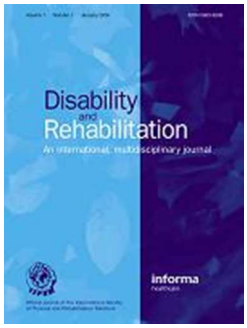


Children's contact with people with disabilities and their attitudes towards disability: a cross-sectional study

Journal:	*Disability and Rehabilitation*
Manuscript ID:	TIDS-01-2015-068.R1
Manuscript Type:	Research Paper
Keywords:	Disability, Attitudes, Contact, Children, Survey

Implications for Rehabilitation

- Children who reported greater levels of contact with people with disabilities had more positive attitudes towards disability.
- Anxiety about interacting with people with disabilities and empathy towards them partially mediated the contact-attitude associations.
- Providing opportunities for contact with people with disabilities, reducing anxiety and increasing empathy may improve children's attitudes to disability.

Children's contact and attitudes to disability

Abstract

Purpose: To explore the association between children's self-reported contact with people with disabilities and attitudes towards them, as well the potential mediating influence of anxiety about interacting with people with disabilities and empathy for them.

Method: 1,881 children, aged 7-16 years, from 20 schools in South West England completed a survey assessing their contact with people with disabilities and their attitudes towards them. Anxiety about interacting with people with disabilities and empathy towards them were examined as potential mediators. Gender, school year, perceived similarity between people with and without disabilities, proportion of children with additional needs at the school and socioeconomic status were assessed as moderators. A random effects ('multilevel') regression model was used to test the contact-attitude association and moderation, and path analysis was used to test for mediation.

Results: Participants with more self-reported contact reported more positive attitudes towards disability ($p<0.001$). Less anticipated anxiety and greater empathy together mediated around a third of this association. Only school year moderated the contact-attitude association (affective attitudes), with stronger contact-attitude associations in primary school children than secondary school children.

Conclusions: Self-reported contact was observed to be associated with more positive attitudes towards disability, which was partially mediated by empathy and anxiety. Providing opportunities for contact with people with disabilities that reduces anxiety and increases empathy may improve attitudes to disability and merits evaluation in interventions.

Keywords: disability, attitudes, contact, children, survey

Children's contact and attitudes to disability

Children with disabilities are often the target of negative attitudes [1]. Loneliness, anxiety and reduced self-worth are some of the health consequences experienced by children who experience prejudice [2]. The World Health Organisation's "International Classification of Functioning, Disability and Health" identifies public attitudes towards disability as a key environmental factor and, in their "World Report on Disability", recommended research to evaluate ways of promoting positive attitudes towards disability [3, 4]. Furthermore, a recent review concluded that the success of inclusive education is determined by the attitudes of children without disabilities [5]. The current study assessed the potential influence of social contact with disabled people in the development of more positive attitudes toward disability.

Research on the "contact hypothesis" has shown that face-to-face interaction between members of different social groups, when positive in nature, can improve intergroup attitudes [6, 7]. This effect has been demonstrated in a variety of social group contexts (e.g., race, age) [7] and has been shown to work by reducing anxiety about interacting with outgroup members and increasing empathy for them [8]. Group members' perceptions of intergroup similarity moderate the contact effect, with strongest effects being observed in contexts where intergroup similarity is high [9]. Beyond direct face-to-face contact, positive attitudes can be formed through knowledge that fellow ingroup members have a positive relationship with an outgroup member ("extended contact") [10]. In the context of specifically *disability* attitudes, a recent review found that children's direct contact with people with disabilities is associated with more positive attitudes [11]. However, most of the research cited in the review was of poor quality, limiting the conclusions that could be drawn; furthermore, potential mediators or moderators of the contact-attitude association were not explored. Previous research in a variety of different intergroup contexts has suggested that the contact-attitude association may be stronger for females and those with higher socioeconomic status

(SES) [7]. Furthermore, this association may be mediated by empathy and anxiety [7]; however, this required testing in the context of children's attitudes towards disability.

Aims

The aims of this cross-sectional study were, first, to examine the association between children's self-reported contact with people with disabilities and their attitudes towards disability and, second, to explore potential mediating effects of anxiety and empathy. The strength of the associations between school-level proxy indicators of contact and SES were also analysed. In addition, we tested whether beliefs about intergroup similarity (between people with and without disabilities), SES, gender or school year moderated contact-attitude associations.

METHOD

Ethical approval

The Peninsula College of Medicine and Dentistry research ethics committee approved the procedures for this study on 28th February 2012 (application number 11/12/131).

Stakeholder involvement

The Peninsula Cerebra Research Unit (PenCRU) involves families of children with disabilities as partners in research through a Family Faculty. Parents prioritised research focusing on improving children's attitudes towards people with disabilities and were involved at various stages of the research. Ten young people, aged 8-15 years, commented on all documents developed for the study to ensure the information, instructions, disability definition and items/questions were age-appropriate and understandable. A head teacher who is also a parent carer advised on the strategy for recruiting schools.

Procedure

Mainstream schools across South West England were approached between March and July 2012. All students from years 3 to 11 (aged 7-16 years) were eligible to participate in the study. Parent/caregiver consent was provided via an opt-out procedure, and children's written consent was obtained on the day of the study. The self-completed survey was administered during a scheduled class, either online or using a paper-based version, following a standard set of guidelines. Participants were provided with the following definition of disability adapted from previous research [12]: "There are different types of disability. Sometimes people can be physically disabled which means they have a part of their body which does not work properly. So maybe their legs do not work and they cannot walk so they have a wheelchair or use sticks. They may also not be able to see or hear. Many physically people with disabilities have been like that since they were born and it will not fix like a broken leg or arm. Other children can have a learning disability. This means some people find it hard to learn things and they find it more difficult than other children find and might have to get extra help. People with learning disabilities sometimes behave differently too." Participants were asked to think about people their own age when answering the survey questions and assured that their responses were confidential. Each question was read aloud and participants were requested to answer the questions on their own without communicating with peers. Participants indicated their gender and school year. Additionally, participants were asked if they had a disability and could answer 'Yes', 'No' or 'Don't know/ Don't want to say'. Only data from participants who selected the option 'No' were included in the analyses.

Measures

Self-reported contact with people with disabilities

Children's contact and attitudes to disability

Six items measured direct and extended contact, adapted from a previous study of intergroup relations [13]: '*How many of your close friends are disabled?', 'How many people in your family are disabled?', 'At school how often do you spend time with disabled people?', 'Outside of school how often do you spend time with disabled people?'*, *'How many of your friends have disabled friends?*' and '*How many of your family members have disabled friends?*' Responses were made on a 5-point scale ranging from *Never* or *0* (0) to *All the time* or *4 or more* (4), with higher scores representing more contact. A scale score was created by calculating the mean across the six items.

Attitudes towards disability

Attitudes were assessed using the Chedoke-McMaster Attitudes Towards Children with Handicaps (CATCH) scale [14]. The scale has been reported to be one of the most reliable, valid and comprehensive measures of attitudes towards disability [15]. The CATCH comprises three 12-item subscales: affective attitudes, cognitive attitudes and behavioural intentions, derived from the three component model of attitudes [16]. The affective attitude subscale concerns children's feelings towards people with disabilities (e.g., '*I would be embarrassed if a disabled person invited me to their birthday party'*), the cognitive attitude subscale measures children's beliefs about people with disabilities (e.g., '*Disabled people feel sorry for themselves'*) and the behavioural intention subscale captures children's behavioural intentions concerning people with disabilities (e.g*., 'I would try to stay away from disabled people'*). As the CATCH was originally designed in 1986 in a North American context, some of the phrases are not commonly used anymore (i.e., handicapped) and, therefore, the wording was adapted to resolve this and for use in the UK. We also changed the word 'child/children' to 'person/people' based on feedback during the involvement group session: teenagers in the involvement group opposed being classified as a 'child'. Participants

indicated their agreement or disagreement in response to each item using a 5-point scale, ranging from *strongly agree* (0) to *strongly disagree* (4).

A Rasch analysis of the CATCH data using the same sample indicated that the full 36-item scale was not unidimensional and suggests the subscales should be considered separately.[17] Furthermore, construct validity was improved by removing four items (leaving eight items) from each of the affective and behavioural subscales and changing the response set for the items from 0-4 to 0-3. The cognitive subscale did not form a unidimensional or internally consistent subscale. For the current analysis, we used data from the revised affective and behavioural subscales, raw scores ranged from 0-24. A transformation of the raw scores to interval scale derived as part of the Rasch analysis was used for the analyses presented in this paper [17]. Higher scores indicate more positive attitudes towards disability.

Intergroup similarity perceptions

Similarity perceptions were measured using two items adapted from previous research [18]: '*People with physical disabilities are different compared to people with no disabilities*' and '*People with learning disabilities are different compared to people with no disabilities'*. Participants rated these items on a 5-point Likert scale ranging from *strongly agree* (0) to *strongly disagree* (4). A scale score was calculated as the mean of the two items, with higher scores indicating stronger perceptions of intergroup difference.

Empathy and anxiety

Empathy for people with disabilities and anxiety about interacting with them were assessed using established scales adapted for use within the context of disability [13, 19]. Empathy was measured using three items: '*If a disabled person was feeling sad I would also feel sad*',

'*I would be angry if a disabled person was treated unfairly'* and *'I would be upset if a disabled person was upset'*. Anxiety was assessed with three items: '*I would be happy if I was put in a class where every other person was disabled*', '*I would be worried if I was put in a class where every other person was disabled*' and '*I would be comfortable if I was put in a class where every other person was disabled'*. Responses were made on a 5-point scale ranging from *strongly agree* (0) to *strongly disagree* (4). Scale scores were the mean score across items, with higher scores indicating greater anxiety/empathy.

Types of disabilities participants considered during the survey

To assess whether any observed contact-attitude associations generalise across different types of disability, participants were asked to indicate which form of disability they had in mind when completing the survey: 'hearing', 'seeing', 'physical', 'learning' or 'all types'.

Demographic variables

Participants self-reported their school year and gender. The percentage of children in each school who received free school meals (FSM) was used as a proxy for SES. FSM is a means-tested entitlement determined according to family income; these data are routinely collected and reported by the UK Department of Education.

Additional contact measure

The percentage of children recorded with Special Educational Needs or Disability (SEND) was identified from data collected by the local authorities and used as an additional measure of contact in the school. SEND includes children with learning difficulties and children who have a disability that limits the use of educational facilities [20]. This can include children

who have physical, sensory or cognitive impairments, emotional and/or behavioural difficulties.

Statistical analysis

Analyses were conducted using Stata 12.1 software. Individual mean substitution across the other scores available for that person was used to impute missing data for items on all the scales if no more than one item response was missing. Multi-item scales were checked for internal consistency using Cronbach's alpha.

Associations between the CATCH subscales (dependent variables) and independent variables were examined using random effects ('multilevel') linear regression models.[21] Multilevel modelling accounts for the similarity in responses between children who are from the same school (cluster). Independent variables (excluding hypothesised mediators) that were associated with attitudes at the 5% level of significance in crude (unadjusted) analyses were included in a multivariable (adjusted) analysis. In the adjusted analysis, all variables placed in the model are controlled for each other. Independent variables and potential moderators at the child-level were self-reported contact, gender, school year, and similarity perceptions; those at the school-level were percentage of children receiving FSM, and percentage recorded with SEND. The analysis was repeated for different types of disabilities the children considered during the survey ('hearing', 'seeing', 'physical', 'learning' and 'all types') and any differences in the significance of the associations with attitudes reported.

To test whether empathy and/or anxiety mediated any observed associations between contact attitudes, separate path analysis models (estimated using least squares) were fitted for each of affective attitudes and behavioural intentions, reporting standardised regression coefficients

(interpretable as correlations coefficients) [22]. The total association between contact and the attitudinal subscales comprised a direct (unmediated) component and an indirect component mediated via anxiety and/or empathy. The direct association was inferred from the standardised regression coefficient for the path directly linking contact to attitudes. The indirect association was calculated by multiplying the standardised regression coefficients (β) along the paths between contact and attitudes for each of the indirect pathways and summing across these. Thus, we report the amount of the association that is (a) direct, (b) indirect via anxiety, and (c) indirect via empathy.

Finally, multivariable regression analyses were conducted to test whether gender, school year, or similarity perceptions moderated the association between contact and attitudes. We fitted a regression model that included parameters for the interaction between contact and the potential moderators.

The above analyses were repeated using data from the original 12 item CATCH subscales to check whether the changes to the CATCH scales made any important differences.

RESULTS

Characteristics of the participants

Head teachers from 483 schools across South West of England were invited to participate in this study via email or telephone. Twenty schools (1,946 students) enrolled in the study. After excluding those with large amounts of missing data and those who were disabled, a final sample of 1,494 participants were included in the analysis (Figure 1): 1,191 participants from primary schools and 295 participants from secondary schools, and 710 (48%) boys and 774

(52%) girls (two participants did not state their gender). Participants' ages ranged from 7 to 16 years, with a mean of 10.2 (SD=1.8), spanning school years 3-11.

Insert Figure 1 about here

Scale internal consistency

Internal consistency (Cronbach's alpha) of the affective attitude scale (α=0.84), behavioural intention scale (α=0.84), the contact scale (α=0.70), anxiety scale (α=0.73), empathy scale (α=0.77) and similarity perceptions scale (α=0.73) met or exceeded the recommended level (>0.7) [23].

Descriptive statistics

The descriptive statistics of all the measures used in the analysis are presented in Table 1. The means for revised affective attitudes and behavioural intentions were similar (13.3 and 12.8, respectively). The mean for contact was 0.8 from a scale of 0 to 4, which indicates children reported having low amounts of contact with people with disabilities. The frequency of the six individual contact items reveal that 37% of participants reported having one or more close friends who are disabled, 40% reported having one or more family members who are disabled, 44% reported having friends who were friends with disabled people and 49% said they had family members who had friends who have disabilities. Also, 62% reported spending at least some time at school with people with disabilities and 52% reported spending at least sometime outside of schools with people with disabilities.

Insert Table 1 about here

Crude and multivariable regression analyses

Results from the crude and multivariable (adjusted) regression analyses of the CATCH subscales are presented in Tables 2 and 3.

Association between contact and attitudes

For both the affective attitudes and behavioural intentions subscales, higher levels of self-reported contact with people with disabilities were associated with more positive attitudes ($p<0.001$ for both subscales). The six contact items were each positively related to the attitudinal scales (all *p*s<0.001). Proportion of children with Special Educational Needs & Disability (SEND) was not associated with attitudes at the 5% level of significance.

Association between similarity perceptions and attitudes

Similarity perceptions were associated with each measure of attitudes. Participants who perceived greater similarity between people with and without disabilities reported more positive attitudes towards disability ($p<0.001$).

Association between demographic variables and attitudes

Percentage of school level FSM was not associated with disability attitudes. Girls reported more positive affective attitudes and behavioural intentions than boys ($p<0.001$). Additionally, the multivariable model shows that younger participants (year six and below) generally reported more favourable attitudes than those in older year groups.

Variation explained by the regression models

Because this is a hierarchical data set with units at a higher level (i.e., schools) and units at a lower level (i.e., children), predictors can potentially explain variation at both levels. For the

affective attitude regression model, 12% of the variability in attitudes was at the cluster level (i.e., school level), as opposed to the child level. When independent variables that were significant at the 5% level were included in the multivariable model, they explained 69% of the variation at the school level and 13% of the variation at the child level. For the behavioural intention component 6% of the variability in attitudes was at the school level. When significant independent variables were included in the multivariable model, they explained 87% of the variation at the school level and 15% of the variation at the child level.

Insert Table 2 and Table 3 about here

Response frequencies of disability type

Participants most commonly reported focusing on physical disabilities when completing the questionnaire (40%), followed by all types of disabilities (33%), learning disabilities (21%), seeing (6%), and hearing impairments (5%). Patterns of association between contact and attitudes were comparable across each type of disability.

Mediation of contact associations

Figures 2 and 3 present results from the path analyses examining anxiety and empathy as potential mediators of the self-reported contact-attitude associations. The association between contact and affective attitudes was mainly direct (71%) with the remainder mediated by anxiety (14.5%) and empathy (14.5%). The total indirect (mediated) association was 29% (p<0.001). For contact and behavioural intention, the association was mainly direct (63%) with the remainder mediated by anxiety (17%) and empathy (20%). The total indirect effect was 37% (p<0.001). The findings indicate that anxiety and empathy partially mediate the association between contact and attitudes.

Insert Figure 2 and Figure 3 about here

Moderation of contact associations

Neither gender, SES or similarity perceptions moderated the contact-attitudes association (all *ps* > 0.05). School year moderated the association between contact and affective attitudes (p=0.05), but not the behavioural intention subscale (p=0.42). The regression coefficient for the relationship contact and affective attitudes was 2.0 (95% CI: 1.7 to 2.3) for primary school children and 1.4 (95% CI: 1 to 1.8) for secondary school children, indicating that the relationship is stronger for primary school children.

Analysis on the original CATCH scales

The same analyses were conducted on the original three scales from the CATCH. The patterns of contact-attitude associations and mediation effects were comparable to those reported for the revised scales above. However, while the contact-attitude association was found to be moderated by school year when the revised affective attitude scale was used, this was not the case when the original affective scale was used. The pattern of results for the cognitive subscale was consistent with those for the affective attitudes and behavioural intentions subscales, with two exceptions: gender was not associated with scores on the cognitive subscale, and there were no mediation effects involving empathy.

DISCUSSION

Children in this study who reported having more contact with people with disabilities tended to report more positive attitudes towards disability, as predicted by the contact hypothesis [6].

This association was apparent across the revised affective and behavioural intention subscales of the CATCH, and held when controlling for observed gender and school year effects.

The association between contact and disability attitudes was only apparent for self-reported contact with people with disabilities: there was no evidence for an association between SEND data and attitudes. This difference in association may be because self-reported contact, unlike SEND data, captures both direct and extended contact, as well as the contact children have with people with disabilities outside of school (e.g., through family, friends and community groups). Additionally, SEND was measured at the school level, whereas self-reported contact was measured for each individual child and, therefore, SEND is likely to be weaker measure.

There was no evidence for an association between SES (as measured by FSM) and attitudes, and SES did not moderate the contact-attitude association. Furthermore, there was no evidence of moderation by gender or intergroup similarity perceptions, although both these variables were independently associated with attitudes: girls and perceptions of greater intergroup similarity were associated with more positive attitudes. Lack of evidence for the moderating effect of intergroup similarity perceptions may not necessarily indicate that this variable is unimportant. Several of the teachers involved in administering the survey reported that their children were unsure as to the meaning of the items on the similarity perceptions scale. Consequently, responses to these items may have been affected by their cognitive difficulty, particularly for the younger children.

There was clearer evidence for a moderating role of school year: the association between contact and affective attitudes was stronger in primary school children (year six and below) than it was in secondary school children. While confirmation of this school year effect should

be sought through experimental studies, it suggests that interventions that provide opportunities for contact between children with and without disabilities may be more beneficial for primary school children than for those in secondary education.

Beyond the moderation effects, the association between contact and attitudes was shown to be mediated by empathy and anxiety, findings which reflect those reported in previous research [8]. These findings therefore add to the evidence base indicating that empathy and anxiety are important components to consider when developing interventions based on contact [8]. For example, interventions promoting positive attitudes towards disability amongst children may focus on methods for creating real or imagined contact situations that enhance children's empathy and reduce anxiety about interacting with children with disabilities.

One of the strengths of this study is the use of the revised CATCH scales of affective attitudes and behavioural intentions. Although the CATCH is the most commonly implemented scale to test children's attitudes towards people with disabilities [11], it has been criticised for the lack of transparency regarding whether it should be treated as a unidimensional scale or as three separate subscales of affective attitudes, behavioural intentions and cognitive attitudes [14, 24]. Before conducting the analysis for this study, scale dimensionality was explored and the CATCH was revised to create two separate unidimensional scales of affective attitudes and behavioural intentions which were used for the main analysis [17].

This study has several limitations that warrant discussing. The lack of ethnic diversity in South West England, where the current study was conducted, limits the generalisation of our findings. Compared to other areas of Great Britain, the South West has the highest proportion

of people declaring themselves 'white British'. Cultural variation in surveys of children's attitudes towards disability is an area that has been largely neglected. We therefore recommend that replication studies are conducted in other geographical regions. The conclusions of the study are also limited by the use here of a proxy measure of SES (FSM). FSM may not be an accurate indicator of SES as some parents/carers may not realise they are eligible to receive FSM. Furthermore, measuring SES at the school level fails to capture inter-individual variability in SES.

A further limitation concerns the definition of disability given to children. We used a definition that had been used in previous research with young children.[12] However, the definition focuses on the medical model of disability (i.e., disability as a result of a physical condition) rather than the social model of disability (i.e., people disabled by environmental and social barriers). Ideally, the definition should incorporate the social model of disability to provide a more positive definition. Additionally, although the validity of the CATCH was explored in detail prior to the analysis [17], further testing of the validity and reliability of measures of empathy and anxiety in the context of disability is merited, especially as there are few such measures available for researchers to use.

This study had a low overall participation response from schools. Every effort was made to maximise involvement of potential schools in the research such as sending email invitations and follow up phone calls. Although we did not have direct feedback from all the schools who chose not to participate, it is possible that, as the invitations were sent to the generic email addresses for each school, not all the head teachers may have received the invitation personally. Schools are also under various obligations and competing priorities, and the

timing of this research project might not have fitted with their other duties and activities. Therefore, there may be an element of selection bias within this sample.

Future research is needed to confirm the causal relationship between contact and attitudes in the context of disability. While the current findings are consistent with a large body of literature that has established a causal effect of intergroup contact on attitudes [7], it cannot be confirmed from this study whether increasing contact with people with disabilities brings about improvements in disability attitudes or whether more positive attitudes encourage such contact. Research should also seek to establish the longer-term impact of contact on attitudes towards disability. To our knowledge, longitudinal studies of the effects of contact have not been conducted in the disability context: documenting any such associations will be critical to the development of new interventions.

CONCLUSIONS

This research indicates that the amount of contact children have with people with disabilities is associated with their attitudes towards disability. Around a third of this association is mediated by a combination of lower anxiety about interacting with people with disabilities and greater empathy for them. These findings warrant further investigation in experimental studies and interventions aiming to improve children's attitudes towards disability.

Children's contact and attitudes to disability

Declaration of interest

The authors report no conflicts of interest

Acknowledgements

We acknowledge funding from the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care of the South West Peninsula (PenCLAHRC), and the charity Cerebra. The views and opinions expressed in this paper are those of the authors and not necessarily those of the NHS, the NIHR, the Department of Health, or Cerebra. We also thank the Family Faculty at PenCRU, the staff and pupils at the schools who participated in this project, and Sammyh Khan for his methodological advice.

References

1. Nowicki EA, Sandieson R. A Meta-Analysis of School-Age Children's Attitudes towards Persons with Physical or Intellectual Disabilities. International Journal of Disability, Development and Education. 2002;49(3):243-65.
2. Graham S, Juvonen J. Self-blame and peer victimization in middle school: an attributional analysis. Developmental psychology. 1998;34(3):587-99.
3. World Health Organization WHO. International Classification of Functioning, Disability, and Health: Children & Youth Version: ICF-CY: World Health Organization; 2007.
4. World Health Organization WHO. World report on disability: World Health Organization; 2011.
5. Bates H, McCafferty A, Quayle E, McKenzie K. Review: typically-developing students' views and experiences of inclusive education. Disability & Rehabilitation. 2014(0):1-11.
6. Allport G. The Nature of Prejudice. Addison-Wesley Publishing; 1954.
7. Pettigrew TF, Tropp LR. A Meta-Analytic Test of Intergroup Contact Theory. Journal of Personality and Social psychology. 2006;90(5):751-83.
8. Pettigrew TF, Tropp LR. How does intergroup contact reduce prejudice? Meta‐analytic tests of three mediators. European Journal of Social Psychology. 2008;38(6):922-34.
9. González R, Brown R. Dual identities in intergroup contact: Group status and size moderate the generalization of positive attitude change. Journal of Experimental Social Psychology. 2006;42(6):753-67.
10. Wright SC, Aron A, McLaughlin-Volpe T, Ropp SA. The extended contact effect: Knowledge of cross-group friendships and prejudice. Journal of Personality and Social psychology. 1997;73(1):73-90.
11. MacMillan M, Tarrant M, Abraham C, Morris C. The association between children's contact with people with disabilities and their attitudes towards disability: a systematic review. Developmental Medicine & Child Neurology. 2013;56(6):529 - 46.
12. Cameron L, Rutland A, Brown R, Douch R. Changing children's intergroup attitudes toward refugees: Testing different models of extended contact. Child Development. 2006;77(5):1208-19.
13. Turner RN, Hewstone M, Voci A. Reducing explicit and implicit outgroup prejudice via direct and extended contact: The mediating role of self-disclosure and intergroup anxiety. Journal of Personality and Social psychology. 2007;93(3):369-88.
14. Rosenbaum PL, Armstrong RW, King SM. Children's attitudes toward disabled peers: a self-report measure. Journal of Pediatric Psychology. 1986;11(4):517-30.
15. Vignes C, Coley N, Grandjean H, Godeau E, Arnaud C. Measuring Children's Attitudes towards Peers with Disabilities: A Review of Instruments. Developmental Medicine & Child Neurology. 2008;50(3):182-9.
16. Triandis HC. Attitude and attitude change: Wiley New York; 1971.
17. Armstrong M, Morris C, Tarrant M, Abraham C, Horton M. Rasch analysis of the Chedoke-McMaster Attitudes towards Children with Handicaps scale. under review.
18. Jetten J, Spears R, Manstead AS. Strength of identification and intergroup differentiation: The influence of group norms. European Journal of Social Psychology. 1997;27(5):603-9.
19. Swart H, Hewstone M, Christ O, Voci A. Affective mediators of intergroup contact: A three-wave longitudinal study in South Africa. J Personality & Soc Psychol. 2011;101:1221, 2.
20. Department for Education. Special educational needs code of practice: DfES London; 2001.
21. Gelman A, Hill J. Data analysis using regression and multilevel/hierarchical models: Cambridge University Press; 2007.
22. Richiardi L, Bellocco R, Zugna D. Mediation analysis in epidemiology: methods, interpretation and bias. International journal of epidemiology. 2013;42(5):1511-9.
23. Nunnally J, Bernstein IH. Psychometric theory. 1994. McGraw, New York. 1991.
24. Bossaert G, Petry K. Factorial validity of the Chedoke-McMaster Attitudes towards Children with Handicaps Scale (CATCH). Research in Developmental Disabilities. 2013;34(4):1336-45.

Children's contact and attitudes to disability

Table 1: Descriptive statistics

Variable	N	Mean (SD)	Median (IQR)
Affective attitude (revised)	1,533	13.3 (4.3)	13 (10.3 to 15.7)
Behavioural intention (revised)	1,533	12.8 (3.8)	12.3 (10.4 to 15.0)
Contact	1,539	0.8 (0.7)	0.7 (0.3 to 1.2)
Empathy	1,574	2.8 (0.8)	2.7 (2.3 to 3.7)
Anxiety	1,573	2.3 (0.9)	2.3 (1.7 to 3)
Similarity perceptions	1,565	1.8 (1.0)	2.0 (1.0 to 2.5)
SEND (%)	1,578	20.5 (7.5)	20.5 (14.7 to 26.7)
FSM (%)	1,578	13.2 (8.4)	13 (6.0 to 17.0)

Table 2: Random effects linear regression of revised affective CATCH score

Independent variable	Crude (unadjusted)			Multivariable (adjusted)		
	Coefficient	95% CI	*p* value	Coefficient	95% CI	*p* value
Contact	1.9	1.6 to 2.2	<0.001	1.8	1.5 to 2.1	<0.001
Female	1.1	0.7 to 1.5	<0.001	0.9	0.5 to 1.3	<0.001
Year*			0.01			<0.001
3	reference			Reference		
4	1.0	0.2 to 1.7		0.1	-0.6 to 0.8	
5	0.5	-0.3 to 1.3		-0.7	-1.4 to 0.0	
6	0.4	-0.4 to 1.2		-0.7	-1.4 to 0.1	
7	-2.5	-4.6 to -0.3		-3.0	-4.8 to -1.3	
8	-2.5	-4.4 to -0.6		-3.3	-4.7 to -1.8	
9	-2.0	-4.1 to 0.0		-2.9	-4.5 to -1.3	
10	-2.5	-5.0 to -0.1		-2.9	-5.0 to -0.9	
11	-1.9	-4.5 to 0.7		-2.3	-4.5 to -0.1	
Similarity perceptions	-0.7	-0.9 to -0.5	<0.001	-0.6	-0.8 to -0.4	<0.001
SEND	-0.04	-0.13 to 0.05	0.35			
FSM	-0.02	-0.09 to 0.05	0.61			
Empathy	1.9	1.6 to 2.1	<0.001			
Anxiety	-1.9	-2.1 to -1.7	<0.001			

* Typical age for school years - year 3 (age 7-8), year 4 (age 8-9), year 5 (age 9-10), year 6 (age 10-11), year 7 (age 11-12), year 8 (age 12-13), year 9 (age 13-14) year 10 (age 14-15) and year 11 (age 15-16)

Table 3: Random effects linear regression of revised behavioural CATCH score

Independent variable	Crude (unadjusted)			Multivariable (adjusted)		
	Coefficient	95% CI	*p* value	Coefficient	95% CI	*p* value
Contact	1.8	1.6 to 2.1	<0.001	1.7	1.5 to 2.0	<0.001
Female	1.6	1.2 to 1.9	<0.001	1.4	1.1 to 1.7	<0.001
Year*			0.004			<0.001
3	reference			reference		
4	0.8	0.1 to 1.5		0.0	-0.6 to 0.6	
5	0.4	-0.3 to 1.1		-0.5	-1.2 to 0.1	
6	0.4	-0.3 to 1.1		-0.4	-1.1 to 0.3	
7	-1.7	-3.2 to -0.2		-1.8	-3.1 to -0.6	
8	-1.6	-2.8 to -0.4		-2.1	-3.1 to -1.2	
9	-1.6	-3.0 to -0.3		-2.3	-3.4 to -1.2	
10	-1.9	-3.7 to -0.1		-2.0	-3.5 to -0.4	
11	-1.0	-3.0 to 1.0		-1.3	-3.0 to 0.4	
Similarity perceptions	-0.5	-0.6 to -0.3	<0.001	-0.3	1.1 to 1.7	<0.001
SEND	-0.03	-0.09 to 0.03	0.27			
FSM	-0.03	-0.07 to 0.02	0.28			
Empathy	2.2	2.0 to 2.5	<0.001			
Anxiety	-1.8	-2.0 to -1.6	<0.001			

* Typical age for school years - year 3 (age 7-8), year 4 (age 8-9), year 5 (age 9-10), year 6 (age 10-11), year 7 (age 11-12), year 8 (age 12-13), year 9 (age 13-14) year 10 (age 14-15) and year 11 (age 15-16)

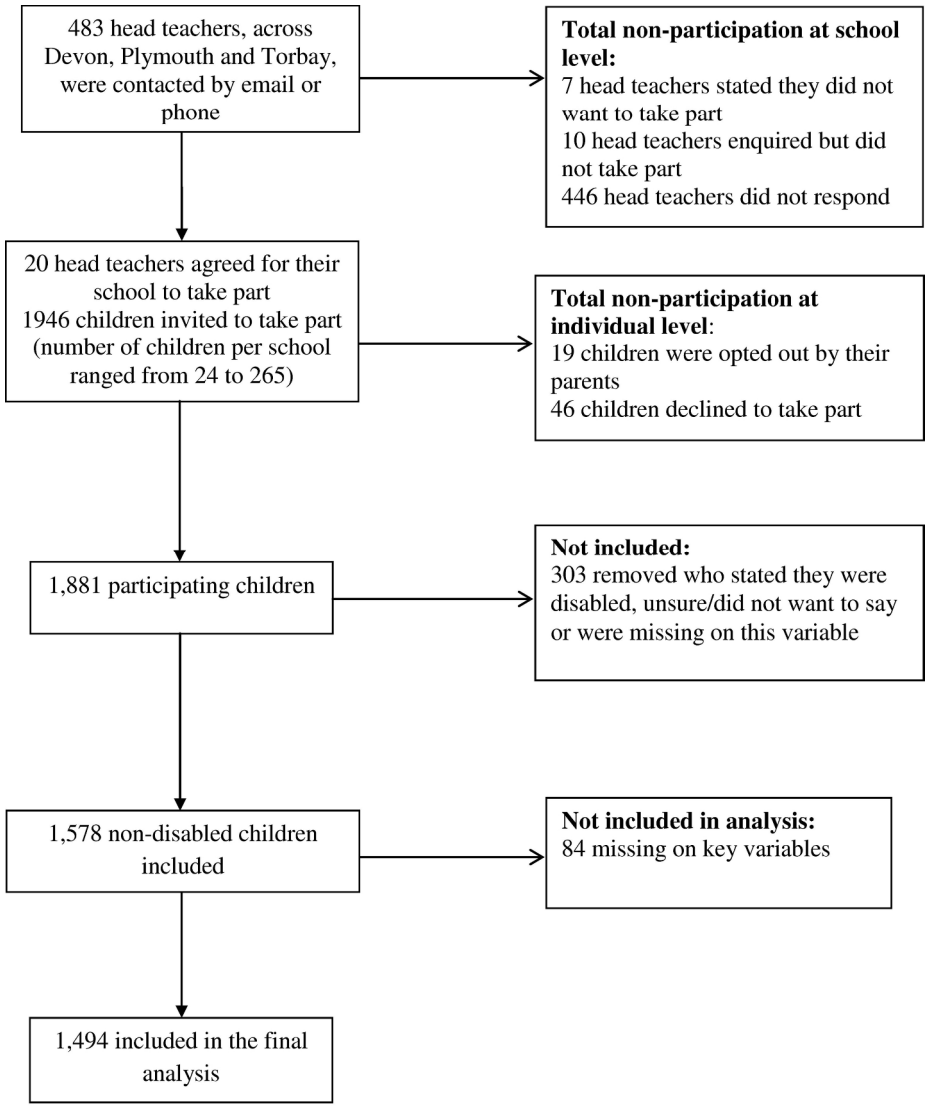
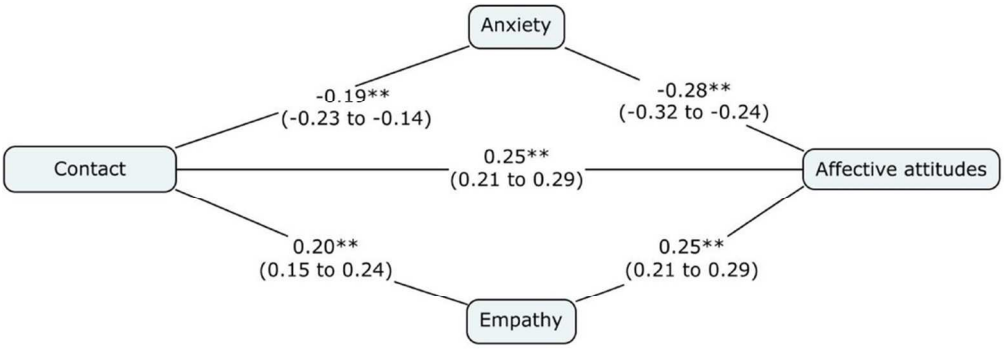


Figure 1: Recruitment flowchart

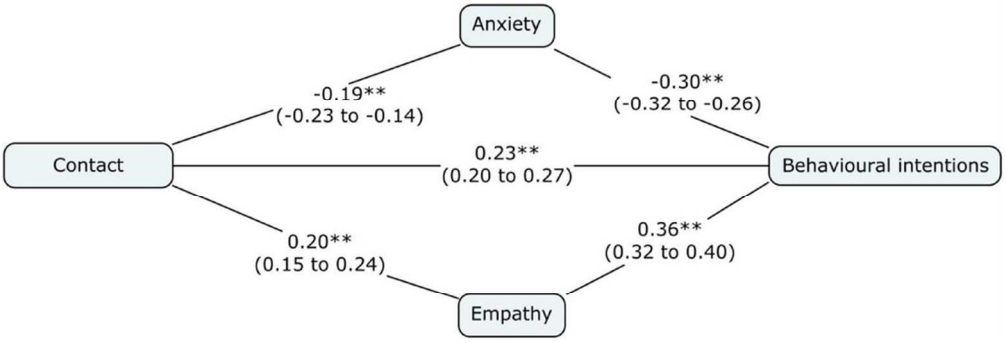
210x274mm (300 x 300 DPI)



**p <0.001

Figure 2: Path analysis model investigating the mediation of the association between contact and affective attitudes by anxiety and empathy: standardised regression coefficients (correlations) are indicated with 95% confidence intervals in brackets

93x54mm (300 x 300 DPI)



**p <0.001

Figure 3: Path analysis investigating the mediation of the association between contact and behavioural intentions by anxiety and empathy: standardised regression coefficients (correlations) are indicated with 95% confidence intervals in brackets

92x53mm (300 x 300 DPI)