**QUEEN'S
UNIVERSITY
BELFAST**

Autism awareness in children and young people: Surveys of two populations

Dillenburg, K., Jordan, J-A., McKerr, L., Lloyd, K., & Schubotz, D. (2017). Autism awareness in children and young people: Surveys of two populations. *Journal of Intellectual Disability Research*, 61(8), 766-777. <https://doi.org/10.1111/jir.12389>

Published in:
Journal of Intellectual Disability Research

Document Version:
Peer reviewed version

Queen's University Belfast - Research Portal:
[Link to publication record in Queen's University Belfast Research Portal](#)

Publisher rights

© 2017 MENCAP and International Association of the Scientific Study of Intellectual and Developmental Disabilities and John Wiley & Sons Ltd. This work is made available online in accordance with the publisher's policies. Please refer to any applicable terms of use of the publisher.

General rights

Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.

Autism awareness in children and young people: Surveys of two populations

Short title: Autism awareness in children and young people

Karola Dillenburger¹, Julie-Ann Jordan¹, Lynne McKerr¹, Katrina Lloyd², & Dirk Schubotz²

Dillenburger, K., Jordan, J.A., & McKerr, L., Schubotz, D., & Lloyd, K (2017) Autism awareness, knowledge, and attitudes in the general population of children and young people. *Journal of Intellectual Disability Research*, 61 (8), 766–777. DOI 10.1111/jir.12389

Correspondence should be addressed to
Professor Karola Dillenburger
Queen's University Belfast
Centre for Behaviour Analysis
School of Social Sciences, Education, & Social Work
69/71 University Street
Belfast BT7 1HL
Northern Ireland
email: K.dillenburger@qub.ac.uk
www.qub.ac.uk/cba

¹Centre for Behaviour Analysis, Queen's University Belfast (www.qub.ac.uk/cba)

²Archive for Research and Knowledge (ARK) Queen's University Belfast

Autism awareness in children and young people: Surveys of two populations

Abstract

Background: Increasingly, pupils on the autism spectrum are educated in inclusive mainstream classrooms. However, they often experience social isolation and bullying and raising the awareness of autism in peers has been suggested as a remedy.

Methodology: In order to assess autism awareness in peers, autism related questions were included in two large-scale surveys; the Kids Life and Times (KLT) Survey for 11-year-olds and the Young Life and Times (YLT) Survey for 16-year-olds; a total of n=3,353 children and young people completed the surveys.

Results: Autism awareness was higher for the teenagers (80%) than for the younger children (50%). Many of the children knew someone with autism (50%) and generally reported positive and supportive attitudes. Self-reported prevalence of autism was 3.1% for teenagers and 2.7% for the younger children. Peers recognised bullying as a problem and were willing to help.

Discussion: Children and young people have good levels of awareness and knowledge about autism, and reported positive attitudes towards peers with autism and are willing to help those who are bullied. A higher than expected number of children and young people self-reported being on the autism spectrum. These findings bode well for peer-mediated support strategies for inclusive education.

Keywords: Autism awareness, children, young people, mainstream, Millennium cohort study, Northern Ireland, inclusion, SEN

Introduction

Autism Spectrum Disorder (ASD) is diagnosed on the basis of pervasive developmental delays in social communication and significantly restricted interests and repetitive behaviours (APA, 2013). The estimated overall prevalence rate of autism increased dramatically over the past 15 years. In 1997/1998, the Avon Longitudinal Study of Parents and Children (ALSPAC) study found that 1% of the overall population was on the autism spectrum (Russell et al 2015). The CDC (2015) found that approximately 1 in every 68 people were on the autism spectrum. However, autism prevalence in children is considerably higher; in Northern Ireland, 2.3% of school children are on the autism spectrum (DHSSPS, 2016) and in the UK as a whole, a secondary analysis of the Millennium Cohort Study (MCS; total n=18,522; Fitzsimmons, 2000) showed that 3.5% (1 in every 29) of 11-year-olds were said to be on the autism spectrum; a significant increase from 1.8%, when these children were 7-year-olds (Dillenburger, Jordan, McKerr, & Keenan, 2015).

This rise has variously been attributed to improved diagnostic criteria, increased service provision, and rising incidents (Keenan, Dillenburger, Doherty, Byrne, & Gallagher, 2010; NICE, 2011). Although exact figures are not available, it is estimated that co-occurring intellectual disabilities affect between 50-75% of the individuals diagnosed with autism and at least 1/3 of people with intellectual disabilities are on the autism spectrum (Brugha et al., 2012).

Despite the fact that raising autism awareness has been the key focus of large international campaigns, such as the designation of April as Autism Awareness month and the 2nd April as Autism Awareness Day (United Nations, 2007) or the Light-up-Blue campaign (Autism Speaks, 2014), there has been relatively little research on levels of autism awareness in the general population.

A recent general population survey of adults in the Northern Ireland (Northern Ireland Life and Times [NILT]; n=1,204) revealed high levels of autism awareness (82%), with 52% of the adult respondents personally knowing someone with autism (Dillenburger, Jordan, McKerr, Devine, & Keenan, 2013). Relatively positive attitudes about autism were found amongst the sample (Dillenburger, McKerr, Jordan, Devine, & Keenan, 2015). These findings confirmed an earlier smaller study (n=500) by the National Autistic Society (NAS) in Northern Ireland, that reported similarly high levels of autism awareness (90%; Stewart, 2008). A larger survey (n=2,000 people aged 16 and over) by the NAS UK, reported an autism awareness rate of 92% (NAS, 2007). A French online survey of public perception of different disabilities and mental health conditions (n=1,000 adults) found 100% were autism aware, although when asked to give more details, only 67% were able to describe autism accurately (Durand-Zaleski et al., 2012).

A lot less is known about autism awareness in children or young people. Campbell and Barger (2011) were the only authors to date who explored children's autism awareness (n=1,015). They found that 77% of elementary school children and 46% of middle school children were aware of the term autism. Campbell and Barger (2014) pointed out that despite the level of autism awareness and significant levels of knowledge about autism in peers (70% accuracy), pupils with autism still experienced high levels of isolation, teasing, and bullying.

Bullying is a serious issue, not just for children with autism. Almost half of the children (47%) in schools in England are bullied, especially as teenagers (Green, Collingwood, & Ross 2012). It is estimated that more than 16,000 children aged 11- 15 years are absent from state schools in England each year due to bullying (Brown, Clery, & Ferguson, 2011).

Bullying and verbal aggression from peers is a major concern for children and adults with intellectual disabilities (Humphrey & Symes, 2011; Scior, 2011), including children with autism (Cappadocia, Weiss, & Pepler, 2012), especially teenagers with high functioning

autism or Asperger syndrome (Bancroft, Batten, Lambert, & Madders, 2012). While merely providing information about autism to typically-developing peers does not result in more positive attitudes towards classmates with autism (Swaim & Morgan, 2001; Morton & Campbell, 2007), direct personal contact can improve attitudes (Mavropoulou & Sideridis, 2014), and pro-active, evidence-based strategies such as ‘buddying’ or peer-mentoring can increase inclusion and prevent bullying (Rodriguez et al., 2007; Kohler et al., 2007).

The present paper reports the first study of autism awareness in children and young people in the UK. An autism module was included in two well-established and validated population surveys; (1) the Kids Life and Times (KLT) Survey (11-year-olds) and (2) the Young Life and Times (YLT) Survey (16-year-olds) (ARK, 2015). Both of these surveys are conducted annually and address a range of different topics each year, including children’s rights, integrated education, play, bullying, nature, and ageing. Data for KLT are available at <http://www.ark.ac.uk/klt/2014/> and data for YLT are available at <http://www.ark.ac.uk/ylt/2014/>.

Method

Ethical approval

Queen’s University Belfast (QUB) granted ethical approval and QUB research governance procedures were adhered to.

Participants

A total of n=3,343 children and young people took part; n=2,319 children (11-years-of-age) took part in the *Kids Life and Times (KLT)* survey; of these approx. 50% were male

(n=1,169) and 50% were female (n=1,145); gender identification was missing for less than 0.5% of respondents.

In total, n=1,034 young people (16-years-of-age) completed the *Young Life and Times (YLT)* survey, of these, 60% were females (n=618) and 40% were males (n=411); ‘other’ or no response (<0.5%).

Research tools

Questions for the autism modules were adapted from the Northern Ireland Life and Times (NILT) Survey Autism Module. The NILT Survey is an annual general population survey for adults (18+ year-olds) that addresses a range of different issues each year. In 2012, an autism module was included for the first time. The NILT 2012 Survey autism module was completed by a representative sample of adults in Northern Ireland (n=1,204). Data are available on the ARK webpages and details are reported elsewhere (Dillenburger, Jordan, & McKerr, 2013; Dillenburger, McKerr, et al., 2015).

The adaptation of the NILT autism module for the KLT and YLT Surveys included a shortening of the questionnaire (e.g., questions about employment and adult caregiving were not included in KLT and YLT) and a slight adjustment of the wording in some of the questions to make them more ‘child-friendly’. The KLT autism module survey questions are presented in Appendix 1. The YLT questions were essentially the same except more mature language was used in the section explaining what autism is, and one additional question related to autism and bullying was included.

After the questions on knowledge about autism, a generally accepted definition of autism was given to ensure that the remaining questions were based on accurate information.

Research procedure

For the KLT survey, consent to participate was sought from school principals, parents, and the children themselves. All primary schools in Northern Ireland (pupil population of approximately $n=22,500$) as well as children who were home-schooled, in hospital, or in special schools were invited to take part. The KLT survey link was given to the children and they completed the survey online. It typically took 20 minutes to complete.

The YLT Survey was carried out with 16-year-olds living in Northern Ireland whose birthdays fall between January and March of the year of the survey. The names and addresses of the target population were sourced through HM Revenue and Customs (HMRC) from the Child Benefit Register ($n=5,646$). Consent was gained from the young people themselves prior to completion of the survey. The survey was accessed and completed online (alternative presentation by telephone or paper copy were available on request).

Data analysis

Most responses were reported as simple descriptive statistics. Chi-square tests were carried out where appropriate.

Some responses from open questions were reported as word clouds. Only words that were mentioned more than 25 times were included in the word clouds. In each word cloud, the frequency with which a word was mentioned is displayed in brackets after the word and the more frequently a word was mentioned the larger is its physical size.

In order to include attitudinal variables, these responses were treated as nominal. Adjusted z scores were computed to enable post hoc comparisons. Predictive analysis and logistic regression analysis was used where appropriate.

Results

Awareness, diagnosis, and knowledge of autism

Significantly more of 16-year-olds were aware of autism than the 11-year-olds (80% vs 50%; $\chi^2 = 272.452$ (1), $p < .001$, $v = .286$).

A diagnosis of autism was more prevalent amongst 16-year-old participants than 11-year-old participants (3.1% vs 2.7%). Both groups reported higher autism rates for themselves than those reported in official statistics (2.3%; DHSPS, 2016). However, they reported slightly lower autism rates as those reported in the secondary analysis of the Millennium Cohort study (3.5% for 11 year olds; Dillenburger, Jordan, & McKerr, 2014).

Children's knowledge about autism was quite accurate as shown in the word cloud of the terms most frequently used by them to describe autism (total responses $n=982$; Figure 1); Figure 2 shows the equivalent word cloud for 16-year-old YLT participants (total responses $n=780$). Many of the children referred to autism as a 'condition', 'disability', 'disease', or 'illness' and these terms were frequently used in conjunction with the terms 'learning' and 'mental'. Some respondents mentioned that autism affected how people 'think', 'talk', 'speak', and 'understand'. Other frequently used terms included 'different' from 'others/people' and problems making friends.

Attitudes towards inclusion of individuals with autism

A greater number of the 16-year-olds (72%) than the younger children (43%) knew someone with autism personally; in most cases this was a classmate or friend (Figure 3).

Younger children were more ambivalent compared to 16-year-olds in terms of attitudes towards peers with autism, i.e., significantly more (3-4 times more) of the younger children said they do not know about their attitudes towards people on the autism spectrum (Table 1).

However, the majority of participants had positive attitudes towards individuals on the autism spectrum; 16-years-olds were more likely than younger children to feel comfortable if a family who had a child with autism moved in next door (82% vs 40%) or if a child with autism was in their class at school/college (77% vs 45%).

The vast majority of 11- and 16-year-olds (81% – 90%) felt it was okay for individuals with autism to get extra help in class; while there was a significant difference between the two age groups, the effect size was very small. (Table 1).

Bullying

One in six of the 11-year-olds and 16-year-olds (17% vs 18%) reported to have witnessed someone with autism being bullied; while there was an age-related association, the effect size was quite small. The differences were mainly due to more of the 11-year-olds selecting ‘don’t know’ and more of the 16-year-olds not having witnessed bullying (Table 2).

Very few of the participants admitted to having bullied someone with autism (1-2%); with 16-year-olds being somewhat more likely than 11-year-olds to admit to having been a bully, albeit effect sizes were very small (Table 2).

The most common responses of 16-year olds who observed a bully was to tell the bully to stop (55%), tell a staff member (32%), or tell other young people (21%). Fewer than one in ten young people (9%) said that they did nothing in response to witnessing someone with autism being bullied. This question was not included for younger children in the KLT.

Predictors of autism awareness and attitudes

Gender was related to autism awareness; girls were 1.5 more likely than boys to be aware of autism (Table 3). Academic achievement was also related to autism awareness; those attending grammar or integrated schools were 2-3 times more autism aware than secondary school attendees. Teenagers' own health condition was also a factor; 16-year-olds with a long-term health condition were nearly 3 times more autism aware than others (Table 4).

For 11-years-olds, the key factors associated with positive attitudes towards the inclusion of children with autism were being female, being autism aware, and knowing someone with autism personally (Table 5). For 16-year-olds, the key factors were being female, being autism aware, having a lower economic status, knowing someone with autism, and having favourable attitudes towards shared education (Table 6).

Discussion

With rising prevalence rates, autism awareness in the general population has become a key focus of governmental and non-governmental initiatives. Recent research has shown that autism awareness is relatively high in the adult population (Dillenburger, Jordan, McKerr, et al., 2013; Stewart, 2008). Less is known about autism awareness in children and young people. The present study assessed awareness, attitudes, and knowledge in relation to autism of 11-year-old primary school children who were on the cusp of entering secondary education and of 16-year-old young people who had completed compulsory school education.

Results showed that 16-year-olds were aware of autism to the same extent as the general adult population (80% vs 82%; Dillenburger, Jordan, McKerr, et al., 2013), while autism awareness amongst the younger children was considerably lower (50%). This result is not surprising, given that most children are not disability aware without specific disability awareness training (Ison et al., 2010; Lindsay & Edwards, 2013; Moore & Nettelbeck, 2013).

Prevalence rates for autism in 11-year-olds and 16-year-olds (2.7% vs 3.1%) exceeded previously published prevalence rates of autism amongst school age children (2.3%; DHSSPS, 2016) and were closer to those discerned through a secondary data analysis of the large scale longitudinal Millennium Cohort Study in the UK (3.5%; Dillenburger, Jordan, et al., 2015) or those found in Korea (2.6%; Kim et al., 2011). Thus, present findings confirmed that autism is still widely under-reported in some inquiries (Baron-Cohen et al., 2009). This could be due to the fact that only about 50% of autism referrals are confirmed within the legal time frame (Wells, 2015) or that autism remains unrecognised and undiagnosed due to lack of screening (Filipek et al., 2000).

Increased levels of autism awareness went hand-in-hand with factual knowledge about autism. Not surprisingly, 16-year-olds had a more sophisticated understanding of autism than 11-year-olds. While there was some degree of overlap between YLT and KLT respondents in terms of the use of general descriptors for autism, 11-year-olds (5%, n=48) referred to autism in quite basic terms, while the young people went beyond the use of general descriptors to name the defining features of autism. In fact, their level of understanding was reminiscent of the knowledge of autism in the general adult population (Dillenburger, Jordan, McKerr, et al., 2013), who showed relatively good knowledge of autism but somewhat overestimated the existence of savants with 'special abilities', aka the 'Rain Man' phenomenon based on the Dustin Hoffman/Tom Cruise blockbuster movie portraying an autistic savant and his brother. This relative overestimation was not surprising given the popularity of the movie and the fact

that some studies have reported elevated prevalence of savant abilities in adults with autism (28.5%) albeit, these data were derived from very small samples (Howlin, Goode, Hutton, & Rutter, 2009). In reality, special or savant abilities are not a diagnostic criterion for autism and occur relatively rarely (approx. 10%; Edelson, 2016). In the general population, savantism exists but is an extremely exceptional phenomenon (1%; Edelson, 2016; Pravda, 2009).

Interestingly, the autism knowledge of the children and young people in the present study was more realistic. They associated autism with rather specific challenges and strengths. This may be due to the fact that they were more likely than adults to have daily contact with peers with autism due to increasing numbers of children with autism being educated in inclusive classrooms.

Generally, it seemed that those who knew someone with autism were more accepting of inclusive practices than those who did not know someone with autism. About half of the children (43%) knew someone with autism personally. This figure was only slightly lower than that for Northern Irish adults (52%) (Dillenburger, Jordan, McKerr, et al., 2013), while even more young people had personal contact with someone on the autism spectrum (72%).

This is not surprising, given that increasingly children with disabilities, e.g., autism, are included in mainstream schools (UNCRPD, 2006). For inclusion to be successful, however, both positive peer attitudes and appropriate additional supports are important. Peer attitudes of both 11-year-olds and 16-year-olds towards inclusion of children with autism were positive; 16-year-olds were more likely than younger children to report feeling comfortable, if a family who had a child with autism moved in next door (82% vs 40%) or if a child with autism was in their class at school/college (77% vs 45%). These findings offered a realistic comparison with figures which showed that over 90% of adults in Northern Ireland felt

comfortable with these kinds of inclusive practices (Dillenburger, McKerr, et al., 2015). The availability of additional supports in the classroom was widely supported by 11-year-olds and 16-year-olds (81% – 90%). While a certain amount of Hawthorne effect (i.e. observation bias) cannot be ruled out from any survey or interview-based research, given the confidential nature of an online survey, it is likely that participants felt free to report accurately their views.

Limitations of study

Perhaps not surprisingly, school bullying was identified as a major problem, with one in six of the respondents having witnessed a peer with autism being bullied. However, over half of the teenagers said they had intervened to try and stop the bullies. It is of course difficult to confirm these self-reported findings. Intervening in bullying can be perilous to those who attempt to stop a bully. For that reason (i.e., to protect participants), the 11-year-olds were not asked if they had intervened in such incidents. School-wide interventions to prevent bullying have had limited success (Gerlinger & Wo, 2016; Vreeman et al., 2007), although findings reported here confirmed that teenage peers felt able to act against bullying of particularly vulnerable peers (Cappadocia et al., 2012; Rowley et al., 2012).

Implications for further research and practice/policy

Findings reported here add to knowledge regarding autism awareness as well as self-declared prevalence in the school-aged populations. They provide evidence that more children and young people report to be on the autism spectrum than are reported in most statistics. Findings also show that relatively young children and teenagers are aware of autism, have

personal experience with peers with autism, and are generally happy to be educated inclusively with their peers with autism. Importantly, young people felt able to intervene if they observed bullying and the children and young people were in favour of educational supports, where needed. These findings bode well for the use of peer-mediated interventions that involve typically developing peers as ‘facilitators’ in the classroom (Zhang & Wheeler, 2011). They may also give direction to using peer-education in anti-bullying interventions. The practice of not educating peers about the autism diagnosis of their classmates (Doyle, 2003) should be revised in light of these findings (AsIAm, 2015).

Key points

- Awareness of autism among teenagers is high and is comparable to autism awareness in the general population (80% vs 82%). Not unexpectedly, autism awareness is somewhat lower among younger children (50%);
- The number of 16-year-olds (3.1%) and 11-year-olds (2.7%) who report that they are on the autism spectrum exceeds official prevalence figures (2.3%);
- Children and young people are aware of the challenges posed by an autism diagnosis;
- Children and young people approve of peers with autism receiving additional educational support where needed; and are prepared to take action to prevent bullying.

References

- Ambitious about Autism. (2014). Ruled out: Why are children with autism missing out on education? Retrieved March 10, 2015, from www.ambitiousaboutautism.org.uk
- APA. (2013). Diagnostic Statistical Manual (DSM-5). Retrieved March 10, 2015, from <http://doi.org/10.1176/appi.books.9780890425596.744053>

- ARK. (2015). Kids' Life and Times Survey. Retrieved October 16, 2015, from <http://www.ark.ac.uk/klt/>
- AsIAm. (2015). Request an AsIAm Secondary School Workshop. Retrieved May 16, 2015, from <https://www.asiam.ie/get-involved/request-asiam-secondary-school-workshop>
- Autism Speaks. (2014). State Initiatives. Retrieved July 21, 2014, from <http://www.autismspeaks.org/advocacy/states>
- Bancroft, K., Batten, A., Lambert, S., & Madders, T. (2012). *The way we are: Autism in 2012*. Retrieved from www.autism.org.uk
- Baron-Cohen, S., Scott, F. J., Allison, C., Williams, J., Bolton, P., Matthews, F. E., & Brayne, C. (2009). Prevalence of autism-spectrum conditions: UK school-based population study. *The British Journal of Psychiatry*, 194(6).
- Brugha, T., Cooper, S. A., McManus, S., Purdon, S., Smith, J., Scott, F., ... Tyrer, F. (2012). Estimating the prevalence of Autism Spectrum Conditions in adults: Extending the 2007 Adult Psychiatric Morbidity Survey. Retrieved December 3, 2016, from <http://content.digital.nhs.uk/catalogue/pub05061/esti-prev-auti-ext-07-psyc-morb-surv-rep.pdf>
- Campbell, J., & Barger, B. (2011). Middle school students' knowledge of autism. *Journal of Autism and Developmental Disorder*, 41, 723–740.
- Campbell, J. M., & Barger, B. D. (2014). Peers' knowledge about and attitudes towards students with autism spectrum disorders. In V. B. Patel, V. R. Preedy, & C. R. Martin (Eds.), *Comprehensive Guide to Autism* (pp. 247–261). New York: Springer.
- Cappadocia, M. C., Weiss, J. A., & Pepler, D. (2012). Bullying experiences among children and youth with autism spectrum disorders. *Journal of Autism and Developmental*

Disorders, 42(2), 266–277. <http://doi.org/10.1007/s10803-011-1241-x>

CDC. (2015). Autism Spectrum Disorder (ASD): Data and statistics. Retrieved January 28, 2015, from <http://www.cdc.gov/ncbddd/autism/data.html>

Connolly, M.-L. (2014). Autism: Around 1,300 children in NI waiting for diagnosis. Retrieved November 25, 2014, from <http://www.bbc.co.uk/news/uk-northern-ireland-30011736>

DHSSPS. (2014). *The estimated prevalence of autism in school age children in Northern Ireland*. Belfast, NI.

DHSSPS. (2016). The prevalence of autism (including Asperger's Syndrome) in school age children in Northern Ireland.

Dillenburg, K., Jordan, J.-A., McKerr, L., & Keenan, M. (2015). The Millennium child with autism: Early childhood trajectories for health, education and economic wellbeing. *Developmental Neurorehabilitation*, 18, 37–46.

Dillenburg, K., Jordan, J. A., McKerr, L., Devine, P., & Keenan, M. (2013). Awareness and knowledge of autism and autism interventions: A general population survey. *Research in Autism Spectrum Disorders*, 7(12), 1558–1567. <http://doi.org/10.1016/j.rasd.2013.09.004>

Dillenburg, K., McKerr, L., Jordan, J. A., Devine, P., & Keenan, M. (2015). Creating an inclusive society... How close are we in relation to Autism Spectrum Disorder? A general population survey. *Journal of Applied Research in Intellectual Disabilities*, 28(4), 330–340. <http://doi.org/10.1111/jar.12144>

Doyle, B. T. (2003). Autism spectrum disorder: Myths and facts. Retrieved April 21, 2015, from <http://education.jhu.edu/PD/newhorizons/Exceptional>

Edelson, S. (2016). Autistic savants. Retrieved December 18, 2016, from

https://www.autism.com/understanding_savants

Filipek, P. A., Accardo, P. J., Ashwal, S., Baranek, G. T., Cook, E. H., Dawson, G., ...

Volkmar, F. R. (2000). Practice parameter: Screening and diagnosis of autism. report of the Quality Standards Subcommittee of the American Academy of Neurology and the Child Neurology Society. *Neurology*, 55(4), 468–79.

Fitzsimmons, E. (2000). Millennium Cohort Study. Retrieved December 14, 2016, from

<http://www.cls.ioe.ac.uk/page.aspx?siteid=851>

Gerlinger, J., & Wo, J. C. (2016). Preventing school bullying: Should schools prioritize an authoritative school discipline approach over security measures? *Journal of School Violence*, 15(2), 133–157.

Hansen, S. N., Schendel, D. E., & Parner, E. T. (2014). Explaining the Increase in the Prevalence of Autism Spectrum Disorders. *JAMA Pediatrics*.

<http://doi.org/10.1001/jamapediatrics.2014.1893>

Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2009). Savant skills in autism: Psychometric approaches and parental reports. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 364(1522).

Humphrey, N., & Symes, W. (2011). Peer interaction patterns among adolescents with autistic spectrum disorders (ASDs) in mainstream school settings. *Autism : The International Journal of Research and Practice*, 15(4), 397–419.

Ison, N., McIntyre, S., Rothery, S., Smithers-Sheedy, H., Goldsmith, S., Parsonage, S., & Foy, L. (2010). “Just like you”: A disability awareness programme for children that

- enhanced knowledge, attitudes and acceptance: Pilot study findings. *Developmental Neurorehabilitation*, 13(5), 360–368.
- Keenan, M., Dillenburger, K., Doherty, A., Byrne, T., & Gallagher, S. (2010). The experiences of parents during diagnosis and forward planning for children with autism spectrum disorder. *Journal of Applied Research in Intellectual Disabilities*, 23(4), 390–397.
- Kim, Y. S., Leventhal, B. L., Koh, Y.-J., Fombonne, E., Laska, E., Lim, E.-C., ... Grinker, R. R. (2011). Prevalence of autism spectrum disorders in a total population sample. *The American Journal of Psychiatry*, 168(9), 904–12.
- Lindsay, S., & Edwards, A. (2013). A systematic review of disability awareness interventions for children and youth. *Disability and Rehabilitation*, 35(8), 623–646.
- Mavropoulou, S., & 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), 1867–1885.
- Moore, D., & Nettelbeck, T. (2013). Effects of short-term disability awareness training on attitudes of adolescent schoolboys toward persons with a disability. *Journal of Intellectual and Developmental Disability*, 38(3), 223–231.
- National Institute of Clinical Excellence (NICE; 2011). Autism diagnosis in children and young people: Recognition, referral and diagnosis of children and young people on the autism spectrum. Retrieved August 21, 2014, from <http://www.nice.org.uk/guidance/CG128>
- Pravda. (2009). Scientists try to unravel mystery of Rain Men. Retrieved May 14, 2015, from <http://english.pravda.ru/science/mysteries/07-08-2009/108679-savant-0/>

- Rowley, E., Chandler, S., Baird, G., Simonoff, E., Pickles, A., Loucas, T., & Charman, T. (2012). The experience of friendship, victimization and bullying in children with an autism spectrum disorder: Associations with child characteristics and school placement. *Research in Autism Spectrum Disorders*, 6(3), 1126–1134.
- Stewart, S. (2008). *I exist: The message from adults with autism in Northern Ireland. The National Autistic Society Northern Ireland.*
- United Nations. (2007). World Autism Awareness Day. Resolution adopted by the General Assembly. Retrieved October 15, 2015, from http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/62/139
- Vreeman, R. C., Carroll, et al. (2007). A systematic review of school-based interventions to prevent bullying. *Archives of Pediatrics & Adolescent Medicine*, 161(1), 78.
- Wells, J. (2015). Autism diagnosis waiting lists. Written Answers to Questions Hansard AQW 44402/11-15. Retrieved May 16, 2015, from <http://aims.niassembly.gov.uk/terms/PrintResults.aspx?se=&so=Ascending&tb=&per=&sp=&fd=&td=&cb1=&cb2=&it1=93168&itn1=Children&it2=&itn2=&it3=&itn3=&pid=4&pm=&pg=2&tn=1&ito2=&ito3=&ks=&st=1&pi=0&m=0&mn=All Questions>
- Zhang, J., & Wheeler, J. J. (2011). A meta-analysis of peer-mediated interventions for young children with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities*, 46(1), 62–77.

Figure 1: Word cloud of terms used to describe autism by 11 year-olds

Figure 2: Word cloud of terms used to describe autism by 16 year-olds

Figure 3: Personal contact with someone on the autism spectrum of 11 year-olds and 16 year-olds

Table 1: Attitudes towards autism (KLT and YLT)

Issue	Response options:	11 year-olds (KLT) n (%)	16 year-olds (YLT) n (%)	p	y
Attitudes towards a family who had child with autism moving in next door	Comfortable	927 (40%)	844 (82%)	<u><.001</u>	<u>.385</u>
	It depends	787 (34%)	131 (13%)		
	Uncomfortable	154 (7%)	8 (1%)		
	Don't know	425 (19%)	51 (5%)		
Attitudes towards a young child with autism being in their class at school/college	Comfortable	1032 (45%)	795 (77%)	<u><.001</u>	<u>.304</u>
	It depends	638 (28%)	166 (16%)		
	Uncomfortable	174 (8%)	21 (2%)		
	Don't know	441 (19%)	52 (5%)		
Attitudes towards someone in their class getting extra help from a teacher or classroom assistant	That's not fair, we should all be treated the same	178 (8%)	24 (2%)	<u><.001</u>	<u>.136</u>
	A bit jealous because I might need help too	88 (4%)	40 (4%)		
	That's ok, because they need extra help	1793 (81%)	926 (90%)		
	Other/Don't know	154 (7%)	34 (3%)		

Table 2: Autism and bullying related experiences (KLT* and YLT)

Question	Response options	X year-olds (KLT) n (%)	X year-olds (YLT) n (%)	p	v
Have you ever seen a child or young person with autism being bullied?	Yes	393 (17%)	181 (18%)	<.001	.186
	No	1468 (64%)	796 (78%)		
	Don't know	433 (19%)	50 (5%)		
What did you do when you saw the person with autism being bullied?	I told the bully to stop	Yes	-	100 (55%)	
		No	-		
	I told a staff member about it	Yes	-	58 (32%)	
		No	-		
	I told other young people about it	Yes	-	38 (21%)	
		No	-		
	I told someone in the person's family about it	Yes	-	25 (14%)	
		No	-		
	I did nothing	Yes	-	16 (9%)	
		No	-		
	I can't remember	Yes	-	14 (8%)	
		No	-		
	I did something else	Yes	-	25 (14%)	
		No	-		
Have you ever personally bullied someone with autism?	Yes	53 (2%)	10 (1%)	<.001	.131
	No	2102 (91%)	1002 (98%)		
	I can't remember	146 (6%)	8 (1%)		

Note: v= Cramer's v effect size

*data only partially available

Table 3. Summary of logistic regression for variables predicting autism awareness (KLT)

	Autism aware		b	p	OR	95% CI
	'Yes' n (%)	'No' n (%)				
Constant			-.18			
Gender						
Male (reference)	532 (46%)	637 (54%)				
Female	624 (54%)	521 (46%)	.37	<.001	1.45	1.22-1.71
Long-term-illness						
No (reference)	904 (50%)	897 (50%)				
Yes	121 (55%)	99 (45%)	.20	.168	1.22	.92-1.62
Don't know	106 (42%)	144 (58%)	-.30	.029	.74	.57-.97

Note. $R^2 = .01$ (Cox & Snell) $.02$ (Nagelkerke). Model $\chi^2 (3) = 26.63$, $p < .001$, OR= odds ratio; CI 95% = confidence interval of 95%.

Table 4. Summary of logistic regression for variables predicting autism awareness (YLT)

	Autism aware		b	p	OR	95% CI
	% Yes (N)	% No (N)				
Constant			.55			
Gender						
Male (reference)	312 (77%)	94 (23%)				
Female	499 (83%)	104 (17%)	.42	.012	1.52	1.10-2.10
Long-term-illness						
No (reference)	730 (80%)	183 (20%)				
Yes	83 (90%)	9 (10%)	.95	.015	2.58	1.21-5.51
School type						
Secondary (ref)	231 (69%)	102 (31%)				
Grammar	473 (86%)	76 (14%)	1.00	<.001	2.71	1.93-3.82
Integrated	56 (86%)	9 (14%)	.89	.020	2.44	1.15-5.17
Other	50 (85%)	9 (15%)	.74	.055	2.10	.98-4.50

Note. $R^2 = .05$ (Cox & Snell) .07 (Nagelkerke). Model $\chi^2(5) = 46.59$, $p < .001$, OR= odds ratio; CI 95% = confidence interval of 95%.

Table 5. Summary of logistic regression for variables predicting attitudes towards a child with autism being in their class at school (KLT)

	Attitudes towards a child with autism being in their class		b	p	OR	95% CI
	Comfortable N (%)	Uncomfortable to some extent or unsure N (%)				
Constant			.89			
Gender						
Male (reference)	457 (40%)	692 (60%)				
Female	573 (51%)	558 (49%)	-.38	<.001	.69	.58-.82
Know Someone						
Yes	581 (59%)	397 (41%)	-.55	<.001	.58	.47-.72
No (reference)	271 (40%)	409 (60%)				
Don't know	176 (29%)	435 (71%)	.40	.001	1.50	1.18-1.90
Autism aware						
Yes	663 (58%)	481 (42%)	-.74	<.001	.48	.40-.58
No (reference)	369 (32%)	772 (68%)				

Note. $R^2 = .10$ (Cox & Snell) .13 (Nagelkerke). Model $\chi^2(4) = 238.65$, $p < .001$, OR= odds ratio; CI 95% = confidence interval of 95%.

Table 6. Summary of logistic regression for variables predicting attitudes towards a child with autism being in their class at school (YLT)

	Attitudes towards autism		b	p	OR	95% CI
	Comfortable	Uncomfortable to some extent or unsure				
	N (%) / (mean SD)	N (%) / (mean SD)				
Constant			-1.45			
Gender						
Male (reference)	291 (71%)	120 (29%)				
Female	500 (81%)	118 (19%)	-.49	.003	.62	.45-.85
Know Someone						
Yes	592 (80%)	147 (20%)	-.40	.027	.67	.48-.96
No/unsure (ref)	199 (69%)	91 (31%)				
Autism aware						
Yes	653 (80%)	163 (20%)	-.62	.002	.54	.36-.79
No (reference)	126 (64%)	72 (36%)				
Economic situation	3.15 (0.81)	3.28 (0.83)	.27	.009	1.31	1.07-1.61
Shared Education	2.83 (1.18)	3.03 (1.21)	.13	.050	1.14	1.00-1.31

Note. $R^2 = .04$ (Cox & Snell) .07 (Nagelkerke). Model $\chi^2 (5) = 40.31$, $p < .001$, OR= odds ratio; CI 95% = confidence interval of 95%.

Appendix 1

Kids Life and Times survey questions

Q49. Do you know what autism is? (Response options: yes/no)

Q50. What do you think autism is? Please type your answer in the box below.

To help you answer the next few questions here is a short explanation of autism – don't worry if it's not what you thought it was when you answered the last question. Autism is also sometimes called 'Asperger's Syndrome' and can affect people in different ways. Someone with autism often has problems with everyday things like taking part in work or school or just talking to people. They may also find it difficult to make friends or understand when someone else is upset or angry. Because autism affects people in so many different ways some will only need a little help in school or at home to help them get the most out of life, while others will need a lot.

Q51. Do you know anybody who has autism? Click on all the answers that apply to you.

(Response options: yes, I have autism; yes a relative of mine; yes, a friend of mine; yes, someone in my class; yes, someone in another class; yes, someone in my neighbourhood; no; don't know)

Q52. What, if any, do you think are the main difficulties or problems that someone with autism might have? Please type your answer in the box below.

Q53. What, if any, do you think are the things that someone with autism might be good at doing?

Please type your answer in the box below.

Q54. Would you be comfortable or uncomfortable if

...a family who had a child with autism moved next door

....someone with autism was in my class in school

(Response options: comfortable; it depends; uncomfortable; don't know)

Q55. If you had someone with autism in your class who got extra help from a teacher or a classroom assistant, how would you feel? Click one answer only.

(Response options: that's not fair, we should all be treated the same; a bit jealous because I might need help too; that's ok, because they need extra help; other answer. Please type your answer in this box)

Q56. Sometimes people with autism get bullied, for example, they might be picked on, called names, teased about how they look or behave, get hit or have their things taken away. Have you ever seen a child or a young person with autism being bullied?

(Response options: yes (go to Q57); no (skip to Q58); don't know (skip to Q58))

Q58. And have you ever personally bullied someone with autism? (Response options: yes; no; I can't remember)

Q59. Is there anything else you would like to say about people with autism? Please type your answer in the box below.

Young Life and Times survey questions

As per the Kids Life and Times except the description of autism was as follows:

To help you answer the next few questions here is a brief explanation of autism – don't worry if it's not what you thought it was.

Autism is sometimes called 'Asperger's Syndrome' and can affect people in different ways. Someone with autism often has problems with everyday things like taking part in work or school or just talking to people. They may also find it difficult to make friends or understand when someone else is upset or angry. Because autism affects people in many different ways some will only need a little help in school or at home to help them get the most out of life, while others will need a lot.

In contrast to the KLT, the YLT included the following question:

Q. When you saw someone with autism being bullied, which of the following things did you do? Click on all the answers that apply to you.

(Response options: I told the bully to stop it; I told a member of staff about it; I told someone in the person's family about it; I told other young people about it; I did nothing; I can't remember; I did something else. Please type in what you did in this box).