieve (Alsehem, Abousaadah, Sairafi & Jan, 2017). Males were more likely to think of ASD as mental retardation while women thought individuals with ASD could be employable. This may be a result of women's predominance in jobs with higher level of exposure to ASD such as nursing (Nursing and Midwifery Council [NMC], 2016) and teaching (Ingersoll, Merrill & Stuckey, 2014). Women also make up 11.3% of general disability carer positions versus men 8.3% (Dahlberg, Demack &

Bambra, 2007). Do women simply appear to be more empathetic than men in general and more informative on ASD (Hansen, 2015) and are males in healthcare wrongfully thought of as less compassionate (W. J. Bartfay, E. Bartfay, Clow & Wu, 2010)? Such beliefs could cause males to be less likely to start careers in this area.

Research indicated individuals with disabilities notice and comprehend negative social attitudes and negative bias (Abbott & McConkey, 2006; Antonak & Livneh, 2000). This can leave individuals with a sense of frustration and negative self-concept (Jahoda & Markova, 2004). As such, observing the levels of empathy and attitudes of students who in the future may be in consistent contact with individuals with disabilities is necessary. Previous work noted an effective link between education and empathy, such that individuals with educational achievements above the level of a bachelor's degree display higher levels of empathy compared to individuals with a bachelor's degree or lower level qualifications (Grühn, Rebucal, Diehl, Lumley & Labouvie-Vief, 2009). Therefore, people who remain in higher education for longer possibly develop skills which result in an increase of empathy and may improve quality interaction with disabled individuals.

Liu and colleagues (2016) found 83% of professionals among a Chinese population displayed inaccurate responses to over half of the items assessing knowledge of ASD. This figure may result as none of the participants had achieved an academic masters. Therefore, they may be insufficiently informed this supports previous research highlighting the importance of education attainment (Grühn et al., 2009). Thus, undergraduate students wishing to pursue a career working with individuals with disabilities including ASD may want to consider extra training. By engaging with work related validated training packages aimed at people interacting with individuals with ASD, it may minimise bias and increase more positive attitudes (Tait & Purdie, 2000). One such package has been found to

statistically increase empathy and positive attitudes towards individuals with ASD for employees such as support workers or those in managerial roles (Hutchinson et al., 2014). It provided specific knowledge material aimed to educate on ASD. Women scored significantly higher on empathy than men. This may be an idea for the requests and suggestions in previous research for training of students, as the influence of empathy on attitude formation towards disabilities is strong (Barr, 2013).

More individuals with an ASD diagnosis are starting to join the college education system (Gardiner & Iarocci, 2013; Seltzer et al. 2003; Van Bergeijk, Klin & Volkmar, 2008). Overall, individuals typically display positive attitudes towards individuals with disabilities except for attitudes towards social interaction with individuals with disabilities (Goreczny, Bender, Caruso & Feinstein, 2011). Positive peer attitudes were revealed as a moderator for social interaction success (Nevill & White, 2011). This has huge implications for objectives such as going to college. Thus, lack of knowledge and understanding on ASD within the college population may withhold this critical socialisation.

Generally, the literature regarding attitudes towards developmental disabilities is sparse. The research primarily focuses on intellectual disabilities. Barr and Bracchitta (2008) measured student scores across Scale of Attitudes toward Disabled Persons (SADP; Antonak, 1982). This scale measured 3 concepts, optimism (positive/optimistic views of disabilities), misconceptions (common misconceptions in relation to the behaviour of disabled individuals) and hopelessness (attitudes around the educability, maturity, and morality for individuals with disabilities). This study showed, student scores on the measures hopelessness and misconceptions correlated negatively with contact to developmental disabilities. Scores on measures of optimism and contact were positively related, which suggests that frequent contact may reduce negative attitudes. Students had higher positive attitudes towards physical

disabilities over developmental. Yet, this research is correlational and as such no cause-effect relationship can be drawn. Notwithstanding, this research points towards a need for future integration of all disabilities within undergraduate degrees where interaction is possible.

Likewise, Matthews and Goldberg (2015) investigated attitudes in college students through the presentation of vignettes representing an individual student with characteristics matching that of an ASD individual. Students were either told the person had ASD or was a 'normal' student. People responded with higher positivity across cognitive and behavioural attitudes but not affective when the label was known. Similarly, labels attached to ASD provoked greater understanding and certain prosocial behaviour (Brosnan & Mills, 2016; Butler & Gillis, 2011). This suggests that when an individual is unaware that another person has ASD, it is the irregular behaviours associated with ASD that provoke negative attitudes. Thus, being informed of an ASD diagnosis may formulate more positive attitudes towards college peers with ASD (Nevill & White, 2011). Moreover, students reported backing people with ASD obtaining independence through college and marriage after a pre-and post-online training intervention (Gillespie-Lynch et al., 2015). Students attitude change was relatively low and still reported common misconceptions, for example confusing ASD with another disorder. Despite the misconceptions and poor attitude change, this study observed increases in general knowledge and a decrease in stigma. Thus, given that quality of contact matters (Keith, Bennetto & Rogge, 2015), it may be beneficial to contrast a contact-based intervention for knowledge improvement with an online training intervention as seen in Gillespie-Lynch and colleagues (2015).

Students with ASD are reported as having problems creating new social bonds during third level education (Orsmond, Shattuck, Cooper, Sterzing & Anderson, 2013). Gardiner and Iarocci (2013) were interested in what factors influenced the acceptance of ASD within a

college cohort and setting. They found greater contact and more positive interactions resulted in higher levels of peer acceptance for an individual with ASD. Positive experiential contact may play a significant role in positive attitude formation leading to positive behavioural changes in comparison to interventions providing paper based factual knowledge on ASD. In another recent study, individuals displayed higher levels of negative attitudes towards, and least contact with, individuals with developmental disabilities as compared to individuals with behavioural and physical disabilities (Barr & Bracchitta, 2015). Contact powerfully influenced attitudes, as contact escalated positive attitudes followed within each category of disability. Thus, this research fulfils the idea that greater contact is needed to increase the knowledge and attitudes towards the developmental disability population.

Many of the above studies and others analysed attitudes through explicit measures therefore only observing explicit attitudes. Explicit attitudes refer to attitudes at a conscious level where individuals have active control over verbal opinions and behaviours (Fazio, Sanbonmatsu, Powell & Kardes, 1986). Thus, explicit scales are useful for measuring deliberate and controlled behaviour (Frieze, Hofmann & Wanke, 2008). Adults were presented with vignettes based on an ASD, attention deficit hyperactivity disorder and a typically developing child (Harnum, Duffy & Ferguson, 2007). Positive attitudes were seen across all three, however when diagnosis labels were unavailable individuals with ASD received the 'unlike me' response more. Thus, suggesting a bias for normal developing children over ASD.

Similarly, Nevill and White (2011) used a set of vignettes depicting an individual with ASD followed by a 7-statement openness to ASD survey to assess an undergraduate population's attitude towards ASD. Students reported positive attitudes towards the ASD adult population using an explicit measure however this study did not measure empathy,

knowledge nor the type of contact engaged with individuals with ASD. This type of measurement is not suitable when researchers are interested in socially sensitive topics and the opinions around them. Attitudes that are private or consciously inaccessible are harder to access using an explicit measure (Gawronski & De Houwer, 2014). Thus, explicit measures do have various issues such as bias and social desirability, i.e. responding inaccurately to please others (Fisher, 1993). This occurs when participants become aware of their attitudes being measured and report deliberate attitudes instead (Antonak & Livneh, 2000).

Deal (2006) inspected the attitudes of people with and without disabilities towards disabilities in society. Both groups held similar positive attitudes. Yet, when researchers examined a subtle prejudiced subscale in comparison to a blatant subscale on the same General Attitude Scale Toward Disabled People, more negative attitudes were found in both groups. This indicated that explicit measures allow for deliberate and calculated responses to social norms when considering disability groups.

Furthermore, an explicit study evaluated the level of inclusiveness society held towards those with ASD. This study observed knowledge, attitudes and behaviours towards this cohort. Results indicated an overall positive attitude within this group of participants towards working with, and living with, adults with ASD (Dillenburger, McKerr, Jordan, Devine & Keenan, 2015). Again, due to the explicit nature of this study it is possible these results were affected by social desirability. Thus, there is uncertainty surrounding the representation of adult's attitudes towards ASD. From the current evidence, explicit measures have the tendency to fail to draw on the psychological gaps, where information is introspectively unreachable or outside the boundaries of conscious awareness (Gawronski, & De Houwer, 2014). Hence, it appears the inclusion of explicit measures in the current study

may only misguide findings. Thus, it proposed an exclusion of such measures for accurate attitude research.

In order to bypass explicit limitations and gauge people's 'true' attitudes, lots of work has focused on implicit attitudes (IA). IA focus heavily on the autonomous aspects of behaviour, such as non-verbal behaviour, eye contact and body language. IA also refer to unconscious preferences/prejudice which are usually subtle, reflexive and uncontrollable (Sabin, Nosek, Greenwald & Rivara, 2009). Implicit measures are therefore thought to be less susceptible to socially desirable responses (Gawronski et al., 2007). IA are of high importance to study as they reflect experience and whether people agree with their experience or adopt new explicit evaluations (Wilson, Lindsey & Schooler, 2000). Therefore, IA are consistently built upon and are habitual attitudes towards something while explicit attitudes reflect change and constructed attitudes. Moreover, they affect split decision making which affects how another individual internalises the result of that decision (Cooper, et al 2012; Sabin & Greenwald, 2012).

Explicit measures revealed that participants considered people with disabilities as warm but less competent (Rohmer & Louvet, 2012). This data was collected from part 1 of one study with the same groups of participants. Part 2 of the study compared implicit and explicit measures, participants reported scores did not change on explicit measures. However, an implicit measure revealed negative IA towards individuals with disabilities, perceiving individuals as less warm and competent. No relationship existed between implicit and explicit scores, and the absence of this relationship is usually explained through the self-report measures susceptibility of social desirability (Carlsson & Björklund, 2010; Dovidio, Kawakami, C. Johnson, B. Johnson & Howard, 1997). Keith and colleagues (2015) reported higher levels of quality contact, rewarding or intimate relationships with individuals

predicted lower levels of prejudice towards people with disabilities at an explicit and implicit level. This research is significant as the type of interactions people have with intellectual and developmental disabilities matter more over quantity of time spent with individuals for both implicit and explicit.

In relation to ASD little research exists specifically on IA towards this population. Barnes-Holmes and colleagues (2006) found implicit measures revealed significant negative attitudes towards individuals with ASD. This result came equally from both unexperienced and experienced teaching staff, indicating more positive attitudes for normal developing children. While across explicit measures results showed more experience with ASD, noted through demographics, uncovered more positive attitudes towards individuals with ASD. This demonstrated the fickleness and ease at which participants could display socially favourable attitudes. Other research surrounding explicit measures and people's attitudes towards disabilities also noted significant differences on demographic variables such as gender and education (Hergenrather & Rhodes, 2007; Yazbeck, McVilly & Parmenter, 2004). Yet no differences were found among these variables and others on implicit measures (Wilson & Scior, 2015).

Studying attitudes is key for future amalgamation of people with disabilities (Wong, Chan, Cardoso, Lam & Miller, 2004). While explicit attitudes influence verbal experiences and conscious decisions (Greenwald, Poehlman, Uhlmann & Banaji, 2009) behaviours generated from IA attitudes are rarely consciously predictable. Unpredictable behaviour may cause setbacks in situations where confident interactions for stabilised relationships is imperative (Dovidio, Kawakami & Gaertner, 2002). Remaining negative IA in society may cause individuals with disabilities to suffer the brunt of negative encounters (Wilson & Scior, 2015). Therefore, the development of interventions which can prevent the segregation,

avoidance and discrimination of individuals with disabilities is essential (Antonak & Livneh, 2000).

There are many ways to assess IA for example the Extrinsic Affective Simon Test (EAST; DeHower, 2003) and the Go/No-Go Association Task (GNAT; Nosek & Banaji, 2001). Kelly and Barnes-Holmes (2013) investigated differences in IA towards children with or without ASD between teachers trained in applied behavioural analysis and mainstream teachers. IA were examined using the Implicit Relational Assessment Procedure (IRAP) (D. Barnes-Holmes, Y. Barnes-Holmes, Stewart & Boles, 2010). The IRAP presents two stimuli together on a computer screen for example, *apricots* and *tasty*. Participants must choose between two-word options to categorise the pairing of stimuli for example *similar* or *different*. Participants must match the predetermined choice for example if *apricot and tasty* is consistent with *similar* participants will pass to the next trial if not, they will see an 'x' on screen.

The IRAP is based on the prepositional relation rather than association of stimuli. This distinction is important and arises as a result of relational frame theory (Hayes, Barnes-Holmes & Roche, 2001). This means assessing how objects relate to each other through similarities and dynamics as opposed to just associations between objects with no explanation. The participants reaction times are then assessed. The shorter the reaction time, the stronger the relational task reflects their beliefs. Both groups demonstrated positive IA towards normally developing children but a negative IA towards children with ASD, although the significance of the negative IA finding was weak. These findings are in support of Barnes-Holmes and colleagues (2006) who found similar negative IA results using the IRAP. However, this finding differs to previous results which indicate positive attitude formation towards ASD adults (Harnum et al., 2007; Nevill & White, 2011).

Although the IRAP is a new and promising research instrument, the research surrounding IA is not without its own limitations. The IRAP has strong validity (D. Barnes-Holmes, Waldron, Stewart & Y. Barnes-Holmes, 2009) but it requires participants to meet specific standards before commencing the test. For example, individuals need to achieve an 80% correct response rate and a response time under 3000 milliseconds on practice trials. This is disadvantageous as researchers are limiting the sample number which inhibits the power of the study. Therefore, harbouring the generalisability.

The Implicit association test (IAT) (Greenwald, McGhee & Schwartz, 1998) is another measure known as the 'gold standard' for IA, it is based on reaction times relative to associations between pairs of ideas and does not pose this requirement. For example, 16 out of 55 participants (29%) did not meet the data inclusion standards needed for participation on the IRAP (Chan, D. Barnes-Holmes, Y. Barnes-Holmes & Stewart, 2009), in comparison to 13 out of 76 participants (17%) on IAT standards. Thus, it appears people find the IAT easier to complete while the IRAP more difficult. Similarly, although the IRAP performs more reliably than most implicit measures, it is not more reliable than the IAT (Golijani-Moghaddam, Hart & Dawson, 2013). The IRAP was also used with different stimuli assemblies on similar topics (Maroto Expósito, Hernández López & Rodríguez Valverd, 2015; Roddy, Stewart & Barnes-Holmes, 2011). This may restrict research regularity, in contrast to the IAT where similar terms are reused on parallel topics. Thus, establishing extra support for its reliability (Golijani-Moghaddam et al., 2013). This measure has been recognised for its stable reliability and flexibility to a range of fields (Carels et al, 2013; Greenwald, Banaji & Nosek, 2003).

The consensus behind this test is that general measures surrounding explicit attitudes are typically introspective (Fazio & Olson, 2003). Explicit attitude measures can be altered

by the participant through faking and social desirability (Fisher, 1993). Research has shown the IAT is not susceptible to forgery or faking (Banse, Seise & Zerbis, 2001). Participants awareness that they are completing a stereotype test beforehand does not appear to apply an order effect, that is, no effect is shown on IA or explicit attitudes if the IAT follows or precedes an explicit test (Nosek, Greenwald & Banaji, 2005). Researchers presumed this was because individuals were aware of their attitudes being measured. Yet, Noeske and Smyth (2004) demonstrated this result when participants were not presented with foreknowledge on the attitude test. Furthermore, an IAT's magnitude of effect is not impacted by labelling bias (De Houwer, 2001).

Additionally, when considering the numbers of stimuli relevant for significant research, Greenwald and colleagues (1998) acknowledged using five stimuli or twenty-five does not have significant impact on the studies effect or reliability. Nosek and colleagues (2005) reported only when stimuli were reduced to one item, a slight variation in magnitude effects appeared. The research team acknowledged this result may arise from the likelihood of participants learning the categories based on recognition (for example by only using ASD and Normal developing to represent the named categories, people may learn based on the recognition of autism starting with A and normal starting with N). Therefore, people are associating them based on the learned features of the stimuli rather than the semantics. Increasing the number of stimuli may assist accurate result representation. However, over use of stimuli may encourage the use of random images/words that are not truly attached to the concepts (Govan & Williams, 2004; Mitchell, Nosek & Banaji, 2003). It is concluded that fewer but representative stimuli are advantageous when considering validity within an IAT.

Considering this, implicit measures are arguably stronger and more valid predictors of behaviour. The IAT unveils communal behaviour by showing improved predicative validity

on socially sensitive topics (Greenwald, Poehlman, Uhlman & Banaji, 2009). Chen, Ma and Zhang (2011) found although positive attitudes existed towards disabilities on an explicit measure. The IAT showed more negative attitude formation from a group of undergraduates. Similar results were found through an IAT assessment of undergraduates with specific disability training, who displayed more negative IA's towards people with disabilities (Hein, Grumm & Fingerle, 2011). Reaction times were quicker with 'disabled & unpleasant' versus 'disabled & pleasant'. Like Rohmer and Louvet (2012), this study only reflected a mild association between implicit and explicit scoring. As research in this area develops it is hopeful that behaviour will be classified according to implicit or explicit attitudes. This may lead to alternative ways in changing negative attitudes towards disabilities (Hein, et al., 2011).

The current research aims to investigate IA towards ASD and gender differences across empathy within a college cohort. This research is adding to the sparse evidence within this population and their IA towards ASD (Wilson & Scior, 2015). Due to the discussed evidence suggesting empathy can affect people's prejudice levels towards stigmatised groups. This element is important to include because it may play a strong role in how we approach individuals with ASD. Also, distinguishing gender differences is important as to add to the inconclusive but strong research which suggests women do have higher levels of empathy. Similarly, research pointed towards the increase in positive attitudes towards individuals with disabilities as contact frequency is increased. However, due to the lack of investigation within a college population on this subject it will be investigated within this study. Based on this the following hypotheses were concluded:

1. Males and females will differ on levels of empathy, females will have significantly higher scores on empathy.

2. Higher scores on empathy will significantly associate with more positive IA towards ASD.
3. Females will have significantly higher scores than males on knowledge of ASD.
4. Higher scores on knowledge of ASD will significantly associate with more positive IA towards ASD.
5. Higher levels of frequency of contact will significantly associate with more positive IA towards ASD.

Methods

Participants

The current research used a non-probability convenience sampling technique and the target sample was college students, with any class of undergraduate degree permitted to take part. Recruitment commenced by approaching 62 college students face to face in the college environment. A total of 56 college undergraduates agreed to participate in the study. 53 participants completed the study, three individuals were excluded, one based on inclusion criteria and two based extreme scores. The sample consisted 26 males and 27 females over 18 years. All data collected were anonymous. Participation in the study was voluntary.

Materials

An information sheet informing participants on the aims of the study, their rights and confidentiality and an informed consent sheet outlining willingness to participate was supplied. A debriefing form with information on the background to the study and possible contacts for any concerns alongside a sheet with support group contact information was also supplied.

Measures used in the current study included a demographic survey, an autism awareness scale, an empathy questionnaire and an IAT. The IAT was derived from downloaded software. The psychological test battery ([2018-01] PEBL Version 2.0 (Final)). Participants were asked to indicate their gender, knowledge of someone with ASD (yes/no), the frequency of contact with ASD individuals (always/often/sometimes/rarely/never) and the nature of the contact (voluntary/involuntary/not applicable).

Autism awareness scale (AAS; Stone, 1987; Gillespie-Lynch et al., 2015). The current scale holds a modest score of 3 on psychometric ratings. It builds upon previously accredited scales and is based on one of the most used measures to assess ASD knowledge,

the autism knowledge survey (AKS; Stone, 1987). The AKS includes a range of ASD related statements rated on agreement through a Likert-style scale (1: strongly disagree, disagree, neither agree nor disagree, agree and 5: strongly agree). Campbell, Reichle and Van Bourgondien, (1996) reviewed it as robust and unidimensional. Through the removal of three rouge items, the scale improved showing higher internal consistency, ($\alpha = 0.74$) it also showed validity when individuals occupation and years of contact were accounted for. Higher levels across occupation and years of contact lead to higher scores across the measure. Thus, confirming reasonable stability. The current studies version of the AKS is now named The Autism Awareness Scale (AAS) with three added items replacing open end questions determined a ‘nuisance’ causing validity issues (Gillespie-Lynch et al., 2015). It has shown low to moderate internal consistency ($\alpha = 0.50 - 0.62$) (Gillespie-Lynch et al., 2015; Obeid, Daou & DeNigris, 2015). It was adapted to most recent definition of ASD according to the Diagnostic and Statistical Manual of Mental Disorders–5th edition (APA, 2013). Furthermore, recent studies evaluated college student’s knowledge of ASD across different settings with the AAS. The adaption gathered information across interventions intended to reduce stigma around ASD (Obeid, Daou & DeNigris, 2015; Tipton & Blacher, 2014). Items on this scale are scored on a 5-point scale according to their rate of accuracy (from -2 to 2). These scores are added together to produce a fused ASD knowledge score. Items 2,3,5,7,9,11,12 are reversed scored. Higher scores suggest greater knowledge about ASD.

The Toronto empathy questionnaire (TEQ; Spreng, McKinnon, Mar, & Levine, 2009). This measure was developed upon 11 previous measures related to empathy. Factors were forced to load onto one single variable each. This resulted in a 16-item measure concentrated on affective empathy (Spreng, McKinnon, Mar, & Levine, 2009). Items 1 and 4 target the perception of an affective state in another that arouses the same emotion in oneself. Item 8 targets emotional comprehension in others. Item 13 acknowledges the occurrence of

behaviours involving higher-order empathic responding, for example pro-social helping behaviours. Sympathetic physiological arousal is assessed through items 3, 6, 9 and 11. Items 5, 14 and 16 pursue altruism. Other items (2, 7, 10, 12, 15) target the same concept but through an expression of this sensitivity across behaviours from perception of emotional state to sympathetic physiological arousal. The original scale holds a strong Cronbach's $\alpha = .85$ it consistently demonstrated this across other studies $\alpha = .87$ $\alpha = .73-.79$ (Spreng, et al., 2009; Totan, Doğan, & Sapmaz, 2012). Like the current study this measure was tested among the undergraduate population. The scale uses a 5-point Likert answering style (1: never, rarely sometimes, often, 5: always), eight items are reversed scored (2, 4, 7, 10, 11, 12, 14, 15), reflecting the frequency of situational lack of interest towards another person. Higher scores are indicative of higher levels of empathy.

The Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998). The IAT is a computer task based on reaction times relative to associations between pairs of ideas. The concept is a behavioural response (key press) will be faster to ideas that are concomitant with each other or in memory (Greenwald, McGhee & Schwartz, 1998; Lane, Banaji, Nosek & Greenwald, 2007). The IAT's reliability and validity is complex in that there are usually different stimuli to each IAT. Therefore, generalizability of findings from the multiple designs producing consistent effects still does not indicate a single IAT is a good measure of a single target subject (Lane, Banaji, Nosek & Greenwald, 2007). However, research showed the IAT has reasonable internal consistency ($\alpha = 0.78$) (Cunningham, Preacher, & Banaji, 2001). Likewise, a meta-analysis with 50 studies revealed an averaged internal consistency for the IAT of $\alpha = .79$. (Hofmann, Gawronski, Gschwender, Le, & Schmitt, 2005). Furthermore, the IAT's validity is obscure, Lane and colleagues (2007) suggest it should dictate similar constructs associating together while discrete concepts should not. This was found with implicit bias towards certain stigmatised groups converging onto a single variable

as predicted (Cunningham, Nezlek, & Banaji 2004). This study also noted unrelated target concepts using an IAT did not load onto the same factor.

The current IAT is broken down into seven different blocks of words on screen. It contains four sets of stimuli relevant to the content domains of assessment and attributes. Within this study the content domain was Autism spectrum disorder and Normal developing. Blocks 3, 4, 6 and 7, reflecting the most important stages due to measurement of response latency (Nosek, Greenwald & Banaji, 2005). Blocks 3 and 4 are the same and blocks 6 and 7 are the same.

The attribute dimensions (block 1).

Participants are required to sort words from two opposing attribute dimensions using two different keys.

Bad assigned to key 1

Good assigned to key 2

Items in the middle of the screen are words associated with good or bad.

Bad: Sad, Bad, Difficult, Angry, Negative, Unpleasant.

Good: Happy, Good, Easy, Calm, Positive, Pleasant.

The concept dimensions (block 2).

Participants are required perform the same task with the same keys but the items are now representing two opposing target concepts.

Autism spectrum disorder assigned to key 1.

Normal developing assigned to key 2.

Items in the middle of screen are words describing either autism spectrum disorder or normal developing.

Autism spectrum disorder: Autism, autistic, ASD, Asperger's, Autistic spectrum, autistic disorder.

Normal developing: Typically developing, normal development, normal, regular, ordinary, mainstream.

Concept-attribute matching (block 3 and 4).

Here both sorting task are combined, participants identify both autism spectrum disorder and normal developing words alongside words to Good or Bad. One key is assigned to both target concept and attribute concept.

Autism spectrum disorder AND Bad key 1.

Normal developing AND Good key 2.

In the middle is a mix of autism spectrum disorder /normal developing words and good/bad terms.

Switching the spatial location of concepts (block 5).

Participants are informed the normal developing group and autism spectrum group have been switched corners on the screen. Therefore, key 1 is now normal developing and key 2 is now autism spectrum disorder. Items (normal developing and autism spectrum disorder words) are sorted again to the target groups.

Concept-attribute matching (block 6 and 7).

Both sorting tasks are combined once again, respondents identify both autism spectrum disorder and normal developing words alongside Good and Bad words. One key is

assigned to target concept and attribute concept. However, target concepts are still in switched positions. Resulting in,

Autism spectrum disorder AND Good key 1.

Normal developing AND Bad key 2.

In the middle is a mix of good/bad items and autism spectrum disorder/normal developing items.

Design

The design for the current study is a mixed between-within design. Independent variables are gender, knowledge of someone with ASD, type of contact, frequency of contact empathy levels and knowledge of ASD. Dependent variables are IA. The within participant analysis consisted of correlational analysis to determine relationships between knowledge, contact, empathy and IAs. The between participants analysis was a gender comparison on empathy and knowledge. Ethical approval was obtained from the Departmental Ethics Committee at the National College of Ireland.

Statistical analysis

Descriptive statistics were carried out with non-parametric measures of central tendency (median) and variability (range) for the AAS. While measures of central tendency (means 95% confidence intervals and median), measures of variability (SD, standard error and range) were carried out for the TEQ, IAT scores and frequency of contact. This was also applied to categorical data (type of contact, sex, and knowledge of someone with ASD). Alongside normality, outliers, and extreme scores. The current study's inferential statistical analysis is broken down in three parts. The study used an independent samples t-test for hypotheses 1 (for TEQ) and a non-parametric independent samples t-test Mann Whitney U

test for hypotheses 3 (for AAS). Alongside a split file procedure to assess the gender differences on IBM SPSS Statistics 21.0 and turned it off following the tests.

The study used 3 types of correlations with IAT scores. A Pearson product moment correlation for TEQ, a Kendall's tau-b correlation for AAS and a Spearman's rho correlation with the ordinal data, how often does one have contact. Spearman's rho correlations work better with ordinal data (Pagano, 2009) while Kendalls Tau-b works well with small samples and vales where the same score for individuals is common (Field, 2013).

Procedure

College students were approached at lunch times, after lectures and before lectures. Participants were invited to take part in the current study verbally, each participant was presented with an online information sheet and consented online via researcher laptop on Google Forms before participation. Participants were then presented with the online questionnaire followed by an IAT. The demographic questionnaire was presented first followed by the AAS and the TEQ. All three questionnaires took approximately nine minutes to complete. One participant was chosen at a time as the IAT was only based on the researcher's laptop. All instructions were presented on the computer screen. The participant's responses were automatically stored in a file. The IAT took approximately six minutes to finish. The researcher was present for all elements of the study. Participants were offered voluntary debriefing print outs following the study. It outlined the specific aims and objectives and thanked the participants for their cooperation. It also outlined again if they wished to withdraw their data within the study, it was completely acceptable at this end point. Data was then inputted into IBM SPSS Statistics 21.0 and appropriate items were reversed coded. For all scales the average score across items was computed for all participants. IAT D scores were computed on each participant excel file according to Greenwald and colleagues

(2003) scoring algorithms. First the mean latency was calculated for correct responses within blocks 3, 6, 7 and 4. 600ms (an error penalty) was then added to this mean, this new figure replaced all incorrect responses within this block. All scores from each block were again computed to form a new mean. Scores were excluded from this process if they were under 300ms or over 10,000ms. The new means from blocks 6 and 3 and blocks 7 and 4 were then subtracted from each other. Scores from block 3 and 6 excluding means were then pooled together to form a combined standard deviation score. The same procedure was completed with blocks 7 and 4. The difference between the blocks was divided by the combined standard deviation for those blocks to create a D score. D scores were then averaged to create an IAT score for each individual, scores were eliminated if they were over plus 2 or under minus 2. These scores were then inputted into IBM SPSS Statistics 21.0, a positive score indicates a negative IA towards individuals with ASD as derived from an implicit preference for ASD and Bad on the IAT. While a negative score indicates a positive IA towards individuals with ASD as derived from an implicit preference for ASD and Good. A score of zero indicates no preference.

Results

Descriptive statistics for each of the measured continuous variables in the current study are presented in Table 1 with gender divisions on the TEQ and AAS. No missing data was reported. 35 individuals reported knowing someone with ASD. Data revealed 20 individuals rarely had contact with individuals with ASD, 12 often had contact, 10 never had contact, 9 sometimes had contact and only 2 individuals always had contact. Most individuals revealed this contact to be voluntary ($n = 23$), only 10 individuals reported never having contact with individuals with ASD but 16 reported their contact as not applicable.

Preliminary analysis indicated ASD knowledge did not approximate normality. IAT scores did meet normality with a positive skew. The TEQ had 2 extreme outliers, for the purpose of this study these outliers were removed as they were abnormally skewing the data revealing a confounding, non-representative result. The removal of these left the data normally distributed with a negative skew. Mean empathy and knowledge of ASD scores were moderate to high and IAT scores were high. However, the relatively large standard deviation around empathy suggests a good deal of variability around this figure. In the current study the Cronbach alpha coefficient for the TEQ was .86 reflecting strong reliability. While the Cronbach alpha for the AAS was .51 depicting moderate reliability in support of previous research (Gillespie-Lynch et al., 2015; Obeid et al., 2015).

Table 1. Descriptive statistics of all continuous variables (n = 53)

| | Mean (95% Confidence Intervals) | Std. Error Mean | Median | SD | Range |
|---------------|------------------------------------|--------------------|--------|------|-----------|
| Empathy | 63 (60.82 – 65.18) | 1.09 | 64 | 7.91 | 43-76 |
| Males | 62.31 | 1.42 | 63 | 7.23 | 44-76 |
| Females | 63.67 | 1.66 | 67 | 8.61 | 42-76 |
| IAT | .79 (.68 – .91) | .06 | .78 | .41 | .04 -1.88 |
| ASD knowledge | | | 51 | | 41-58 |
| Males | | | 51 | | 41-58 |
| Females | | | 51 | | 42-57 |

An independent samples t-test was conducted to compare TEQ scores between males and females. There was no significant difference in scores between males ($M = 62.31$, $SD = 7.23$) and females ($M = 63.67$, $SD = 8.61$; $t(50.09) = -.621$, $p = .54$, two-tailed). The magnitude of the difference in the means (mean difference = - 1.36 95% CI : -5.75 to 3.03) was very small (Cohen's $d = .2$). The relationship between TEQ scores and IAT scores was investigated using a Pearsons product moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions, normality, homoscedasticity and linearity. There was a very small negative correlation $r = -.05$, $n = 53$, $p = .74$ between the two variables with high scores on the IAT associated with lower levels of empathy.

Differences on levels of knowledge on ASD were compared between males and females using a non-parametric Mann-Whitney U test. This test revealed no significant

difference on levels of knowledge of ASD for females and males, $U = 343.5$ $z = -.134$ $p = .89$ $r = 0.02$.

The relationship between AAS scores and IAT scores was investigated using Kendalls Tau-b correlation. Results indicated there was a small negative correlation between the two variables $\tau_b = -.01$, $n = 53$, $p = .92$. The relationship between frequency of contact and IAT scores was investigated using a Spearmanns rho correlation. Results indicated there was a small positive correlation $\rho = .12$, $n = 53$, $p = .41$ between the two variables with high scores on the IAT associated with less contact.

Discussion

The present study hypothesised more positive IA towards individuals with ASD would associate significantly with higher scores on; empathy, ASD knowledge and higher levels of frequency of contact. It was also predicted that females would score higher than males both on empathy and ASD knowledge. The results demonstrated females were not observed scoring higher than males on either empathy or ASD knowledge. Similarly, although the direction of the relationships mirrored the hypothesis, none were statistically significant.

The current study found unexpected findings on empathy and gender differences which are not reflected in the self-report literature (De Corte et al., 2007; Eisenberg & Lennon, 1983; Rueckert, Branch & Doan, 2011; Toussaint & Webb, 2005). Despite this lack of corroboration, the findings are to be welcomed as they oppose the static male stereotype, embracing males and females as alike (Bartfay et al., 2010; Smith & Dundes, 2008). The current study evaluated existing undergraduate students and this cohort may represent a change in trends. However, this supposition is highly speculative as many studies demonstrated self-reported differences in male and female empathy levels as well as increased differences as people age (Baez et al., 2017; de Corte et al., 2007; Eisenberg & Lennon, 1983). Barr (2013) showed females scored higher on a self-reported empathy questionnaire within a student population. However, this study used a sample of students within the same degree speciality. Therefore, it may not provide an accurate representation of all male and female student empathy levels. Furthermore, this sample had almost 3 times as many females as it did males unlike the current study's relatively balanced gender sample. However, the TEQ's original study also found gender differences. Though only of a small magnitude and the sample contained two hundred individuals one hundred of whom were

female. Although the current study found females scored higher on empathy the difference was not significant. A large variation surrounded this mean as indicated by the confidence interval (60.82 – 65.18) and the SD (7.91). This may be an indication that the sample was too small to recognise underlying differences.

Other studies observed specific subtypes of empathy as the reason for differences between females and males on empathy. For example, Rueckert and colleagues (2011) showed differences may be due to females scoring higher on emotional responsiveness. Similarly, Klein and Hodges (2001) indicated females may have scored higher on empathy because of motivational discrepancies. The current study observed whole empathy using the TEQ which captures subtypes of empathy and it is feasible that the breakdown of the TEQ's large range in subtypes may lend support to previous research. Additionally, the current study measured empathy and knowledge of ASD and IA towards ASD. However, as there is considerable stigma associated with ASD (Gray, 2002; Werner & Shulman, 2015), both males and females may have felt a level of pressure to respond in a socially desirable fashion on the TEQ as they understood the current hypotheses (Fisher, 1993). This may suggest a need for a task-based measurement of empathy to avoid desirability bias as employed by Geçkil and colleagues (2017).

The findings on knowledge of ASD contrasted heavily with the available data. In the results of the current study females and males did not differ on knowledge of ASD, whereas available data claims females do score higher (Alsehem et al., 2017; Liu et al., 2016; Tipton & Blacher, 2014). However, there were inconsistencies in the sample groups of undergraduates, for example Alsehem and colleagues (2017) collected from a sample of the general public and only 19% were students. Likewise, Liu and associates (2016) derived their sample from preschool teachers. Different again, Tipton and Blacher's (2014) participants

were a mix of both undergraduates and faculty staff. Specific undergraduate research indicated college students shared high levels of knowledge on ASD (Gardiner & Iarocci, 2013; Tipton & Blacher, 2014). In a sample with over 1000 participants most of whom were undergraduates, Tipton and Blacher (2014) found the difference between men and women, though significant, was of a very small magnitude. This suggests that due to undergraduate educational attainment, there is no gender difference on knowledge of ASD.

It is important here to note the frequency of contact with individuals with ASD in the current study, where only two individuals revealed *always*. This may indicate that students who are not specialised in working with or are not family incorporated with individuals with ASD may not hold high levels of knowledge regardless of gender. It is reasonable to suggest a gender effect on ASD knowledge may depend on frequency of contact. However, the current sample size was limited, so interventions such as extra training to increase knowledge or empathy for either gender should not be disregarded (e.g. Hutchinson et al., 2014).

Another possible explanation for the lack of gender difference on knowledge of ASD is the scale used. Previous studies did not find differences between male and females on the AAS used in this study (Gillespie-Lynch et al., 2015; Obeid et al., 2015). It uses open-ended statements with three items added to capture misconceptions in the latest version (Gillespie-Lynch et al., 2015). These additional items still reflected low reliability and this may have led to attrition in possible gender differences within the current study. It suggests further research is needed to create more relevant items for a reliable tool. In the present study both females and males only scored slightly higher than the midpoint, past research indicated even professionals hold misinformation on the nature of ASD (Ahearn, 2010). Thus, levels observed in the current study are encouraging.

Positive scores on IAT correlated non-significantly with lower empathy scores. This result is slight support for the hypothesised directional relationship between empathy and IA towards individuals with ASD. No participants held positive IA or no preference towards individuals with ASD. Geçkil and colleagues (2017) showed students invested in empathy increasing activities had more positive attitudes towards disabilities. This sample contained 116 individuals, the smaller sample in the current study may have created a lack of power and disrupted significance. Nevertheless, empathy's effect on positive IA attitude formation may be important.

Likewise, the outgroup effect may not hold in a college atmosphere because likeminded individuals such as individuals in a degree setting, tend to form shared views (Myers & Bishop, 1970). Similarly, Paluck and Green (2009) noted intergroup behaviour is closer in association to social norms than personal beliefs. The clear message from peers and social norms thus needs to indicate that stigma towards individuals with ASD is abnormal. Meaning that, if some individuals share weak empathetic views but the majority share a strong empathic understanding, individuals will tend to act more towards this majority group position than their own personal one. The present study's slight correlation may suggest positive attitudes towards individuals with ASD may be accentuated over time due to group polarisation (Moscovici & Zavalloni, 1969). Researchers should observe attitudes or traits over time, e.g. when individuals enter college and at two further times during their degree. Moreover, it lends support to previous research that suggests more highly educated individuals have higher levels of empathy (Grühn et al., 2009; Low & Zailan, 2018).

A non-significant inverse correlation was also found between ASD knowledge and IA. This suggests more accurate information on ASD is associated with more positive IA. However, as with the results on empathy this result is non-significant and should be

interpreted with caution. Low and Zailan (2018) showed year of study predicted knowledge, with third year undergraduate students knowing more about ASD than first years. The current study did not control for year of degree. Consequently, if more of the sample are first years this may have affected the finding of a stronger correlation. Furthermore, the nonsignificant correlation with scores above midpoint may indicate that current participants are less informed than those with an undergraduate degree and above. This supports previous research indicating professionals with an undergraduate degree had an 83% inaccuracy rate on an ASD knowledge questionnaire (Liu et al., 2016).

Similarly, previous research indicated significantly higher rates of acceptance of individuals with ASD associated with higher knowledge levels and greater contact (Mahoney, 2008). Like gender differences and knowledge of ASD, elevated knowledge and positive IA formation may be affected more by greater contact than minimal factual knowledge (Gardiner & Iarocci, 2014). Based on this, future research can consider utilising an intervention whereby individuals with ASD assist on tasks aimed at improving ASD knowledge and IA using pre and post intervention design.

Another potential reason as to why non-significant correlations existed because research suggests a poor correlation between explicit and implicit measures. Researchers reported the more sensitive the topic is the less individuals report explicit negative bias and this creates a lower correlation between the two measures (Nosek, 2005; Hofmann et al., 2005). Similarly, social desirability poses a threat to true explicit values, relationships with IA should be higher when explicit attitudes are not readily controlled (Nosek 2005). When responses are manipulated they reduce the unspoiled automatic responses (Fazio, Jackson, Dunton & Williams, 1995).

Furthermore, Nosek and colleagues (2007) found the correlation between implicit and explicit measures was just about moderate across 17 studies. However, there was large variation depending on the topic, which supports the idea of evaluative strength whereby the chosen topic influences evaluations (Krosnick & Petty, 1995). Topics that are personally meaningful or often thought of create a stronger evaluation resulting in a stronger correlation between implicit and explicit measures over topics that are insignificant and rarely thought about (Nosek, 2005). Furthermore, the present study used thematic nouns as attribute stimuli. Hofmann and associates (2005) suggested a lower correlation exists between the two measures when adjectives or thematic nouns are used instead of just nouns on the IAT attribute stimuli. Researchers postulated this may occur because these words have cross category links that may affect reliability.

Lower contact frequencies positively correlated with higher scores on the IAT, again non-significantly. This indicates negative IA may associate with less contact. Although non-significant, research indicated more contact with individuals with disabilities encouraged positive attitudes towards this population of people (B. Hunt & C. S Hunt, 2000; McDougall, DeWit, King, Miller & Killip, 2004; Seo & Chen, 2009). Pettigrew and Tropp (2008) identified contact as a predictor of levels of prejudice towards individuals with disabilities. Contact was mediated through strengthening in knowledge of ASD and increased empathy levels.

Similarly, students who shared positive views of disabilities had higher rates of contact (Barr & Bracchitta, 2008). Whilst, students had higher positive attitudes towards physical disabilities over developmental ones. More contact with each disability category including ASD indicated more positive attitude escalation. This emphasises the need for contact with individuals with ASD for advancement knowledge and positive attitudes. It does

however need to be considered that contact with different variations of ASD may deliver specific information that would not avail itself through brief one-off contact. These studies concentrated on explicit attitudes and although weak, the direction found in the current study with IA mirrors the associations explored here. The current study did not investigate explicit attitudes as they are prone to social desirability and previous studies indicated explicit measures towards disabilities show positive attitudes but using an implicit measure alongside this depicts negative IA (Fisher, 1993; Rohmer & Louvet, 2012). Furthermore, supplementary research focusing on ASD is imperatively needed.

Few studies investigated correlations between empathy, knowledge, contact frequency and IA directly. Beckford (2016) demonstrated that induced empathy for blacks was significantly associated with higher implicit preferences for blacks on the IAT. Similarly fear of minorities effect on shooting bias towards blacks was mediated by empathy levels (Mekawi, Bresin & Hunter, 2016), in that higher empathy resulted in less probability of black shooting bias. In relation to the present study this suggests higher levels of empathy are important in reducing IA and inducing empathy appears useful for creating a preference for the stigmatised group. Empathy positively affected participant motivation on supportive behaviours irrespective of whether they liked the group (Batson & Shaw, 1991). This is important for individuals with ASD within a college setting as it may determine whether individuals feel welcome. Moreover, individuals displaying more supportive behaviour can lead by example for those with lower empathy. Therefore, to sustain the enacted preference from the induction of empathy individuals may want to engage in face to face contact and absorb further knowledge on ASD.

Empathy was reported as an important reduction device for negative explicit attitudes and IA towards general outgroups in a study using the example of an Asian-American movie

character (Shih, Stotzer & Gutiérrez, 2013). Participants were either asked to imagine how the character felt, to induce empathy or review the movie for a newspaper as a control condition. This study is extremely relevant as researchers did not define target groups on their implicit measure therefore empathy appears as a relatively stable bias shrinking device. In relation to the present study empathy training in the form of asking individuals to imagine the perspective of an outgroup member may create this important effect for individuals with ASD. This would be an easy and cost-effective method for training college students.

Likewise, Sternadori (2017) administered the IAT before and after an empathy inducing news story regarding African Americans or native Americans. Results indicated significantly abated negative IA towards both. Using passages to evoke empathy appears to be a useful technique (Beckford, 2016; Shih et al., 2013). College specific passages may be useful to students encountering and socialising with individuals with ASD as they may help students become aware of inappropriate behaviours. However, researchers encourage caution when developing passages as they can lead to negative judgements if individual situations are viewed as self-inflicted (Iyengar & Kinder, 1987).

Similarly, researchers found more contact indicated significantly more positive IA towards older people (Tam, Hewstone, Harwood, Voci & Kenworthy, 2006). This suggests that the quantity of contact matters and repeated exposure may increase positive IA (Zajonc, 1968). Whilst, this research is in relation to older adults, previous research on disabilities also indicated that the quality of contact matters (Keith et al., 2015). Vezzali and Capozza (2011) investigated attitudes of non-disabled employees who worked with disabled employees. They found overall positive explicit attitudes towards individuals with disabilities but implicit measures revealed negative IA. What is more, negative IA decreased when cooperative contact was frequent and improved in quality. This supports the environmental interpretation

of IA, whereby more positive repeated exposure to an outgroup leads to more positive IA (Aberson & Haag, 2007). Furthermore, researchers found cooperative contact increased empathy when contact was frequent. Likewise, Nagd and Zúñiga (2003) showed contact with outgroup members increased the perspective taking capabilities of an individual. In respect to the current study, Vezzali and Capozza (2011) highlight the salience of quality and quantity of contact. Initial positive experiences with individuals with ASD may determine vital increases in empathy and the likelihood of engagement in more contact. Due to the increase in college attendance for individuals with ASD who have problematic communication (APA, 2013; Seltzer et al., 2003), early interventions demonstrating positive experiences are crucial for abating negative bias.

Links between knowledge and IA require greater exploration. Researchers which did explore this, informed participants that obesity resulted from poor diet and exercise. These participants revealed stronger negative IA towards fat individuals than those who were told obesity resulted from genetic predisposition (Teachman, Gapinski, Brownell, Rawlins & Jeyaram, 2003). However, the difference between the two primed groups on negative IA was very small. This highlights the importance of individuals obtaining unmanipulated factual knowledge in relation to a stigmatised subject such as ASD to prevent the solidification of negative IA. As trying to promote information surrounding a stigmatising subject in a positive light is difficult after negative information has been introduced (Teachman et al., 2003).

Limitations within this current study mainly fall under methodological flaws. One limitation is that individuals may have responded in a socially desirable manner on the TEQ because the study's focus on ASD. However, this study follows on from suggestions encouraging the investigation of empathy and gender differences within this research area

(Obeid et al., 2015). Another issue was the use of the AAS, it had small reliability in the current study and in previous studies. However, this version of the AAS is quite new and with further testing and revision, this scale may become more applicable and reliable. The result that individuals in the current study still scored above midpoint on the AAS identified an encouraging trend amongst the population. A small sample was used and the means observed and correlational directions provide slight support to previous research findings. Although finding no differences between men and women on empathy is positive and somewhat original, it would be unreasonable to suggest the dense collection of significant research indicating differences between male and female empathy is entirely incorrect based on the current study. Nevertheless, the current study holds as it was specific to the chosen disability ASD, as currently there is a dearth in IA literature related to ASD.

A possible implication from the current study is that males and females do not need to be considered different on levels of empathy. Employers can consider males in an equal light when applying for careers that are female dominated and hold female empathy stereotypes. Similarly, although more women are in jobs which expose them to more contact with individuals with ASD (Ingersoll et al., 2014), the current findings indicated that men know as much about ASD as women, thus men should not be anxious to enter careers working with individuals with ASD. Furthermore, interventions may want to use empathy training intermittently to evoke and increase levels in those below average.

There are several ways in which future research could expand on this study. First, introduce the use of an experimental measure of empathy to avoid possible influence of social desirability alternatively researchers may want to measure empathy on subtypes to identify specific discrepancies between men and women (Klein & Hodges, 1999). Second, researchers could perform the current study again with a larger college cohort to confirm whether the

results on males and females are significant as the indications raised by this study are notably encouraging. Third, future studies could include a measure for quality of contact as this was reported as crucial in the formation of IA (Keith et al., 2015). Finally, researchers may want to include demographic characteristics such as degree type and age. This would help identify which students hold higher levels of knowledge, empathy and positive IA. Further, it would allow researchers to postulate if the job circuit students intend on entering based on their degree holds individuals with much the same levels of knowledge, empathy and positive IA.

In conclusion, this study showed college students displayed above midpoint knowledge on ASD and reasonably high empathy levels. However, students also displayed moderate to strong negative IA towards individuals with ASD. Stronger negative IA indicated a relationship with lower empathy, knowledge on ASD and frequency of contact. While this study is unusual and positive in that it suggests males are no different than females on empathy and knowledge of ASD, it does not dismiss past research findings. These findings suggest that there is an important role for more contact, more information on ASD and greater understanding of it, because these may contribute to positive IA formation. This study is a step forward for the research needed within an undergraduate cohort in relation to IA, empathy and ASD. It is persuasive in support of the idea that research specific to IA is an important method for progressive change in attitudes and behaviours towards ASD (Hein, et al., 2011).

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Appendix

(A)

Toronto Empathy Questionnaire (TEQ)

Below is a list of statements. Please read each statement *carefully* and rate how frequently you feel or act in the manner described. Circle your answer on the response form. There are no right or wrong answers or trick questions. Please answer each question as honestly as you can.

1. When someone else is feeling excited, I tend to get excited too

Never / Rarely / Sometimes / Often / Always

2. Other people's misfortunes do not disturb me a great deal

Never / Rarely / Sometimes / Often / Always

3. It upsets me to see someone being treated disrespectfully

Never / Rarely / Sometimes / Often / Always

4. I remain unaffected when someone close to me is happy

Never / Rarely / Sometimes / Often / Always

5. I enjoy making other people feel better

Never / Rarely / Sometimes / Often / Always

6. I have tender, concerned feelings for people less fortunate than me

Never / Rarely / Sometimes / Often / Always

7. When a friend starts to talk about his/her problems, I try to steer the conversation towards something else

Never / Rarely / Sometimes / Often / Always

8. I can tell when others are sad even when they do not say anything

Never / Rarely / Sometimes / Often / Always

9. I find that I am "in tune" with other people's moods

Never / Rarely / Sometimes / Often / Always

10. I do not feel sympathy for people who cause their own serious illnesses

Never / Rarely / Sometimes / Often / Always

11. I become irritated when someone cries

Never / Rarely / Sometimes / Often / Always

12. I am not really interested in how other people feel

Never / Rarely / Sometimes / Often / Always

13. I get a strong urge to help when I see someone who is upset

Never / Rarely / Sometimes / Often / Always

14. When I see someone being treated unfairly, I do not feel very much pity for them

Never / Rarely / Sometimes / Often / Always

15. I find it silly for people to cry out of happiness

Never / Rarely / Sometimes / Often / Always

16. When I see someone being taken advantage of, I feel kind of protective towards him/her

Never / Rarely / Sometimes / Often / Always

Scoring Item responses are scored according to the following scale for positively worded items 1, 3, 5, 6, 8, 9, 13, 16. Never = 0; Rarely = 1; Sometimes = 2; Often = 3; Always = 4. The following negatively worded items are reverse scored: 2, 4, 7, 10, 11, 12, 14, 15. Scores are summed to derive total for the Toronto Empathy Questionnaire.

(B)

Demographic Form

1) Please select your gender

- Male
- Female

2) Know of someone with ASD?

- Yes
- No

3) How often would you have contact with ASD individuals?

- Always
- Often
- Sometimes
- Rarely
- Never

4) This contact is usually

- Voluntary
- Involuntary
- Not applicable

(C)

Autism Awareness Scale

Response choices included strongly disagree (-2), disagree (-1), neither agree nor disagree (0), agree (1), strongly agree (2).

1. Autism is more frequently diagnosed in males than females
2. **Children with autism do not show attachments, even to parents/caregivers**
3. **People with autism are deliberately uncooperative**
4. Children with autism can grow up to go to college and marry
5. **There is one intervention that works for all people with autism**
6. Autism can be diagnosed as early as 15 months of age
7. **With the proper treatment, most children diagnosed with autism eventually outgrow the disorder**
8. People with autism show affection
9. **Most people with autism have low intelligence**
10. Children with autism grow up to be adults with autism
11. **People with autism tend to be violent**
12. **People with autism are generally disinterested in making friends**
13. People with autism have empathy

Note: We added questions 11-13 to the scale.

Bolded items are reverse scored

(D)

INFORMATION SHEET**TITLE OF RESEARCH: BREAKING THE PRACTICE, NEGATIVE ATTITUDES TOWARDS AUTISM.****Aims of the research:**

- To explore the differences in gender on empathy, implicit attitudes and knowledge of autism.
- To research implicit attitudes towards autism in relation to empathy, knowledge and frequency of contact.

INVITATION

You are being asked to take part in a research study on people's attitudes and knowledge surrounding autism with focus on empathy and gender differences. The general aim of this research is to collect a wider scope of knowledge on the undergraduate student population information and attitude base. Individuals taking part in the research are assisting in the creation of meaningful interventions for negative attitudes and biases towards autism.

- This research is being carried out by named psychology undergraduate **Áine Walsh**.
- **Dr. Conor Nolan** will supervise this research which will be undertaken through the National College of Ireland (NCI).
- This project has passed the standards of the Psychology Research Ethics Committee at NCI.

WHAT WILL HAPPEN

In this study, you will be asked to enter a computer lab to complete 3 questionnaires and a computer task. Questionnaires are: (in order of answering)

- A demographic questionnaire for gender, knowledge of someone with autism, how often you are in contact with that person and if this contact is voluntary/involuntary.
- Toronto Empathy Questionnaire (TEQ) measuring empathy levels.
- Modified autism awareness scale (AAS) measures the level of knowledge individuals have surrounding autism.

The Implicit Association Task (IAT) is a computer task that measures how strong a person's associations are with specific topics. These are attitudes or 'opinions' a person has that they may be unaware of and are not consciously or 'actively' controllable.

Details:

- You will be asked to sort words into groups as fast as you can, using the '1' and '2' keys.

TIME COMMITMENT

The study typically takes 17 minutes all together.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. You will be reminded that after you leave the study there is no longer opportunity to withdraw data as it becomes fully anonymised. You will be thanked and offered to leave without penalty.

You have the right to omit or refuse to answer or respond to any question that is asked of you without penalty.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

BENEFITS AND RISKS

Participation in this study involves completion of some standardised tests [demographics, TEQ, and IAT]. Scores from the IAT would not be a sufficient basis for definite confirmation on your implicit attitudes.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary. We thank you.

CONFIDENTIALITY/ANONYMITY

- The data we collect do not contain any personal information about you except gender.
- No one will link the data you provided to the identifying information you supplied (gender, email (if appropriate))
- Data collected today will be used/stored for presentation purposes, examination by ethics committee and examination for final year project. Anonymity will remain constant.
- Participants are encouraged and reminded **not** to leave names or contact details on any of the given questionnaires as it breaches confidentiality.

FOR FURTHER INFORMATION

Dr. Conor Nolan will gladly answer your questions about this study at any time.

Email: conor.nolan@ncirl.ie

If you want to find out about the final results of this study you should contact the researcher by email at aineewalshh@gmail.com **Thank you for your time**

(E)

INFORMED CONSENT***BREAKING THE PRACTICE, NEGATIVE ATTITUDES TOWARDS AUTISM***

The general aim of this project is to create a wider palate of research in the subject area with specific attention on people's attitudes and knowledge surrounding autism, focusing mainly on empathy and gender differences in the undergraduate student population. The results of this research may be useful in manifesting meaningful interventions for negative attitudes or biases.

By ticking the 'I consent' box, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks, and (4) you are taking part in this research study voluntarily (without coercion).

I **consent** ☐

Date

I **do not** consent ☐

Name of person obtaining consent (Printed)

Signature of person obtaining consent

(F)

DEBRIEFING

BREAKING THE PRACTICE, NEGATIVE ATTITUDES TOWARDS AUTISM.

Thank you for your time and worthwhile contribution to this project. It is greatly appreciated!

This study was designed to explore the differences in gender on empathy, knowledge of autism and implicit attitudes. Researching implicit attitudes towards autism in relation to empathy, knowledge and frequency of contact.

Previous work has shown people gather their knowledge surrounding autism through the media and the internet. This does not fully educate people, therefore what people 'know' can have negative impacts on their social and inclusive abilities with these individuals.

This study was looking at people's attitudes, an attitude is a grouping of beliefs or feelings. Implicit attitudes are attitudes people may be unaware they have. This may result in certain biases or behaviour towards objects or other people. Empathy is the ability to 'place one's feet in another's shoes', it is having the sensitivity to understand what that person is feeling and acknowledge it all at the same time. Most of us hold this incredible ability and use it on a day to day bases. Some research suggests that women hold greater levels than men.

Here we are looking at implicit attitudes in relation to autism this is a way of testing whether any potential negative attitudes exist among undergraduates. By looking at the gender of each person, we can observe the gender differences across empathy levels, knowledge of autism and implicit attitudes.

Demographic questions were taken to support any significant findings. This will give greater insight into for example, those who hold the least implicit negative attitudes towards autism. This may relate to those who are in frequent contact with autistic individuals.

All data is confidential and participants have the right to remove any form of data from the project at any time **within the study** without reason or penalty. We are not interested in any one individual's response; rather a collection of all data and its effects.

The present researcher will be available for contact via email at:

aineewalshh@gmail.com

Dr. Conor Nolan is also available for any concerns via email at office hours: 9am-5pm

conor.nolan@ncirl.ie

If this study has caused you any form of distress, please feel free to contact any of the agency's listed on the attached 'services' document.

Thank you again for your time

(G)

Services

- **National College of Ireland Counselling**

Mary Keating

Text or call: 086 8783086

Email: counselling@ncirl.ie

- **Jigsaw Dublin City**

Support service for people aged between 12-25

Monday 9am – 1pm, 2pm – 5.30pm

Tuesday 9am – 1pm, 2pm – 5.30pm

Wednesday 9am – 1pm, 2pm – 5.30pm

Thursday 9am – 1pm, 2pm – 5.30pm

Friday 9am – 1pm, 2pm – 5.00pm

Address: 41 - 45 Mountjoy Square South
Dublin 1
Ireland.

Telephone: 016583070

Email: dublincity@jigsaw.ie

- **Snowflakes autism support**

Address: Holywell Community Centre, Swords, Co. Dublin

Opening hours

Monday: closed

Tuesday: 10am-9pm

Wednesday: closed

Thursday: 10am-9pm

Friday: 10am-4pm

Saturday: 10am-4pm

Sunday: closed

Phone: (01) 524 1544

Website: Snowflakes.ie