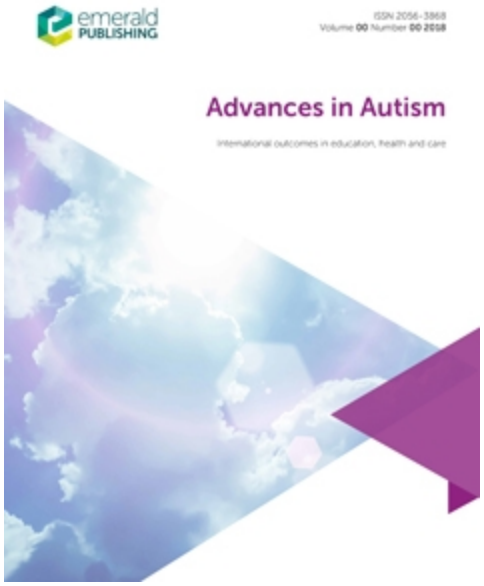

Public attitudes to people with ASD: contact, knowledge and ethnicity

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The present study explored what factors (contact, knowledge and ethnicity) may be associated to positive attitudes towards individuals with ASD. An online survey examined contact with and knowledge of ASD among Black, Asian and White ethnic groups to predict public attitudes to people with ASD. The results from multiple regression models suggested that the level of contact predicts positive attitudes towards autism when demographic factors were accounted. The level of knowledge about autism were significantly associated to attitudes but not consistently when demographic factors were accounted. However, differences in knowledge and attitudes to people with ASD were identified amongst Black, Asian and White ethnic groups.

These findings have implications for policy and public health and education campaigns, including ensuring contact and knowledge of autism among the public.

Additionally, further effort is required to target public knowledge and attitudes to autism, particularly among ethnic groups. 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.

These findings have implications for policy and public health and education campaigns, including ensuring contact and autism knowledge among the public. Additionally, further effort is required to target public knowledge and attitudes to autism by dispelling myths that contribute to create distance between the public and autistic people. Autism public awareness and education campaigns may encourage social interactions to support contact between people with ASD and the public.

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Public attitudes to people with ASD: 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 mechanisms (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; Tromans et al., 2020), we know little about the views of ethnic minority groups about 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 about autism 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, although 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 unique aspects of 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). This supports Allport's (1954) observation that what is alien can be judged as 'other', 'inferior', and 'less good'. People with neurological disabilities accompanied by behavioural symptomology tend to face stigma

and discrimination, with public attitudes highlighted as the major barrier to people's 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 disabilities. 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 among 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 programme. 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 towards 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,

aetiology 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 with a protagonist with ASD characteristics, acquired transferrable knowledge about autism with participants then attributed more positive characteristics about 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. It appears that contextualised rather than abstract representations of people with ASD are likely to reduce stigma and increase acceptance of people with ASD.

Research on disability has identified certain social demographics as contributing to attitudes. Higher income has been associated with more positive attitudes to disability, albeit a physical disability. It is unclear whether higher income would be associated with more positive attitudes to hidden disabilities, autism in particular (Staniland, 2009). Age has also been found to contribute to attitudes. Younger participants (34years and below) held more positive attitudes to hidden disabilities than older participants (35years and older) (Staniland, 2009). Evidence on public attitudes towards people with developmental disabilities has shown ethnicity to be an important factor. Compared to Black and minority ethnic respondents, White British respondents showed decreased social distance to people with intellectual disability (Scior et al., 2013). Coles and Scior (2012) compared the attitudes towards people with intellectual disabilities as expressed by people from South Asian backgrounds and White British people in the UK. The researchers reported that White British participants were more likely to make accepting and empowering statements about people with 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 showed limited awareness of autism among ethnic minority and immigrant families when compared to White British parents. Ethnic minority families of children with ASD have experienced disablist attitudes and marginalisation from their own communities stressing the double marginalisation and isolation they face from their ethnic communities and the wider societal context (Munroe et al., 2016; Fox et al., 2017; Heer et al., 2012; Papadoulous, 2016).

In the most recent British national survey on attitudes to disability (BSAS, 2009), conducted over 10 years ago, the association between ethnicity and attitudes was not examined. This is an important omission in the light of evidence that people from ethnic minority backgrounds may be less aware of autism-related behaviours and needs (Munroe et al., 2016; Fox et al., 2017; Hussein et al., 2019l; Heer et al., 2012). 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:

- Examine associations between contact and attitudes to disability while accounting for various factors associated with attitudes

- Examine the association between autism knowledge and attitudes, while accounting for social demographic characteristics, and examine 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 knowledge about autism, the amount of contact they had with people with ASD as well as their attitudes towards individuals with ASD under various scenarios. Participants identified as Black (47.3%), White (29.1%), Asian (15.5%), or other ethnic (8.1%). Their age range was 18-74years (M = 28.6, SD = .485) (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 a diagnosis of autism. Regarding 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 and 2.6% were looking after home and family.

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 people with ASD.

Attitudes

The Comfort Scale (Staniland, 2009) was designed to assess participants' attitude to disability in various social contexts. Staniland (2009) employed cognitive testing to measure accuracy (DWP, 2009) of the public's attitude to disabilities across various 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, i.e., more positive attitudes, towards autism. The internal reliability of the scale was .88 (Cronbach's alpha), indicating strong internal consistency.

Autism Knowledge

The Autism Survey was developed by Stone (1987) 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 & Bourgondien 1996). Stone (1987) and Campbell et al. (1996) 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 was summed (range 0 to 72) with higher scores indicating higher autism knowledge. The internal

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

Age

The age range was 18-74years and mean age was 28.6 years (SD = .485). Categorical data depicted the number of participants who were 34 years and under and 35 years and older (see Table 1). This approach was adopted from the most recent survey (BSAS, Staniland, 2009) to examine 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, Asian and White to distinguish knowledge and attitude to autism among ethnic groups. White Irish participants were included in the 'White' 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; Understanding Society Survey, Wave 11, 2019). 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) and Australia (e.g., the Longitudinal Study of Australian Children, 2004). For the purposes of the present study, the variable was coded as 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; 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, 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.

Procedure

Hyperlinked adverts for the 10-minute anonymous online survey in Qualtrics software were placed on social media sites (e.g. WhatsApp, Facebook and Twitter) to target different ethnic groups between the end of April to the beginning of June 2018. Findings were analysed using SPSS, version 25. 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 were statistically significant 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, (β=.326, $t(96) = 3.246$, = .002), indicating that for every 1-unit increase in contact with persons with autism, levels of comfort increased by about .326 of a standard unit. However, age: (β=-.139, $t(96)= -1.418$, $p= .159$); financial status: (β=.140, $t(96)= 1.360$, $p=.177$); and Black ethnic group: (β= .034, $t(96)= .335$, $p=.738$) did not predict attitudes to autism.

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 to attitudes after accounting for age, financial status and Asian ethnicity, *(F(4, 96) = 2.924, p= .025)*. Contact notably predicted attitudes to autism, (β=.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: (β=-.143, *t*(96)= -1.457, *p*= .148); financial status: (β=.131, *t*(96)= 1.318, *p*= .191); and Asian ethnic group: (β= -.026, *t*(96)= -.270, *p* =.787) were not found to 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 age, financial status and White ethnicity, *(F(4, 96) = 3.045, p= .021)*. Contact notably predicted attitudes to autism, (β=.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: (β=-.151, *t*(96)= -1.538, *p*= .127); financial status: (β=.111, *t*(96)= 1.066, *p*= .289); and White ethnic group: (β= .072, *t*(96)= .711, *p*= .479) were not found to predict attitudes.

Autism knowledge, demographic factors and 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, (β=.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: (β=-.084, t(129)= -.959, *p*= .340); financial status: (β=.063, t(129)= .695, *p*= .489); and Black ethnic group: (β= .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, (β=.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: (β=-.092, t(129)= -1.047, *p*= .297); financial status: (β=.051, t(129)= .576, *p*= .566); and Asian ethnic group: (β= -.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 predict attitudes to autism, (β=.157, t(129) = 1.718, *p*= .088). Additionally, age: (β=-.100, t(129)= -1.130, *p*= .261); financial status: (β=.031, t(129)= .344, *p*= .732); and White ethnic group: (β= .069, t(129)= .722, *p*= .472), were not predictors of autism knowledge.

Interactions between knowledge and ethnicity / age / financial status were examined to ascertain whether the association between autism knowledge and attitudes was moderated by ethnicity, age and financial status (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 (β=-.055, t(129) = -.233, *p*= .816) and neither did age: (β=-.090, t(129)= -1.005, *p*= .317); financial status: (β=.060, t(129)= .651, *p*= .516); and Black ethnic group: (β= .079, t(129)= .335, *p*= .739).

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

The third regression model explained 2.3% of the variance and identified that autism knowledge and attitude was not moderated by ethnicity (β=-.055, t(129)= -.133, *p*= .894). Additionally, age (β=-.110, t(129)= -1.219, *p*= .225), financial status (β=.022, t(129)= .240, *p*= .811) and White ethnicity (β=.169, t(129)=.409, *p*= .683) did not moderate 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 factors that contribute to attitudes. Contact was the most significant predictor of attitudes to people with ASD consistently with 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 highlighted the significance of contact to reduce prejudice and stigma in public attitudes to autism and suggested that autism knowledge was associated with attitudes towards autism among ethnic minority groups. The study's finding that Black and Asian ethnic groups predicted knowledge and attitudes to autism is significant although inconsistent with previous research on autism knowledge (Gillespie-Lynch et al., 2015; Stern & Barnes, 2019; Campbell et al., 2019), awareness and understanding of autism among Black and Asian parents and the prevalence of societal stigma in these communities (Munroe et al., 2016; Fox et al., 2017; Slade, 2014; Selman, 2017). Interactions also showed that ethnicity moderated autism knowledge and attitudes to autism in the Asian ethnic group only. Therefore, autism knowledge among the Asian ethnic group contributed to positive attitudes to people with ASD.

The significant association between contact and public attitudes showed that contact with people with ASD contributed to 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 reflected 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 common goals, be governed by social traditions and 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 persons with ASD (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 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, reduce the public's negative attitudes against hidden disabilities in general and prejudice about people with ASD in particular (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 disabilities. Positive media content about people with ASD could gradually change public attitudes and encourage positive expectations of people with autism in social, educational and professional settings (Totsika & Jones, 2017; Tharian et al., 2019). The study's findings 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 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 impacts 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 responds 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 among 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, intellectual disability and mental health (May 2012; McManus et al., 2011; White et al., 2016). Also, that knowledge did not predict attitudes to autism among White participants is also inconsistent with research (Scior et al., 2013; Coles & Scior, 2012). The findings about differences in autism knowledge and attitudes to autism between ethnic groups suggested that Black, Asian and White participants experienced varying degrees of exposure to autism (Slade, 2014; Selman, 2017; Scior et al., 2013; Heer et al., 2012). The study produced novel findings that in contrast to White participants, Black and Asian participants' knowledge of autism predicted attitudes. Prior research (Munroe et al., 2016; Fox et al., 2017; Selman, 2017; Slade, 2014) suggested that autism knowledge tend to be lower among Black and Asian groups, however, the findings from this paper indicated that knowledge does contribute to attitudes, highlighting the importance of increasing knowledge about autism among ethnic minority groups.

A considerable disparity in the percentage of children with ASD amongst different ethnic groups has been found across different studies (PLASC, 2006; Strand & Lindsay, 2012). National surveys on ethnicity and ASD found 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). An increased 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 such as language difficulties for non-English speaking parents (Corbett &Perepa, 2007) and 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 were factors that explained the limited representation of ASD among Asians. Unlike previous research on knowledge and attitudes, this study focused on ethnicity and included sizeable ethnic minority groups, thus painting the current picture of knowledge and attitudes to autism by suggesting that among Black and Asian groups, increased knowledge and exposure to autism were associated with attitudes to autism (Gillespie-Lynch et al., 2015).

The findings showed that the association between autism knowledge and attitudes was moderated by Asian ethnic membership. Research evidence suggests that minority ethnic parents have been noted for limited knowledge, low ASD prevalence (due to under diagnosis) and poor attitudes to autism (Munroe et al., 2016; Fox et al., 2017; Slade, 2014; Selman, 2017; Chandran et al., 2019; Lindsay et al., 2006). Thus, findings from this study support the idea that knowledge about autism is an important component of effective interventions towards reducing stigma and increasing positive attitudes to people with ASD among Asian ethnic groups (Corbett & Perepa, 2007; Heer et al., 2012).

Strengths and limitations

This study contributed to growing evidence on attitudes towards ASD, particularly amongst ethnically diverse groups. It also examined the role of 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 the 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 about exposure, knowledge and attitudes to autism among different ethnic groups. Thus, this study highlighted the need to explore stereotypes that underlie prejudice and stigma towards people with ASD in society and examine the 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 towards ASD across Black, Asian and White ethnic groups and offered insight on the differences in knowledge and attitudes to autism. It would be worthwhile for future research to explore the differences in knowledge, contact and ethnicity by gathering 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 different ethnic groups. Its main premise was that being aware of people with ASD and having contact with them are 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 contributes to a small but growing number of studies on ethnicity, contact and attitudes to autism in the general public. Despite the novel findings on attitudes and knowledge among various ethnic groups, researchers, policymakers and commissioners must include ethnicity in decisions about disability and autism research, policy and practice: autism public awareness and education campaigns are likely to encourage social interactions between people with ASD and the general public. As our findings showed, knowledge on autism *per se* did not improve attitudes across all ethnic groups, whereas actual contact did. A practical implication that emerges from this is for 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 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 of and more accepting of differences.

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Tables

Table 1: A summary of participants' social stratifications.

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	28
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 ASD 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]
R^2 =.109 F = 2.935					

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

*Table 3: Regression model examining associations between **contact** and attitudes to ASD 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]
R^2 =.10.9 F = 3.045					

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

*Table 4: Regression model examining associations between **contact** and attitudes to ASD 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]
R^2 =.113 F = 3.045					

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

*Table 5: Regression model examining associations between **knowledg**e and attitudes to ASD after 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]

R^2 =.044

F = 1.446

*Table 6: Regression model examining associations between **knowledg**e and attitudes to ASD after 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]

R^2 =.045
F = 1.486

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

*Table 7: Regression model examining associations between **knowledg**e and attitudes to ASD after 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]

R^2 =.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 Ethnicity	-.002	.008	-.233	.816	[-.017, .014]

R^2 =.012
F = .366

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

Table 10: Regression model examining whether the association between autism knowledge and attitudes is moderated by ethnicity (White).

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 Ethnicity	.097	.044	2.210	.029	[.010, .183]
R^2 =.052 F = 1.697					

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

Table 10: Regression model examining whether autism knowledge and attitudes 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 Ethnicity	-.001	.006	-.133	.894	[-.012, .011]
R^2 =.023 F = .725					

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