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Factors that predict attitudes: contact, knowledge and ethnicity.

Research on the **societal stigma** people with autism spectrum disorder (ASD) experience have explored **associations** between autism knowledge **and** contact stigma, and **between** autism knowledge and stigma (Mavropoulou & Sideridis, 2014; Gillespie-Lynch et al. 2015; Stern & Barnes, 2019; Campbell et al, 2019), **with a focus on** the effects of **children's** autism on parents' wellbeing and coping **mechanism** (Tarakeshwar & Pargament, 2001; Timmons & Ekas, 2018). **Although research has examined the** prevalence of autism across ethnic groups (Mandell et al, 2009; **Hassam, 2012; Maenner et al, 2020**), **we know little about ethnic minority views of autism, particularly the experiences of autism in families from minority ethnic group backgrounds** (Heer et al, 2012; Munroe et al, 2016; Fox et al, 2017; **Lin et al, 2011**). To mitigate **societal** stigma, it is important to identify **the** factors that contribute to public attitudes to autism. **To this end**, this paper **examined** the **association between** contact and knowledge **with** attitudes towards people with autism, particularly among Black, Asian and White ethnic groups.

The **rise in the** prevalence of autism means that the public are more likely to meet or be in casual contact with **a person with ASD**; whether the public member can **recognise the** characteristics and **symptomatology of autism** is debateable. **How** are the public likely to react **when a person with ASD displays** limited social communication **and** interaction and repetitive behaviours in social contexts (APA, 2013)? Social distance and preconceived biases among the general public abound due to misconceptions that people **with ASD** are disinterested in social relationships, purposefully avoid physical contact, are less tuned in with their surroundings (John et al, 2017), **supporting Allport's (1954) observation that what is alien is considered as an 'other', inferior and 'less good'**. People with mental impairments tend to face stigma and discrimination, with public attitudes highlighted as the major barrier

to peoples' full participation, integration and acceptance by society (Gillespie-Lynch et al, 2015; Heer et al, 2012).

Allport (1954) proposed that contact between members of different groups under certain conditions can work to reduce prejudice and intergroup conflict. Research has recognised the benefits of contact to mitigate disablist attitudes. Studies that explored the association between contact and Intellectual disability (Totsika & Jones, 2017; McManus et al, 2011) and cross group friendships (Pettigrew & Tropp, 2006) agree with Allport's hypothesis that contact is an effective intervention to improve attitudes towards people with disability. More specific research on contact and autism demonstrated positive attitudes towards autism when measures are taken to employ the four conditions Allport (1954) proposed for attitude change to outgroups: equal status, intergroup cooperation, common goals, and support by social and institutional authorities (Mavropoulou & Sideridis, 2014; Gardiner & Iarocci, 2014).

It is reasonable to suggest that more knowledge of autism in the public would produce fewer negative, if not positive, attitudes to autism; however, research indicates otherwise.

Gillespie-Lynch et al. (2015) examined the effectiveness of an online training program among college students by testing knowledge and acceptance of ASD before and after exposure to the training program. The study reported an increase in autism knowledge and decrease in stigmatic attitudes after, however, changes in knowledge were higher than changes in attitude. Stern and Barnes (2019) also examined whether increased knowledge about autism would increase positive attitudes to autism. Their study found that knowledge does not translate into positive attitudes because participants found it difficult to identify behaviours associated with autism despite receiving a lecture on diagnostic criteria, etiology and ASD treatment. The participants selected more negative autism traits from a checklist of adjectives to describe a person with ASD. However, participants who watched the TV show

‘The Good Doctor’, a fictional drama which portrayed ASD characteristics, **acquired transferrable** knowledge about autism with participants attributing more positive characteristics **to people** with ASD. **This distinction in attitudes to autism suggests that the representation of people with ASD and the medium used to inform the public about autism play an important role in highlighting key characteristics of autism in ways the public can access, recognise and understand.**

Research on disability has identified certain social demographics as a main contributor to attitudes. Higher income has been associated with more positive attitudes to disability, albeit a physical disability, and younger participants (34years and below) held more positive attitudes to hidden disabilities than older participants (35years and older) (Staniland, 2009). It is unclear whether higher income would be associated with more positive attitudes to hidden disabilities, and autism in particular. Existing evidence about developmental disabilities suggests that ethnic minority attitudes may differ from ethnic majority attitudes in the UK. **Compared** to Black and minority ethnic respondents, British white respondents showed lower social distance to people with intellectual disability (Scior et al, 2013). Coles & Scior (2012) compared the attitudes towards people with intellectual disabilities of people from South Asian backgrounds in the UK and people of White British origin. The researchers reported **that** White British participants were more likely to make accepting and empowering statements about intellectual disabilities. Meanwhile, Slade (2014) explored **understanding of autism and** the barriers to accessing services by parents and carers of children with ASD from **immigrant** Black and Asian communities. The findings from the focus groups in **Slade’s (2014) study** indicated a limited awareness of autism among ethnic minority and immigrant communities when compared to White British parents. Families of children **with ASD** from

ethnic minority groups noted **the** **disablist attitudes and marginalisation they experienced** from their ethnic communities (Munroe et al, 2016; Fox et al, 2017).

In the most recent British national survey on attitudes to disability (BSAS, 2009) which was conducted over 10 years ago, the association between ethnicity and attitudes was not examined. This is an important omission in the light evidence that people from ethnic minority backgrounds are more likely to know less about autism (Munroe et al, 2016; Fox et al, 2017). In the present study, we aimed to address this gap by examining differences in autism knowledge and attitudes among participants from Black, Asian and White ethnic groups.

The research aimed to:

- Explore whether associations between contact and attitudes **to disability** still hold after accounting for various factors associated with attitudes
- **Examine whether there is an association between autism knowledge and attitudes, after accounting for social demographic characteristics associated with attitudes and whether the association is moderated by participants' ethnicity.**

Methods

Participants

The participants ($N=152$) were from the general public as a result of an online survey. The study recruited a convenience sample following advertising through social media.

Through an online survey, participants reported on their autism knowledge and the amount of contact they had with autistic people as well as their attitudes towards individuals with autism under various scenarios. Most participants came from a Black ethnic **group (47.3%), White**

(29.1%), Asian (15.5%), and other ethnic (8.1%) and the age range was 18-74years (M = 28.6, SD = 39.38) (see Table 1). Approximately 60% reported some contact with people with autism, 18% reported having an immediate family member with autism and 1.3% reported having autism. For employment status, 55.9% reported being in a job and currently working for an employer, 9.2% identified as self-employed, 19.7% as a full-time student, 2.6% were looking after home and family.

Procedure

Hyperlinked adverts for the 10-minute anonymous online survey in Qualtrics software were placed on social media sites: WhatsApp, Facebook and Twitter to target different ethnic groups between the end of April to the beginning of June 2018 and findings were analysed using SPSS, version 25.

Measures

Contact

The survey included four items measuring respondents' extent of contact with a person with ASD: self-identified; immediate, extended family member and social circle. Responses to each item were 'yes' and 'no', and responses were summed (range 0 to 4) with higher values indicating more contact with ASD people.

Attitudes

The Comfort Scale (Staniland, 2009) was designed to assess participants' attitude to disability in various social contexts. The researchers employed cognitive testing to measure accuracy (DWP, 2009) on the public's attitude to disabilities across different ethnic groups. The six questions in this scale were adapted to focus on attitudes to autism in various real-life

situations (i.e., a person with ASD as: a local Minister of Parliament (MP), neighbour, their child's classmate, quiz team member, boss and relative through marriage). A Likert scale was used ranging from 4 (very comfortable) to 1 (very uncomfortable). The maximum score was 24 and a higher score indicated greater comfort towards autism, i.e., more positive attitudes. Internal reliability of the scale was (Cronbach's alpha) .88, indicating strong internal consistency.

Autism Knowledge

The Autism Survey, developed by Stone (1987), was administered to evaluate autism knowledge in specialists', primary providers' and professionals employed by the Center for Autism and Related Disabilities (Heidgerken et al, 2005). Confirmatory factor analysis indicated that the survey demonstrated adequate psychometric properties (Campbell, Reichle & Bourgonien 1996). Researchers did not mention participants' ethnic groups; therefore, it is not clear whether the measure has been used with participants from different ethnic groups. The Autism Knowledge Scale (Tipton & Blacher, 2014) was adapted from the Autism survey (Stone, 1987) to assess the general public's knowledge of autism among college students. The study included 12 statements about autism (e.g. autism is a mental health condition; there is a cure for autism, etc) to determine participants' autism knowledge. A Likert scale was used ranging from 1 (I don't know) to 6 (strongly agree) (Tipton & Blacher, 2014). For the primary analyses, the 12 items were translated into a 6-point correctness scale (Tipton & Blacher, 2014). For example, if the item statement was true, the scoring would range (I don't know = 0; strongly disagree = 1 to strongly agree = 5). If the statement was not true, the scoring would be reversed (I don't know = 0; strongly agree = 1 to strongly disagree = 5). The total "correct" score for the 12item scale were summed (range 0 to 72) with higher scores indicating more autism (range 0 to 72) with higher scores indicating more autism

knowledge. Internal reliability of the scale in the current sample was .78 (Cronbach's alpha), indicating strong internal consistency.

Age

The age range was 18-74 years and mean age was 28.6 years (SD = 39.38). The sample were split into categorical data to depict the number of participants who were 34 years and under (1.00) and 35 and older (2.00) (see Table 1). This approach was adopted from the most recent survey (BSAS, Staniland, 2009) to observe whether age predicted knowledge and attitudes to people with ASD.

Ethnicity

The ethnicity items were adopted from the UK National Census and Official National Statistics (ONS, 2011) (Table 1). The ethnicity items were placed in categories: Black (1.00), Asian (2.00) and White (3.00) to distinguish knowledge and attitude to autism among ethnic groups. White Irish participants were included in the 'White' (1.00) category. All other ethnicities were recoded into the 'other' category.

Financial status

A measure of subjective poverty was used to capture the experience of financial security by respondents. The measure is widely used by national surveys in the UK and includes a 5-item response scale (Millennium Cohort Study, fifth survey, 2012). Data from the present sample indicated that 16.4% of participants were living comfortably, 50.7% were doing alright, 24.3% were just about getting by, 3.3% were finding it quite difficult. The variable was recoded from 4 (finding it quite difficult) to 1 (living comfortably) to 1 (finding it quite difficult) to 4 (living comfortably) (see Table 1). A single-item measure captured hardship by

asking if participants were in need of £2000 for an emergency: 22.4% could easily raise the money, 32.2% could raise the money, but it would involve some sacrifices (e.g. reduced spending, selling a possession); 17.8% would have to do something drastic to raise the money (e.g. selling an important possession) and 15.8% did not think they could raise the money.

This measure of hardship has been used by national surveys in the UK (Office for National Statistics, 2019, Wealth and Assets Survey, Waves 1- 6, 2012- 2018) and Australia (e.g., the Longitudinal Study of Australian Children). For the purposes of the present study, the variable was recoded from 1 (did not think they could raise the money) to 4 (could easily raise the money). A composite measure of financial status was created by summing the recoded variables of hardship and subjective poverty with scores (ranging 2 to 8) and higher values indicated living comfortably and financial wellness.

Approach to Analyses

Multiple linear regressions were conducted to explore the unique and cumulative relationships between attitudes and participants knowledge, social demographics and contact with people with autism. In response to the first research question, a regression model was conducted to examine whether contact is associated with attitudes while accounting for demographic characteristics (e.g., age, financial status and ethnicity). Additional multiple regressions analyses were also conducted to examine associations between autism knowledge and attitudes in the public and particularly among ethnic minority groups. Ethnicity variables were applied in separate models, so the same regression was repeated with a different ethnicity variable. Finally, an interaction term (knowledge* ethnicity) was used to test whether the association between autism knowledge and attitudes is moderated by ethnicity.

Ethical Considerations

Ethical approval for the study was granted by independent reviewers at the Education Studies department, University of Warwick. Information sheets briefed participants of the study's purpose, ethical guidelines and obtained their consent.

Results

Association between contact and participant attitudes

To address the first aim, multiple regression analyses were conducted to examine whether associations between contact and attitudes still hold after accounting for various factors associated with attitudes (see Tables 2 to 4). A multiple linear regression analysis was conducted to predict attitudes to autism based on contact and social demographic factors: age, financial status and Black ethnicity, see Table 2. The model explained 10.9% of the variance and identified whether contact made a significant unique contribution on attitudes after accounting for social demographic factors associated with attitudes towards autism: ($F(4, 96) = 2.935, p = .025$). Contact notably predicted attitudes to autism, ($\beta = .326, t(96) = 3.246, p = .002$), indicating that for every 1-unit increase in contact with autism, levels of comfort increased by about .326 of a standard unit. However, age: ($\beta = -.139, t(96) = -1.418, p = .159$); financial status: ($\beta = .140, t(96) = 1.360, p = .177$); and Black ethnic group: ($\beta = .034, t(96) = .335, p = .738$) did not predict attitudes..

A second multiple regression was conducted to predict attitudes to autism based on contact and social demographic factors: age, financial status and Asian ethnicity (see Table 3). The model explained 10.9% of the variance and identified whether contact made a significant unique contribution on attitudes after accounting for social demographic factors associated

with attitudes towards autism: ($F(4, 96) = 2.924, p = .025$). Contact notably predicted attitudes to autism, ($\beta = .322, t(96) = 3.184, p = .002$), indicating that for every 1-unit increase in contact with autism, levels of comfort increased by about .322 of a standard unit. However, age: ($\beta = -.143, t(96) = -1.457, p = .148$); financial status: ($\beta = .131, t(96) = 1.318, p = .191$); and Asian ethnic group: ($\beta = -.026, t(96) = -.270, p = .787$) did not predict attitudes.

A third multiple regression was conducted to predict attitudes to autism based on contact and social demographic factors: age, financial status and White ethnicity (see Table 4). The model explained 11.3% of the variance and identified whether contact made a significant unique contribution on attitudes after accounting for social demographic factors associated with attitudes towards autism: ($F(4, 96) = 3.045, p = .021$). Contact notably predicted attitudes to autism, ($\beta = .315, t(96) = 3.121, p = .002$), indicating that for every 1-unit increase in contact with autism, levels of comfort increased by .315 of a standard unit. However, age: ($\beta = -.151, t(96) = -1.538, p = .127$); financial status: ($\beta = .111, t(96) = 1.066, p = .289$); and White ethnic group: ($\beta = .072, t(96) = .711, p = .479$) did not predict attitudes.

Association between autism knowledge and demographic factors on participants' attitudes

In response to the study's second aim, multiple regression analyses were conducted to examine the association between autism knowledge, attitudes and demographic factors associated with attitudes (see Tables 5 to 8).

The first multiple regression was conducted to predict attitudes to autism based on knowledge and social demographic factors: age, financial status and Black ethnicity (see Table 5).

The regression model explained 4.4% of the variance and identified whether knowledge made a significant unique contribution on attitudes after accounting for social demographic factors associated with attitudes towards autism. Knowledge predicted attitudes to autism,

($\beta=.184$, $t(129) = 2.080$, $p= .040$), indicating that for every 1-unit increase in autism knowledge, levels of comfort increased by about .184 of a standard unit. However, age: ($\beta=-.084$, $t(129)= -.959$, $p= .340$); financial status: ($\beta=.063$, $t(129)= .695$, $p= .489$); and Black ethnic group: ($\beta= .059$, $t(129)= .639$, $p= .524$), were not predictors of autism knowledge.

The second multiple regression was conducted to predict attitudes to autism based on knowledge and social demographic factors: age, financial status and Asian ethnicity (see Table 6).

The regression model explained 4.5% of the variance and identified whether knowledge made a significant unique contribution on attitudes after accounting for social demographic factors associated with attitudes towards autism. Knowledge predicted attitudes to autism, ($\beta=.176$, $t(129) = 2.013$, $p= .046$), indicating that for every 1-unit increase in autism knowledge, levels of comfort increased by about .176 of a standard unit. However, age: ($\beta=-.092$, $t(129)= -1.047$, $p= .297$); financial status: ($\beta=.051$, $t(129)= .576$, $p= .566$); and Asian ethnic group: ($\beta= -.065$, $t(129)= -.748$, $p= .456$), were not predictors of autism knowledge.

The third multiple regression was conducted to predict attitudes to autism based on knowledge and social demographic factors: age, financial status and White ethnicity (see Table 7). The regression model explained 4.5% of the variance and identified whether knowledge made a significant unique contribution on attitudes after accounting for social demographic factors associated with attitudes towards autism. Knowledge did not predicted attitudes to autism, ($\beta=.157$, $t(129) = 1.718$, $p= .088$). Additionally, age: ($\beta=-.100$, $t(129)= -1.130$, $p= .261$); financial status: ($\beta=.031$, $t(129)= .344$, $p= .732$); and White ethnic group: ($\beta= .069$, $t(129)= .722$, $p= .472$), were not predictors of autism knowledge.

For further analyses, an interaction term (knowledge* ethnicity) was used to test whether the association between autism knowledge and attitudes is moderated by ethnicity (see Tables 8 to 10).

The first regression model explained 1.2% of the variance and identified that ethnicity did not moderate autism knowledge and attitudes ($\beta=-.055$, $t(129) = -.233$, $p= .816$) and neither did age: ($\beta=-.090$, $t(129)= -1.005$, $p= .317$); financial status: ($\beta=.060$, $t(129)= .651$, $p= .516$); and Black ethnic group: ($\beta= .079$, $t(129)= .335$, $p= .739$).

The second regression model explained 5.2% of the variance and identified that autism knowledge and attitude is moderated by ethnicity ($\beta=.717$, $t(129)= 2.210$, $p= .029$), more specifically the Asian ethnicity ($\beta=-.754$, $t(129)=-2.325$, $p= .022$). However, age: ($\beta=-.084$, $t(129)= -.963$, $p= .338$) and financial status: ($\beta=.088$, $t(129)= .996$, $p= .321$) did not predict autism knowledge and attitudes.

The third regression model explained 2.3% of the variance and identified that autism knowledge and attitude is not moderated by ethnicity ($\beta=-.055$, $t(129)= -.133$, $p= .894$). Additionally, age: ($\beta=-.110$, $t(129)= -1.219$, $p= .225$) and financial status: ($\beta=.022$, $t(129)= .240$, $p= .811$) and White ethnicity ($\beta=.169$, $t(129)=.409$, $p= .683$) did not predict autism knowledge and attitudes.

Discussion

This study examined associations between contact and public attitudes to ASD, autism knowledge and demographic factors, particularly among ethnic groups to identify underlying factors which contribute to attitudes. Contact was the most significant predictor of attitudes to

ASD and supports other research on contact and disability (Totsika & Jones, 2017; McManus et al, 2010), cross-group friendships (Pettigrew, 1998), stigmatised illnesses such as HIV and AIDS (Al-Ramiah & Hewstone, 2011) and ethnic minority groups (Allport, 1954). The findings highlight the significance of contact to reduce prejudice and stigma in public attitudes to autism. The findings suggested that autism knowledge does associate with attitudes towards autism among ethnic minorities. The study's finding that Black and Asian ethnic groups predicted knowledge and attitudes to autism is a significant and novel finding but inconsistent with previous research on autism knowledge (Gillespie-Lynch et al. 2015; Stern & Barnes, 2019; Campbell et al, 2019) and awareness and understanding of autism among Black and Asian parents and the prevalence of societal stigma in the communities (Munroe et al, 2016; Fox et al, 2017; Slade, 2014; Selman, 2017). The interaction term also showed that ethnicity moderated autism knowledge and attitudes to autism in the Asian ethnic group. Therefore, autism knowledge among the Asian ethnic group resulted in positive attitudes to people with ASD.

The finding that contact was significantly associated with public attitudes showed that contact between groups is associated with reduced prejudice. According to Allport (1954), it is essential for the contact situation to include the four conditions (i.e., equal status, intergroup cooperation, common goals, and support by social and institutional authorities) to a degree. In this study, contact was consistent with all four conditions: participants had an immediate and/or extended family and friends with autism. As such, participants were likely to: perceive the person with autism as having equal status, often work together to achieve goals, be governed by social traditions and the inherent nature of the family as an institution (Burgess & Locke, 1945). Friends and families of a person with autism most likely undergo the “four processes of change” that explain the mechanisms through which contact reduces

prejudice: they learn about the outgroup (cognitive), change their behaviour (behaviour), and reduce negative emotions and in-group appraisal (affective) (Pettigrew, 1998).

Everette (2013) recognised that contact situations are likely to be effective at improving intergroup relations insofar as they induce positive affect, and ineffective insofar as they induce negative affect such as anxiety or threat. However, daily public interactions with people with autism in various social settings can be difficult to plan and monitor to ensure Allport's (1954) optimal conditions. In various public settings, there is often no/limited institutional support for intergroup contact between the public and people with ASD; as such, people with ASD may not necessarily be treated as equal nor share a common goal for intergroup cooperation. Actively including people with hidden disabilities in society through direct and indirect contact can challenge stereotypes and reduce prejudice about autistic people and the public's negative attitudes against hidden disabilities (Totsika & Jones, 2017; Mavropoulou & Sideridis, 2014). Coles & Scior (2012) and Draaisma (2009) acknowledged that media images of disability are often the main source of contact for a large portion of the public and contribute to shaping their attitudes towards people with hidden disability. Positive media content on the abilities of a person with autism could gradually change public attitudes and encourage positive expectations of people with autism in social, educational and professional settings (Totsika & Jones, 2017). The study's results highlighted the importance of qualifying the four conditions as an interconnected package 'rather than as independent factors' (Pettigrew and Tropp, 2006) in public settings to mitigate against prevalent stigma attached to people with autism. However, according to Pettigrew and Tropp (2006), even unstructured contact reduces prejudice and these conditions are not essential for prejudice reduction. Due to the wide variation and continuum of ASD symptomology, future studies could examine how unstructured contact impact the public and people with ASD, whether positively or negatively. To our knowledge, this is the first study to explore the relationship

between contact and attitudes to autism when other factors (age, financial status and ethnicity) have been accounted.

The study's focus on the relationship between autism knowledge and attitudes respond to John et al's (2017) enquiry into the public's knowledge and understanding of autism for the inclusion and acceptance of people with autism. Studies on autism knowledge with college and university students found that public misconceptions about autism led to stigmatization and exclusion of autistic students (Dillenburger, 2013; Stern and Barnes, 2019). In this study, knowledge was found to contribute to attitudes among the Black and Asian ethnic group, contrary to existing research findings on autism knowledge and intellectual disability and mental health (May 2012; McManus et al. 2011; White et al, 2016). However, that knowledge did not predict attitudes to autism among White participants is also inconsistent with research (Scior et al, 2013; Coles & Scior, 2012). Differences in autism knowledge and attitudes to autism between ethnic groups suggest that Black, Asian and White participants experience degrees of exposure to disability in general and autism in particular (Slade, 2014; Selman, 2017; Scior et al, 2013; Heer et al, 2012). The study produced novel findings that knowledge Black and Asian participants' knowledge of autism predicted attitudes than did the White participants. These findings vary from prior research that highlighted immigrant Black and Asian parents' limited awareness and knowledge of autism prior their child's diagnosis, mainly due to cultural, religious and family beliefs and traditions (Munroe et al, 2016; Fox et al, 2017; Selman, 2017; Slade, 2014). A consistent pattern over the years have shown considerable disparity in the percentage of children with ASD amongst different ethnic groups (PLASC, 2006; Strand & Lindsay, 2012). National surveys on ethnicity and ASD noted that for ASD, Black Other and Black Caribbean groups are over-represented whereas Indian, Pakistani, Bangladeshi, and Other Asian pupils were under-represented (Strand & Lindsay, 2012). Such ever-increasing diagnosis and prevalence of autism among

Black children in comparison to Asian and White children suggest more contact and a heightened awareness of autism among the Black community. Previous research has focused on the prevalence of autism among people of Asian background and identified multiple factors that impacted the recorded prevalence of autism: language difficulties for non-English speaking parents (Corbett & Perepa, 2007), late access and take up of services due to cultural differences, religious beliefs and family traditions (Lindsay et al, 2006; Heer et al, 2012). These are multiple factors that explains the limited representation of ASD among Asians. However, this study, unlike previous research on knowledge and attitudes focused on ethnicity and had sizeable ethnic minority groups, thus offers a current picture of knowledge and attitudes to autism, suggesting that among Black and Asian groups, increasing knowledge and exposure to autism affects attitudes to autism. The finding that knowledge within the Black and Asian ethnic groups predicted attitudes support the intergroup contact theory in that Black and Asian participants are likely to have more positive attitudes to people with autism because they have more contact with this population (Gillespie-Lynch et al, 2015).

The findings show that association between autism knowledge and attitudes is moderated by ethnicity, in particular, the Asian ethnic group. Consistently in research, minority ethnic parents have been noted for limited knowledge, under-representation in ASD prevalence and poor attitudes to autism (Munroe et al, 2016; Fox et al, 2017; Slade, 2014; Selman, 2017; Chandran et al, 2019). The findings showed that the Asian ethnic group in particular, was the main group where knowledge and ethnicity both had an effect on attitudes to autism. Thus, this finding supports the observation that Asian communities need accessible information, culturally sensitive support and engagement to create optimal conditions for contact and knowledge transmission (Corbett & Perepa, 2007; Heer et al, 2012). Practical approaches to autism in the Asian community can mediate the limited communication, stigma and isolation

rampant among families with a child with ASD experience (Lindsay et al, 2006; Heer et al, 2012). This distinct difference between autism knowledge, ethnic groups and attitudes to people with ASD show the importance of addressing ethnic groups in conversation with autism.

Strengths and limitations

This study contributed to the growing evidence on attitudes towards ASD, particularly amongst ethnically diverse groups. It examined underlying factors such as contact, knowledge, ethnicity, age and financial status that have been found to contribute to attitudes towards disability and autism. The study identified the important role of contact on attitudes within the general public; it may be worthwhile for future research to investigate underlying causes of prejudice and stigma in various contexts in relation to contact. The findings cannot be generalizable to the population given the sample size. Nevertheless, they offered an insight to the degrees of exposure, knowledge and attitudes to autism among ethnic groups. Thus, this study highlighted the need to further explore stereotypes that underlie prejudice and stigma towards people with ASD in society and examine the negative factors that prevent knowledge of autism and intergroup contact for the continuous development of targeted, high-quality public awareness and education campaigns (John et al, 2017). Institutional support tailored to encourage structured and unstructured contact across public domains such as education, health, social and care practices could effectively reduce prejudice between the public and people with ASD over time.

Research on attitudes to hidden disabilities has often compared two cultures (Coles & Scior, 2012; Scior et al, 2013; Lin et al., 2011), whereas, this research examined the nuanced beliefs and attitudes between Black, Asian and White ethnic groups and offered insight of

differences in knowledge and attitudes to autism. It would be worthwhile for future research to explore the differences in knowledge, contact and ethnicity further, a particularly useful approach would be to gather data on the length of time ethnic minority participants have lived in the UK, thereby considering the acculturation of ethnic minority groups to western beliefs and attitudes to autism. Future research could also include participants' birthplace and how long they have lived in the UK to allow for comparison of attitudes to autism between UK born and non-UK born participants (Munroe et al, 2016).

The study examined contact with and knowledge about people with ASD with a focus on ethnic groups. Its main premise was that being aware of people with ASD and in contact with them is likely to reduce stigma and discrimination over time. This has important implications for policy and practice especially as mental health difficulties and disabilities (mostly hidden) are on the rise across different ethnic groups (Heer et al, 2012; Slade, 2014, Munroe et al, 2016). This study is among one of very few researches on ethnicity, autism and attitudes in the general public. Despite the novel findings on different attitudes and knowledge among various ethnic groups, researchers, policymakers and commissioners must include ethnicity to disability and autism research: autism public awareness and education campaigns may encourage social interactions to support contact between people with ASD and the public. As findings showed, knowledge on autism per se does not improve attitudes across all ethnic groups, whereas actual contact does, a practical implication is for more families and people with ASD to be supported to access public and social spaces and increase visibility and contact with the public in the hope that this may lead to positive social attitudes. Educational, social and health policies would need to tackle public misconceptions and discriminatory attitudes about autism. Policies that support social contact and integration of people with autism in the social realm are crucial in terms of offering a platform for these individuals to have a presence and a voice but also for the public to be aware and accepting of difference.

References

- Al Ramiah, A. and Hewstone, M. (2011). Intergroup difference and harmony: The role of intergroup contact. *Progress in Asian social psychology*.
- Allport, G. W. (1954). The nature of prejudice. Reading, MA: Addison-Wesley.
- American Psychiatric Association. (2013). Neurodevelopmental disorders. Autism spectrum disorder. in: Diagnostic and statistical manual of mental disorders. 5th ed. Arlington, VA: American Psychiatric Association.
- Brown, L.X., Ashkenazy, E. and Onaiwu, M.G. eds. (2017). *All the weight of our dreams: On living racialized autism*. DragonBee Press.
- Campbell, J.M., Caldwell, E.A., Railey, K.S., Lochner, O., Jacob, R., Kerwin, S. and Eckert, T. (2019). Educating Students About Autism Spectrum Disorder Using the Kit for Kids Curriculum: Effects on Knowledge and Attitudes. *School Psychology Review*, 48(2).
- Campbell, D.G., Reichle, N.C. and Van Bourgondien, M.E. (1996). The autism survey: An evaluation of reliability and validity. *Journal of autism and developmental disorders*, 26(6), pp.621-634.
- Chandran, H., Jayanthi, K., Prabavathy, S., Renuka, K. and Bhargavan, R., (2019). Effectiveness of video assisted teaching on knowledge, attitude and practice among primary caregivers of children with Autism Spectrum Disorder. *Advances in Autism*.
- Coles, S. & Scior, K. (2012). Public attitudes towards people with intellectual disabilities: A qualitative comparison of white British and South Asian people. *Journal of Applied Research in Intellectual Disabilities*, 25, pp. 177–188.
- Corbett, P. and Perepa, P. (2007). *Missing Out?: Autism, Education and Ethnicity: the Reality for Families Today*. National Autistic Society.
- Department for Work and Pensions (2009), *British Social Attitudes Survey – Attitudes Towards the Rights of Disabled People: Findings from Cognitive Interviews*, <http://research.dwp.gov.uk/asd/asd5/rports2009-2010/rrep588.pdf>
- Dillenburger, K., Jordan, J.A., McKerr, L., Devine, P. and Keenan, M. (2013). Awareness and knowledge of autism and autism interventions: A general population survey. *Research in Autism Spectrum Disorders*, 7(12), pp.1558-1567.
- Draaisma, D. (2009). Stereotypes of autism. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 364(1522), pp.1475-1480.
- Everett, J.A. and Onu, D., 2013. Intergroup contact theory: Past, present, and future. *The Inquisitive Mind*, 2(17), pp.1-6.

Fox, F., Aabe, N., Turner, K., Redwood, S. and Rai, D. (2017). “It was like walking without knowing where I was going”: A Qualitative Study of Autism in a UK Somali Migrant Community. *Journal of Autism and Developmental Disorders*, 47(2), pp. 305-315.

Gardiner, E. and Iarocci, G. (2014). Students with autism spectrum disorder in the university context: Peer acceptance predicts intention to volunteer. *Journal of autism and developmental disorders*, 44(5), pp. 1008-1017.

Gillespie-Lynch, K., Brooks, P. J., Someki, F., Obeid, R., Shane- Simpson, C., Kapp, S. K., & Smith, D. S. (2015). Changing college students’ conceptions of autism: An online training to increase knowledge and decrease stigma. *Journal of Autism and Developmental Disorders*, 45(8), 2553–2566.

Hassan, M., 2012. Predicting the prevalence of Autism among ethnic groups. *Archives of Disease in Childhood*, 97, p.A95.

Heer, K., Rose, J. and Larkin, M. (2012). Understanding the experiences and needs of South Asian families caring for a child with learning disabilities in the United Kingdom: an experiential–contextual framework. *Disability & Society*, 27(7), pp.949-963.

Heidgerken, A. D., Geffken, G., Modi, A., & Frakey, L. (2005). A survey of autism knowledge in a health care setting. *Journal of Autism and Developmental Disorders*, 35(3), 323–330.

John, R.P., Knott, F.J. and Harvey, K.N. (2017). Myths about autism: An exploratory study using focus groups. *Autism*, p.1362361317714990.

Lin, L.Y., Orsmond, G.I., Coster, W.J. and Cohn, E.S. (2011). Families of adolescents and adults with autism spectrum disorders in Taiwan: The role of social support and coping in family adaptation and maternal well-being. *Research in Autism Spectrum Disorders*, 5(1), pp. 144-156.

Lindsay, G. Dockrell, J. Law, J. and Roulstone, S. (2012). *The Better Communication Research Programme: Improving provision for children and young people with speech, language and communication needs*. London: Department for Education.

McManus, J. L., Feyes, K. J., & Saucier, D. A. (2011). Contact and knowledge as predictors of attitudes toward individuals with intellectual disabilities. *Journal of Social and Personal Relationships*, 28(5), 579–590.

Maenner, M.J., Shaw, K.A. and Baio, J. (2020). Prevalence of autism spectrum disorder among children aged 8 years—autism and developmental disabilities monitoring network, 11 sites, United States, 2016. *MMWR Surveillance Summaries*, 69(4), p.1.

Mandell, D.S., Wiggins, L.D., Carpenter, L.A., Daniels, J., DiGuseppi, C., Durkin, M.S., Giarelli, E., Morrier, M.J., Nicholas, J.S., Pinto-Martin, J.A. and Shattuck, P.T. (2009). Racial/ethnic disparities in the identification of children with autism spectrum disorders. *American journal of public health*, 99(3), pp.493-498.

Mavropoulou, S. and Sideridis, G.D. (2014). Knowledge of autism and attitudes of children towards their partially integrated peers with autism spectrum disorders. *Journal of autism and developmental disorders*, 44(8), pp. 1867-1885.

May, C. (2012). An investigation of attitude change in inclusive college classes including young adults with an intellectual disability. *Journal of Policy and Practice in Intellectual Disabilities*, 9(4), 240–246.

Munroe, K., Hammond, L. and Cole, S. (2016). The experiences of African immigrant mothers living in the United Kingdom with a child diagnosed with an autism spectrum disorder: an interpretive phenomenological analysis. *Disability & Society*, 31(6), pp.798-819.

Office for National Statistics Census. (2011). Digitised Boundary Data (England and Wales) [computer file]. UK Data Service Census Support. Downloaded from: <https://borders.ukdataservice.ac.uk/>

Office for National Statistics. (2019). Families and households QMI [Online]. Titchfield: Office for National Statistics.

Scior, K., Addai-Davis, J., Kenyon, M. and Sheridan, J.C. (2013). Stigma, public awareness about intellectual disability and attitudes to inclusion among different ethnic groups. *Journal of Intellectual Disability Research*, 57(11), pp. 1014-1026.

Selman, L.E., Fox, F., Aabe, N., Turner, K., Rai, D. and Redwood, S. (2017). ‘You are labelled by your children’s disability’—A community-based, participatory study of stigma among Somali parents of children with autism living in the United Kingdom. *Ethnicity & health*, pp.1-16.

Slade, G. (2014). *Diverse perspectives: The challenges for families affected by autism from Black, Asian and Minority Ethnic communities*. London: The National Autistic Society.

Staniland, L. (2009). *Public Perceptions of Disabled People. Evidence from the British Social Attitudes Survey*.

Stern, S.C. and Barnes, J.L. (2019). Brief Report: Does Watching The Good Doctor Affect Knowledge of and Attitudes Toward Autism?. *Journal of autism and developmental disorders*, 49(6), pp.2581-2588.

Strand, S., Lindsay, G. and Pather, S. (2006). *Special educational needs and ethnicity: Issues of over-and under-representation*. Department for Education and Skills.

Strand, S. and Lindsay, G. (2012). *Ethnic Disproportionality in the Identification of Speech Language and Communication Needs (SLCN) and Autistic Spectrum Disorders (ASD): 2005-2011*.

Tarakeshwar, N. and Pargament, K.I. (2001). Religious coping in families of children with autism. *Focus on Autism and Other Developmental Disabilities*, 16(4), pp.247-260.

Timmons, L. & Ekas, N. (2018). Giving thanks: Findings from a gratitude intervention with mothers of children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 49, 13-24

Tipton, L.A. and Blacher, J. (2014). Brief report: Autism awareness: Views from a campus community. *Journal of autism and developmental disorders*, 44(2), pp.477-483.

Totsika, V. & Jones, R.P. (2017). Changing students' attitudes to people with intellectual disabilities: Findings from a natural experiment. *The Bulletin of the Faculty of People with Intellectual Disabilities*, 15(1) 17-26.

University of London, Institute of Education, Centre for Longitudinal Studies, 2017, *Millennium Cohort Study: Fifth Survey*, (2012), [data collection], UK Data Service, 4th Edition, Accessed 18 May 2020. SN: 7464, <http://doi.org/10.5255/UKDA-SN-7464-4>

White, D., Hillier, A., Frye, A. and Makrez, E. (2019). College students' knowledge and attitudes towards students on the autism spectrum. *Journal of Autism and Developmental Disorders*, 49(7), pp.2699-2705.

Tables

Table 1: A summary of participants' social demographics.

Socio-demographics	Characteristics	N	Percent
Age	18-24	26	18.1
	25-34	64	44.4
	35-44	23	16.0
	45-54	18	12.5
	55-64	9	6.3
	65-74	4	2.8
Age recode	34 and Under	90	62.5
	35 and Over	54	36.5
Ethnicity	Arab	1	.7
	Asian or Asian British – Bangladeshi	3	2.0
	Asian or Asian British – Indian	11	7.4
	Asian or Asian British – Pakistani	1	.7
	Asian or Asian British – Other	8	5.3
	Background	57	35.7
	Black or Black British – African	6	4.1
	Black or Black British – Caribbean	7	4.7
	Black or Black British – Other	0	0
	Background	1	.7
	Chinese	0	0
	Mixed – White and Asian	2	1.4
	Mixed – White and Black African	6	4.1
	Mixed – White and Caribbean	36	25
	Mixed – Other Mixed background	7	4.7
	White British	5	3.4
	White Irish		
White – Other White Background			
Ethnicity recoded	Black	70	47.3%
	Asian	23	15.5%
	White	43	29.1%
	Other	18	8.1
Financial status	Living comfortably	102	67.1
	Finding it difficult	42	27.6

Table 2: Regression model examining associations between **contact** and attitudes to disability after accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-1.052	.742	-1.418	.159	[-2.523, .420]
Financial status	.328	.241	1.360	.177	[-.151, .806]
Black Ethnicity	.041	.122	.335	.738	[-.202, .283]
Contact	1.327	.409	3.246	.002	[.516, 2.139]
R² = .109					
F = 2.935					

Note. CI = Note: CI= Confidence Interval = p <.05

Table 3: Regression model examining associations between **contact** and attitudes to disability after accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-1.076	.739	-1.457	.148	[-2.542, .390]
Financial status	.308	.233	1.318	.191	[-.156, .771]
Asian ethnicity	-.132	.490	-.270	.787	[-1.105, .840]
Contact	1.312	.412	3.184	.002	[.494, 2.130]
R² = .10.9					
F = 3.045					

Note. CI = Note: CI= Confidence Interval = p <.05

Table 4: Regression model examining associations between **contact** and attitudes to disability after accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-1.143	.743	-1.538	.127	[-2.618, .332]
Financial status	.259	.243	1.066	.289	[-.223, .741]
White Ethnicity	.042	.059	.711	.479	[-.075, .158]
Contact	1.286	.412	3.121	.002	[.468, 2.103]
R² = .113					
F = 3.045					

Note. CI = Note: CI= Confidence Interval = p <.05

Table 5: Regression model examining whether **knowledge** is associated with participant attitudes accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-.637	.665	-.959	.340	[-1.953, .678]
Financial status	.147	.212	.695	.489	[-.273, .567]
Black Ethnicity	.072	.112	.639	.524	[-.150, .294]
Knowledge	.067	.032	2.080	.040	[.003, .131]
R² = .044					

F = 1.446

Table 6: Regression model examining whether **knowledge** is associated with participant attitudes accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-.692	.662	-1.047	.297	[-2.002, .617]
Financial status	.118	.205	.576	.566	[-.288, .525]
Asian Ethnicity	-.330	.441	-.748	.456	[-1.203, .543]
Knowledge	.067	.032	2.013	.046	[.001, .127]
R² = .045					
F = 1.486					

Note. CI = Note: CI= Confidence Interval = $p < .05$

Table 7: Regression model examining whether **knowledge** is associated with participant attitudes accounting for demographic characteristics

Variable	B	SE	t	p	95% CI
Age	-.757	.670	-1.130	.261	[-2.083, .569]
Financial status	.073	.213	.344	.732	[-.348, .494]
White Ethnicity	.040	.055	.722	.472	[-.069, .148]
Knowledge	.057	.033	1.718	.088	[-.009, .213]
R² = .045					
F = 1.476					

Note. CI = Note: CI= Confidence Interval = $p < .05$

Table 8: Regression model examining whether the association between autism knowledge and attitudes is moderated by ethnicity (Black)

Variable	B	SE	t	p	95% CI
Age	-.680	.676	-1.005	.317	[-2.019, .659]
Financial status	.141	.216	.651	.516	[-.287, .568]
Black Ethnicity	.097	.289	.335	.739	[-.475, .669]
Knowledge*Black	-.002	.008	-.233	.816	[-.017, .014]
Ethnicity					
R² = .012					
F = .366					

Note. CI = Note: CI= Confidence Interval = $p < .05$

Table 9: Regression model examining whether autism knowledge and attitude is moderated by ethnicity (Asian)

Variable	B	SE	t	p	95% CI
Age	-.635	.660	-.963	.338	[-1.942, .671]
Financial status	.207	.208	.996	.321	[-.204, .619]
Asian Ethnicity	-3.802	1.635	-2.325	.022	[-7.038, -.565]
Knowledge*Asian	.097	.044	2.210	.029	[.010, .183]
Ethnicity					
R² = .052					
F = 1.697					

Note. CI = Note: CI= Confidence Interval = $p < .05$

Table 10: Regression model examining whether autism knowledge and attitude is moderated by ethnicity (White).

Variable	B	SE	t	p	95% CI
Age	-.828	.679	-1.219	.225	[-2.171, .516]
Financial status	.052	.215	.240	.811	[-.374, .477]
White Ethnicity	.097	.238	.409	.683	[-.374, .569]
Knowledge*White	-.001	.006	-.133	.894	[-.012, .011]
Ethnicity					
R² = .023					
F = .725					

Note. CI = Note: CI= Confidence Interval = $p < .05$