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

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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.

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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

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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

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(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.

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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

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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

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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*',

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'*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

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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

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(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

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(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

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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 ps<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

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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.

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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].

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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

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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

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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

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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.

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Declaration of interest

The authors report no conflicts of interest

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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)
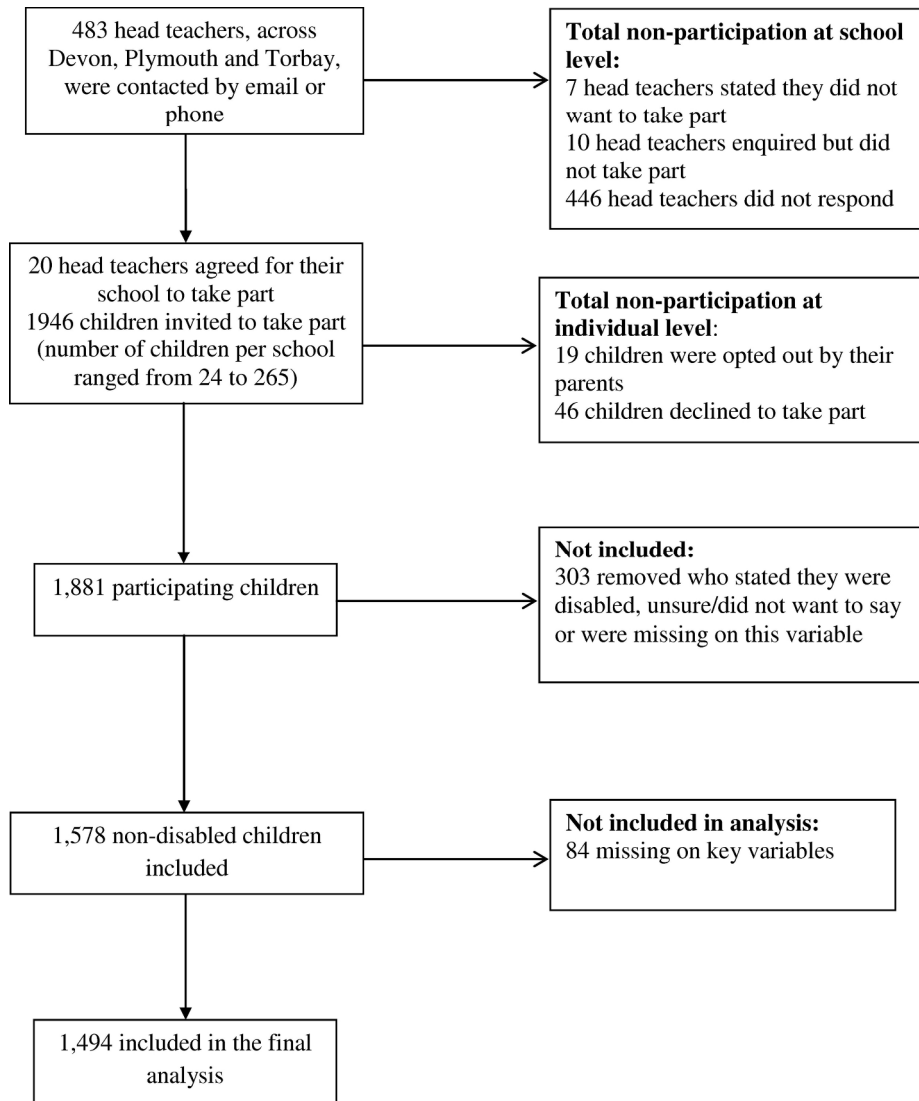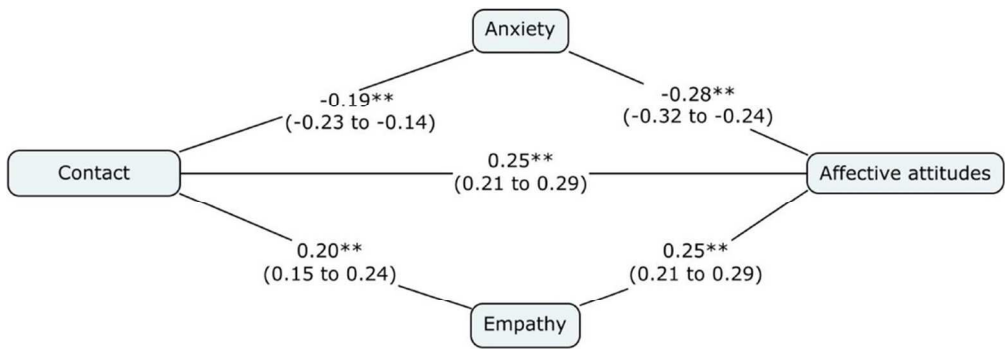
Figure 1: Recruitment flowchart
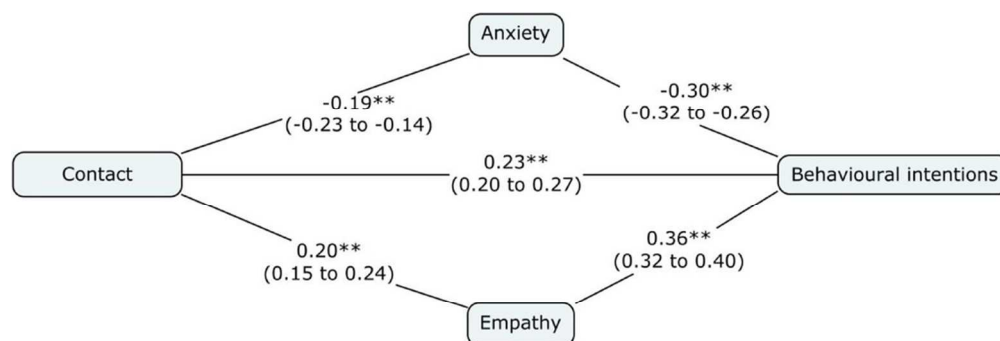
210x274mm (300 x 300 DPI)

**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)