Department for Education

Diversity and Social Cohesion in Mixed and Segregated Secondary Schools in Oldham

Research report

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Aims

This report presents findings regarding the extent, quality and consequences of social contact between young people from different ethnic and religious communities in light of six questions asked by the Department for Education (DfE):

1. Do attitudes relating to trust and tolerance of other groups differ amongst pupils in mixed vs segregated schools?
2. Do mixed schools result in more social mixing of different groups or do pupils remain segregated?
3. How does mixing manifest itself? In classes, clubs, lunchtimes, after school?
4. Do the attitudes of pupils who mix with other backgrounds differ compared to those who remain within their own ethnicities?
5. In schools that have merged, have the attitudes of pupils changed over time?
6. What role do parents and the wider community play? Do their attitudes have an impact on the extent to which young people integrate?

Background and method

We were commissioned to prepare a report using the extensive data we had collected on the extent, quality and consequences of mixing (what we term *intergroup contact*) between White-British and Asian-British-Muslim pupils at state secondary schools in the town of Oldham, north-west England. This research contains essential, but comparatively rare, *longitudinal* data, which follows up the same individuals over one or more years. The data is further broken down into four projects:

1. A *longitudinal* study of 11-16 year olds in nine existing ethnically-mixed and segregated schools, with data collected at two time points (following up the same individuals).
2. A longitudinal study of 11-12 year olds in what were at the time the three most ethnically-mixed schools, with data collected at two time points.
3. A *cross-sectional* study of 16-18 year olds at a sixth form college (i.e., data collected at only one-time point).

4. A longitudinal study of 11-16 year olds at three recently-merged schools, including one school that merged two previously segregated schools (one White-British, the other Asian-British), with data collected at four time points.

Where the study was longitudinal (i.e., it involved the collection of data at two or more time points), this has allowed us to make more confident causal inferences about the effects of ethnic mixing.

- Two ethnic groups were analysed, White-British and Asian-British. The latter group also self-identified as Muslim.
- Three aspects of intergroup contact between individuals belonging to different groups were measured: *quantity* (frequency of interaction), *quality* (how positive or negative the interaction was), and *cross-group friendship* (number and proportion of friends from the other ethnic group). In one of the merger schools, contact was also measured through cafeteria observations, and social network analysis. Outcomes measured include outgroup liking, outgroup trust, anxiety about meeting outgroup members, and perceived support from family and friends for intergroup mixing (referred to, respectively, as: *liking, trust, intergroup anxiety,* and *norms*).
- We used the data to answer questions 1-4 and 6; and we summarize all the key findings on schools that have merged in one section, answering question 5.

1. Do attitudes to trust and tolerance differ amongst pupils in mixed vs segregated schools?

- Before comparing schools, it should be noted that they may differ on socio-economic (e.g., numbers of children on Free School Meals) and educational (e.g., exam performance) dimensions, and not only on their ethnic make-up. Thus, caution should always be exercised in comparing between mixed and segregated schools.
- Both Asian-British and White-British pupils in mixed schools expressed more positive attitudes and higher levels of trust (proxies for tolerance) towards outgroup pupils than those in segregated schools.
- Although responses of White-British pupils in mixed schools were quite positive across a range of variables, Asian-British pupils in mixed schools had even more and better quality contact and a greater proportion of outgroup friends than White-

British pupils. They were also more likely to see mixing as the norm, and perceived negative contact experiences as less frequent than did White-British.

- Because we could not name individual schools, and there was only one segregated Asian school, conclusions about mixed versus segregated schools can only be made confidently for White-British pupils. White-British pupils in mixed schools had more and better quality contact, and a greater proportion of outgroup friends than White-British pupils in segregated schools. Measures do not allow us to say whether pupils in the mixed schools had as many outgroup friends as would be expected, given the proportion of pupils from each ethnic group in each school. However, given that pupils in mixed schools sometimes 're-segregate' (i.e., fail to take up opportunities for mixing; see Sections 5.6 and 5.7, below), these findings confirm that pupils in the mixed schools *did mix* and had outgroup friends.

- White-British pupils in mixed schools also had more close outgroup friends, more positive attitudes higher levels of trust in the outgroup, and saw mixing more as the norm than those in segregated schools.

- White-British pupils in mixed schools (compared with segregated schools) had lower levels of 'intergroup anxiety' (anxiety about mixing with the other group) but higher levels of negative contact. Outgroup friendships predicted outgroup attitudes despite some evidence of negative contact, albeit low in frequency.

- Asian-British pupils had mixed more in primary school than White-British pupils, and White-British pupils in mixed schools had mixed more in primary school than their counterparts in segregated White-British schools; this effect may have attenuated the effect of mixing in secondary school.

- Over a seven-month period, White-British pupils improved their attitudes and decreased their anxiety. The quantity and quality of contact (both in the classroom and outside) at the first Wave (first point of data collection) increased by the second Wave. Changes over time were fewer for Asian-British pupils, who are already more exposed to the outgroup, and anxiety levels actually increased over time when Asians were in a small minority, but decreased in the three most mixed schools. On other measures, there were, in general, no large- or even medium-size effects for changes over time, perhaps because of the short period of seven months between waves. However, analyses demonstrated that, even after accounting for self-selection, contact led over time to more positive outgroup attitudes.

There was consistent evidence that attitudes relating to trust and tolerance of other groups differ amongst White-British pupils in mixed vs segregated schools. Attitudes were more positive and, as would be expected, mixing was more frequent in mixed than segregated schools.

2. Do mixed schools result in more social mixing of different groups or do pupils remain segregated?

- A much greater proportion of White-British pupils in segregated than mixed schools reported having no close outgroup friends towards the end of their first year of secondary school.

- White-British pupils at mixed schools had a higher proportion and number of outgroup friends than those at segregated schools at both waves.

- Within mixed schools, Asian-British pupils had a higher proportion of outgroup friends and number of close outgroup friends, and reported more out-of-school outgroup contact than White-British pupils in the same schools.

- Number of outgroup friends was positively correlated with proportion of outgroup pupils in the school population.

- Mixing was most evident in the three most-mixed schools. In these schools, Asian-British had greater quantity and quality of contact, number of outgroup friends, and interest in making outgroup friends than the White-British. They had more positive attitudes towards the outgroup, and were more likely to perceive mixing to be valued by their family and ingroup. Even when they perceived little support for mixing, Asian-British had more positive attitudes when there was higher contact.

- Again in the most-mixed schools, pupils who had outgroup contact showed an improvement in outgroup attitudes, even after accounting for self-selection.

- These findings suggest a reciprocal process, in which greater contact promotes better attitudes, and better attitudes promote greater contact.

Mixed schools do result in more social mixing between ethnic groups over time, and mixing is reliably associated with more positive views of the outgroup.

3. How does mixing manifest itself? In classes, clubs, lunchtimes, after school?

- While Asian-British reported more contact in and out of the classroom at both time points than White-British, they particularly reported higher levels of break-time quantity and quality of contact.

- For White-British and Asian-British pupils, classroom contact inside the school at Wave 1 predicted contact outside school at Wave 2; likewise, Wave 1 outside-school contact predicted classroom contact at Wave 2.

- Contact between ethnic groups was more frequent and enjoyable when it took place in the classroom, as compared to contact during break times. This pattern was found in both pre-16 and post-16 schools.

- This last finding suggests that classroom contact should be increased and further developed, but also that more effort needs to go into promoting contact beyond the classroom, where pupils mix freely in break times and at lunch.

(Findings on mixing at lunchtime are reported under Section 5.)

There was consistent evidence of mixing in the classroom. Our research did not set out to compare mixing in different settings, but we found evidence across studies that the school was the most important context for mixing. This report did, however, find evidence of segregation within school during lunchtimes (see Section 5).

4. Do attitudes of pupils who mix differ compared to those who remain within their own ethnicities?

- There was clear evidence that those who engage in positive contact had more positive attitudes, but there was also evidence in the other direction, so that those with positive attitudes were more likely to engage in contact.

- Although mixed settings were associated with slightly increased levels of negative contact, overall levels of negative contact were low and White-British pupils reported having more negative contact than Asian-British pupils.

- Even if pupils had negative contact experiences, however, outgroup friendship had a positive overall effect on outgroup attitudes.

- Pupils who had more positive contact experiences with outgroup members also tended to show more positive attitudes, as well as more trust, and less intergroup anxiety towards the outgroup as a whole.

Attitudes of pupils who mix with other backgrounds were more positive compared to those who remain within their own ethnicities.

5. In schools that have merged, have the attitudes of pupils changed over time?

- In the planned merger between a former predominantly White-British and a predominantly Asian-British school at *Waterhead Academy,* we found (using latent growth model, LGM, analyses) that, over a four-year period, intergroup anxiety significantly decreased, and liking and outgroup contact significantly increased for both Asian-British and White-British pupils.

- In percentage terms, calculating observed change as a function of possible change from initial score along each response scale, White-British pupils showed a reduction of 31% for anxiety, and increases of 6% and 1% for contact and liking. Asian-British pupils showed a reduction of 33% for anxiety, and increases of 5% and 11% for contact and liking.

- There was a positive association between contact quantity and liking, indicating that, for Asian-British, if quantity of contact increased by 1 standard deviation (*SD*) from June 2012 to February 2015, then the outgroup liking score also increased half a *SD* (0.51). Results were similar for White-British pupils (an increase in contact of 1 *SD* was associated with an increase in liking of 0.68).

- More detailed analysis in *Waterhead* showed that the merger worked best for those pupils who were most lacking in initial contact. Although not all students decreased their anxiety and increased their liking for the outgroup, on average they did, and for those with low initial contact, White-British and Asian-British, the impact of the merger was largest.

- A simple metric for assessing the value of the merger is to assess the impact of gaining one outgroup friend, between Waves 1 and 5, on liking and anxiety. Gaining just one outgroup friend had more impact on White-British than Asian-British pupils, affecting anxiety and liking for the former, but only liking for the latter. The greater impact for the White-British of gaining one outgroup friend is consistent with the

ethnic minority pupils having more outgroup contact, including outgroup friends, than the majority.

- Similar results were found in the other two merged schools (*Oasis*, a merger of two White-British schools and *Newman*, a merger of two Roman Catholic schools, one of which had a sizeable Asian-British population of Muslim religion). To preserve the anonymity of the other two merged schools for comparisons with *Waterhead*; they were arbitrarily named schools *B* and *C*.

- Overall, the results showed that increases in contact went together with increases in liking to the same extent in all three schools.

- Anxiety showed a significant decrease in all schools, but this decrease was not significantly different between the three schools. This held for both White-British and Asian-British. For White-British pupils, improvements were consistently found in *Waterhead*, and these improvements were consistently stronger than in school *C*. However, improvements for White-British were similar in *Waterhead* and school *B*. Asian-British pupils in *Waterhead* and school *B* showed more improvements than in school *C*, with the exception of contact quantity. In school *C*, Asian-British pupils remained stable in liking, yet in *Waterhead* and school *B*, they *increased* in liking. Across the three schools, however, increases in contact went together with increases in liking to the same extent.

- The effect of the merger at *Waterhead* can be seen, simply, by looking at changes in the proportion of pupils who have no friends from the ethnic outgroup. At Wave 1 (June, 2012), approximately 20% of White-British and Asian-British pupils reported that they had no outgroup friends. By Wave 5 (February, 2015), these figures had dropped significantly to approximately 5% in each case. The reduction was lower in schools *B* and *C*, and significant only in school *B*.

- From systematic observations of seating in the cafeteria at lunchtime at *Waterhead*, there was clear evidence that pupils self-segregated by gender and, even more, by ethnicity. Although self-segregation was still evident at the end of the study, there was a significant increase in ethnic integration between two time points several months apart.

- Social network analysis of pupils at *Waterhead* showed that pupils had 90% or more of their friends in the same ethnic group as themselves. Although gender segregation was much greater among Asian-British pupils, both groups segregated more by gender over time.

In merger schools, pupils' attitudes did change over time, with the largest effect being a reduction in intergroup anxiety. There was consistent evidence of greater improvement in Waterhead than the other merger schools. Based on these results, we believe that the most dramatic merger at Waterhead can be judged a success, but we emphasize that increases in contact went together with increases in liking to the same extent in all three merger schools.

6. The impact of parental and community attitudes on the extent to which young people integrate?

- Regarding ingroup norms (whether family and friends would encourage outgroup mixing), pupils from neither ethnic community saw strong support for mixing from their family and friends.

- White-British pupils in mixed schools perceived more positive ingroup norms than those in segregated schools at both time points. Within mixed schools, Asian-British pupils perceived more positive ingroup norms than did White-British pupils.

- For Asian-British, positive family norms mattered most when contact was low. When pupils did not have much contact, they tended to have more positive attitudes towards the White-British when they perceived positive norms from their family. However, when contact was high, norms did not have as big an impact on attitudes. This suggests that even Asian-British pupils from homes with negative norms towards mixing still have the opportunity to develop positive outgroup attitudes if they have sufficient positive contact with the outgroup.

- Pupils who reported less positive norms showed a stronger positive relationship between intergroup contact and outgroup attitudes.

There was evidence of a significant role played by how pupils perceived their parents' views. Neither White-British nor Asian-British perceived strong support for mixing from their friends and families, but mixed schools appeared to help in promoting more positive perceptions of norms. Even when norms were perceived to be negative, contact still promoted more positive outgroup attitudes, and to greater effect.

1. Background to the research: agenda set by DfE

As input to the Casey Review ('Bringing Britain together as one nation'), we were asked to prepare a report using the multiple data sets we had collected over the last 7 years on the extent, quality and consequences of mixing (what we term *intergroup contact*) between young people from different ethnic and religious communities. All the data come from a long-term study of White-British and Asian-British-Muslim pupils at state secondary schools in the town of Oldham, north-west England. The data includes essential, but comparatively rare, *longitudinal* data, which follows up the same individuals over one or more years. Only with such data can one understand the processes that underlie any changes in outcomes such as prejudice, as a function of variables such as intergroup contact.

DfE guided this review by asking us to answer specifically the following six questions:

1. Do attitudes relating to trust and tolerance[1] of other groups differ amongst pupils in mixed vs segregated schools?
2. Do mixed schools result in more social mixing of different groups or do pupils remain segregated?
3. How does mixing manifest itself? In classes, clubs, lunchtimes, after school?
4. Do the attitudes of pupils who mix with other backgrounds differ compared to those who remain within their own ethnicities?
5. In schools that have merged, have the attitudes of pupils changed over time?
6. What role do parents and the wider community play? Do their attitudes have an impact on the extent to which young people integrated?

We seek to answer these questions without reporting any of our findings in relation to specific schools, identified by name. Rather, we make comparisons between different *types of school* (e.g., segregated and mixed). We follow this practice due to research ethics, because when we were permitted to collect data in each school, we assured school Heads that we would not identify their school by name. The only exceptions to this are reported in Sections 4 and 5, respectively, where we identify Oldham Sixth Form College (because it is the only such college) and the *Waterhead Academy* merger school (because this school has been reported in the mass media and is now quite well known).

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[1] Attitudes and trust are used as proxies for tolerance throughout this report.

Ethnic ingroups and outgroups

Ingroups are social groups we belong to; outgroups are groups we do not belong to. We are concerned here exclusively with attitudes towards ethnic outgroups (which are Asian-British, for White-British pupils; and White-British, for Asian-British pupils). Although the six 'lead questions' do not specify differences between ethnic groups, we always compare the patterns of responses for White-British and Asian-British pupils.

1.1 A note on terminology

Sometimes the terms *mixed* and *integrated* are used interchangeably in the available literature. However, Thomas Pettigrew (1971), the preeminent scholar of this topic, has argued for the distinction between *integration* and (mere) *desegregation* (see also Hewstone, 2009, 2015). He contrasted desegregation under conditions likely to improve relations between members of previously segregated groups (in other words, *integration)* with the simple creation of a racially or ethnically mixed institution or, in short, mere desegregation. Integration goes beyond the mere presence of people from different social groups, and denotes an environment where cross-group friendships are formed and maintained, and where all social groups have the right to live and be accepted as culturally different, but equal groups. In this report we refer to schools as mixed vs segregated (i.e., without making any assumptions about whether some mixed schools are truly integrated); and we focus on the extent and quality of mixing (*contact*) and its effects.

1.2 The contact hypothesis

The underlying theme of our research in all the data sets considered here was to test, in English secondary schools, the 'contact hypothesis' (Allport, 1954), the idea that by bringing groups together under positive conditions one can improve both attitudes towards outgroups and intergroup relations. Although there is extensive support for this idea (see a meta-analysis of over 500 studies by Pettigrew & Tropp, 2006), it has rarely been tested in English schools. For this report, we focus on three measures of 'contact':

Measures of contact

Quantity of contact: frequency of interaction with outgroup members, e.g., 'How often do you meet/talk to/etc. [outgroup[2] members] where you live/shop/socialize, etc?'

Quality of contact: nature of the interaction with [outgroup members], e.g., 'How positive/negative; friendly/unfriendly, etc, is the contact?'

Cross-group friendship: being friends with [outgroup members], e.g., 'How many close [outgroup] friends do you have?'

We test the basic idea that, *cross-sectionally (measuring at only one time point)* and *longitudinally (measuring over time, with at least two time points)* an increase in contact is associated with an improvement in intergroup relations.

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[2] The specific outgroup (either White-British or Asian-British) is named and replaces the square brackets in the actual surveys; the word "outgroup" is not used in the surveys.

2. Study of nine segregated and mixed secondary schools in Oldham

At the time our research began in 2010, we were given unique access to all of Oldham's state secondary schools (and its Sixth Form College). These secondary schools consisted of nine schools that were the focus of our first analyses, and six other schools that were to be merged into three new 'merger schools'. In this section we report on our study of the nine schools (subsequent sections report on the three most mixed schools alone, the Sixth Form College, and the three new mergers). All of this research explores relations between White-British and Asian-British (primarily of Pakistani or Bangladeshi heritage) communities.

2.1 Ethnic breakdown

The ethnic break-down of the nine schools in 2010 is shown in Table 1. There was one segregated Asian-British (Muslim) school (*Oldham Academy North;* 92% Asian-British); four segregated White-British schools (*Bluecoat,* 95% White-British; *Saddleworth,* 98%; *Crompton House,* 99%; and *Failsworth*, 92%); and four mixed schools whose proportions of Asian-British pupils ranged from 62% to 7% (*Hathershaw*, 36% White-British & 62% Asian-British; *Radclyffe*, 42% White-British & 54% Asian-British; *North Chadderton*, 74% White-British & 23% Asian-British; *Royton & Crompton*, 91% White-British & 7% Asian-British).

Although our focus here is on secondary schools, we note below that White-British pupils from mixed secondary schools did report more primary-school contact than those from segregated secondary schools. However, primary schools in Oldham are highly segregated, and even for pupils in mixed schools, reported contact in primary school was below the mid-point of the scale.

Table 1: Ethnic composition of the nine Oldham secondary schools in our sample (2010)

Segregated Asian-British	Segregated White		Mixed	
Oldham Academy North	Bluecoat	Saddleworth	Hathershaw	Radclyffe
92% Asian-British	95% White-British	98% White-British	36% White-British 62% Asian-British	42% White-British 54% Asian-British
	Crompton House	Failsworth	North Chadderton	Royton & Crompton[3]
	99% White-British	92% White-British	74% White-British 23% Asian-British	91% White-British 7% Asian-British

Because there is only one segregated Asian-British school, when we compare segregated versus mixed schools below, we consider only segregated *White-British* schools vs mixed schools, so as not to identify a school. We include the data from pupils in the single segregated Asian-British school only when we report analyses based on all schools.

Finally, it should be noted that schools may differ on socio-economic (e.g., numbers of children on free school meals – see Table 2) and educational (e.g., exam performance) dimensions, and not only in their ethnic make-up. Thus caution should always be exercised in comparing between schools.

Table 2: Proportion of pupils eligible for free school meals in Oldham schools

School	% Pupils eligible for free school meals					
	Census Year					
	2010	2011	2012	2013	2014	2015
Oldham Academy North	58.3%	57.2%	52.4%	53.8%	52.7%	45.3%
Bluecoat	4.4%	5.1%	5.4%	6.8%	8.2%	6.6%
Saddleworth	5.5%	4.7%	5.4%	7.2%	6.9%	7.1%
Hathershaw	42.5%	43.6%	42.4%	34.3%	36.2%	31.1%
Radclyffe	29.4%	30.2%	27.3%	29.7%	28.6%	24.7%
Crompton House	2.5%	2.6%	2.4%	3.7%	4.4%	4.3%
Failsworth	15.2%	14.5%	17.3%	13.9%	17.1%	15.7%
North Chadderton	9.6%	10.8%	10.8%	11.1%	12.2%	10.7%
Royton & Crompton	16.8%	16.4%	17.6%	16.3%	18.0%	18.3%
Waterhead Academy	NA	33.4%	32.6%	32.2%	31.8%	29.3%
Newman Roman Catholic College	NA	NA	22.1%	22.4%	24.6%	20.5%
Oasis Academy	NA	39.2%	36.0%	35.7%	41.2%	39.8%

Note: Shading indicates years in which data was collected.

2.2 Methodological details

We sampled 908 White-British pupils from four segregated White-British schools and 1000 pupils (608 White-British, 392 Asian-British) from four mixed schools. Pupils were aged 11-12 years and were in their first year of secondary school; approximately 48% of the sample was female. Pupils completed a survey asking about contact, attitudes towards the other group, and other aspects of community relations at two time points (Wave 1: November 2010; Wave 2: June 2011). Rather than report all the items here, we reproduce the wording of illustrative items when discussing the results below. Unless otherwise noted, measures use 5-point rating scales, and we followed convention in creating reliable scale scores (i.e., by averaging over multiple items assessing the same construct). When discussing empirical findings (e.g., comparing responses of ethnic groups, or comparing scores across time), these are based on conventional statistical analyses to test for the significance of differences between group means.

We also report the 'effect size' of any differences. An effect size is a standardized difference between means, or a measure of the association between variables, for

example. It provides a means of showing whether a reported effect is not merely 'statistically significant' (which can occur with small differences, given sufficiently large samples), but also 'substantial', and also provides a way of comparing variables with different scales.[3]

2.3 Main findings: quantity and quality of contact, social intimacy, trust

Contact measures

We first compared the extent and quality of various types of contact between the two ethnic groups in mixed schools, and then also between the White-British pupils at the two types of school (segregated or mixed). In all questions, participants were asked about the relevant outgroup (i.e., White-British or Asian-British).

Quantity of contact outside school

Please think about the time you spend <u>outside school</u> when you answer these questions:

(i) How often do you hang out with people who are [outgroup members]; and

(ii) How often do you spend your free time with people who are [outgroup members]?

Quality of contact outside school

How happy are you when you spend time with pupils who are [outgroup members]"?

As shown in Figures 1 and 2, Asian-British pupils in mixed schools had more contact outside school at both waves and also reported higher quality of contact outside school than White-British pupils in mixed schools.[4] White-British pupils in mixed schools also reported more contact than White-British pupils in segregated schools at both waves, and higher quality of contact.[5]

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[3] We compared means using analyses of variance (ANOVAs), which test for the statistical significance of any differences (* = $p < .05$, ** = $p < .01$, and *** = $p < .001$). For effect sizes, we follow the convention that *small* effects ($d = 0.2$) should be distinguished from *medium* effects ($d = 0.5$) and *large* effects ($d \geq 0.8$). We report the key statistical results in footnotes.

[4] To keep this report readable, we do not report tests of differences between waves for each variable. In most cases, with a small lag between waves, there was not a significant difference between waves for either ethnic group. We do, however, highlight differences that seemed interesting.

[5] For Asian-British vs White-British in mixed schools: outside school quantity of contact: Wave 1 (W1): $F = 25.91$, $p < .001$, $d = .33$; W2: $F = 46.73$, $p < .001$, $d = .44$; outside school quality of contact: W1: $F = 31.18$, $p < .001$, $d = .36$; W2: $F = 42.59$, $p < .001$, $d = .42$. For White-British in mixed vs segregated White-British schools: outside school quantity of contact: W1: $F = 61.62$, $p < .001$, $d = .41$; W2: $F = 71.61$, $p < .001$, $d = .44$; outside school quality of contact: W1: $F = 4.73$, $p < .05$, $d = .11$; W2: $F = 4.26$, $p < .05$, $d = .11$.

Figure 1: Outside school quantity of contact
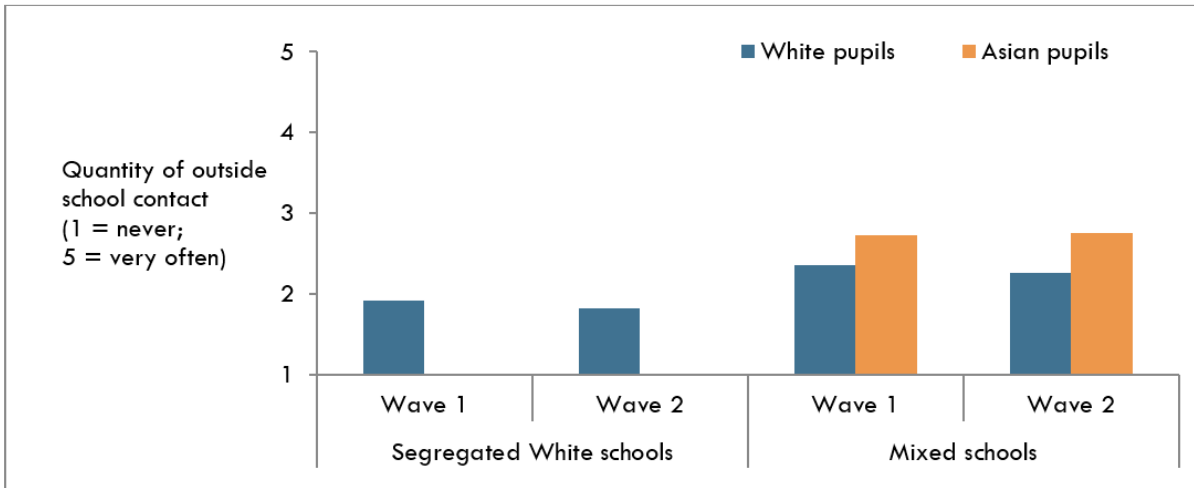
Note: White in figures stands for White-British; Asian stands for Asian-British.

Figure 2: Outside school quality of contact
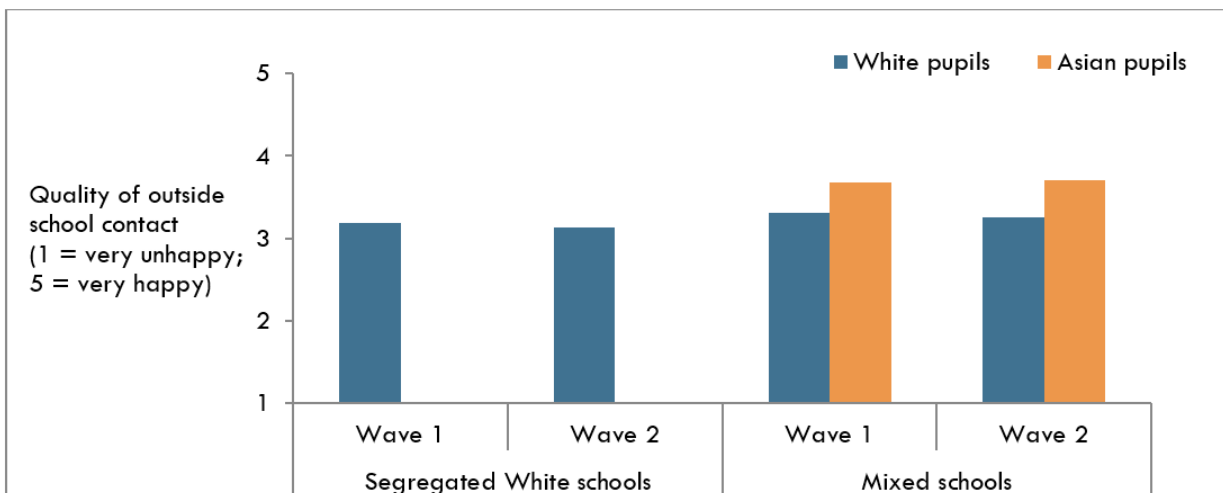
Contact with outgroup friends

Items include*:*

Proportion of friends who are from the outgroup:

About how many of your friends are from [the outgroup]? (A friend is a person whom you know, like and trust.)

Number of close outgroup friends:

In numbers, how many close friends do you have who are from [the outgroup]?

Figures 3 and 4 show that Asian-British pupils in mixed schools had both a higher proportion of outgroup friends and a greater number of close outgroup friends than did the White-British pupils at both waves. White-British pupils in mixed schools also

reported both a higher proportion of outgroup friends and a greater number of close outgroup friends than did White-British pupils in segregated schools at both waves.[6]

Figure 3: Proportion of friends who are from outgroup
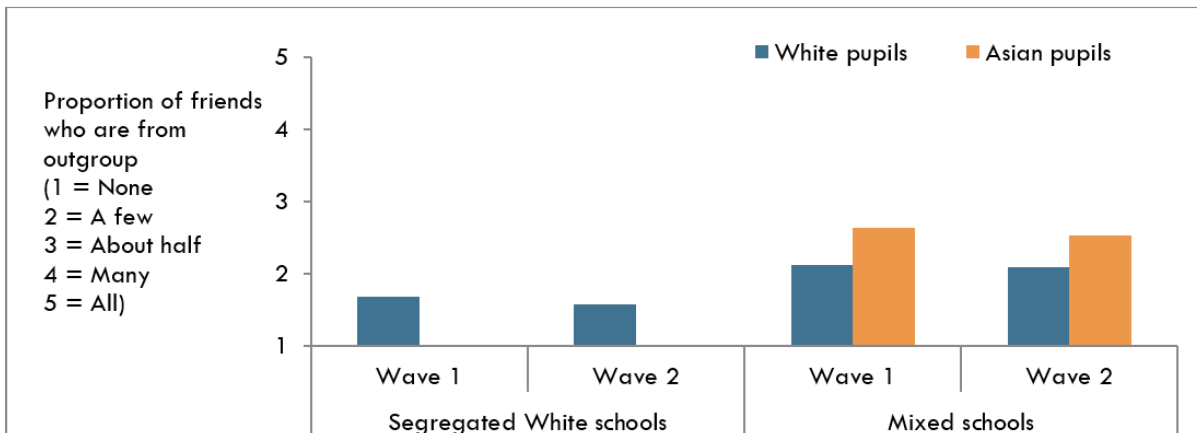
Figure 4: Number of close outgroup friends
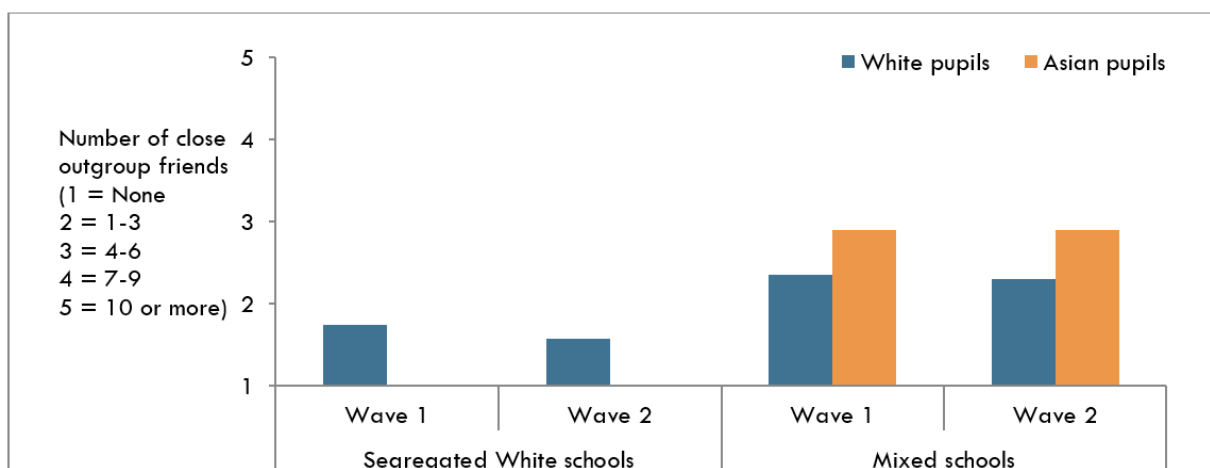
Figure 5, showing the percentage of pupils reporting different numbers of 'close outgroup friends', demonstrates very clearly: (1) that over 50 per cent of White-British pupils in segregated schools have no outgroup friends; and (2) that about 40 per cent of pupils in mixed schools (combining across White-British and Asian-British pupils) reported having more than four outgroup friends.

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[6] For Asian-British vs White-British in Mixed schools: proportion of outgroup friends: W1: $F = 70.91$, $p < .001$, $d = .55$; W2: $F = 53.69$, $p < .001$, $d = .47$; number of close friends: W1: $F = 52.51$, $p < .001$, $d = .47$; W2: $F = 62.70$, $p < .001$, $d = .51$. For White-British in mixed vs segregated schools: proportion of outgroup friends: W1: $F = 85.15$, $p < .001$, $d = .48$; W2: $F = 143.96$, $p < .001$, $d = .63$; number of close friends: W1: $F = 135.47$, $p < .001$, $d = .61$; W2: $F = 237.47$, $p < .001$, $d = .81$.

Figure 5: Percentage of pupils reporting different numbers of 'close outgroup friends'
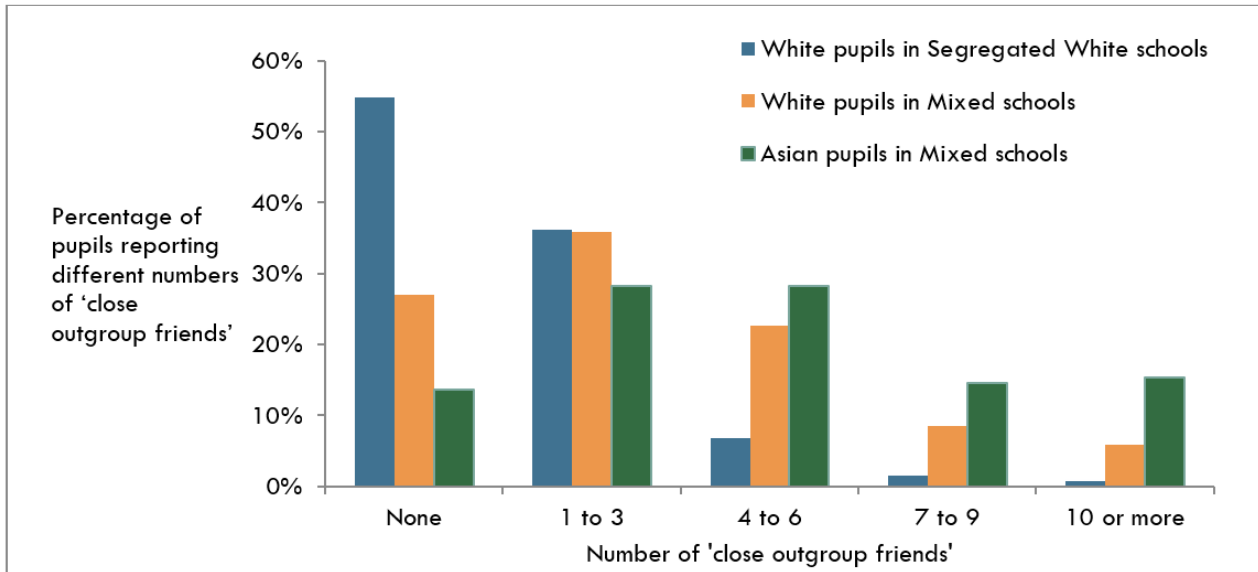
Without identifying any schools by name in this report, we were also able to break the friendship data down by individual schools (comparing segregated White-British and mixed schools). White-British pupils in segregated schools had a very low proportion of outgroup friends (as shown above). For White-British pupils in mixed schools, the proportion of Asian-British friends was, as would be expected, higher in the two schools with fewer White-British and more Asian-British, than in the two schools with over 80% White-British pupils. For Asian-British pupils in mixed schools, as expected, the number of White-British friends rose steadily as the proportion of White-British pupils in the school increased. Our point here is not, in any sense, to say that the mixed schools are 'better' than the segregated ones; nor are we interested in whether pupils in the mixed schools have the number of outgroup friends that they would be expected to, given the proportion of pupils from each ethnic group in each school. Rather, given that pupils in mixed schools sometimes 're-segregate' (i.e., fail to take up opportunities for mixing; see Sections 5.6 and 5.7, below), we merely provide robust empirical evidence that pupils in the mixed schools *are mixing*.

Views of the outgroup

Social intimacy

Items include:

Neighbours:

How would you feel about having neighbours who are from [the outgroup]?

Outgroup romantic partner:

How would you feel about having a boyfriend or girlfriend who is from [the outgroup]?

Asian-British in mixed schools reported being more comfortable with having outgroup neighbours and outgroup romantic partners than were White-British at both waves. Figure 6 shows that White-British in mixed schools reported being more comfortable with having outgroup neighbours than did White-British in segregated White-British schools at Wave 1, but reported comfort levels were equivalent at Wave 2. Interestingly, as shown in Figure 7, White-British in segregated White-British schools reported being much more comfortable with having an outgroup romantic partner than White-British in mixed schools at Wave 1, which was an unexpected finding. However, their level of comfort decreased considerably from Wave 1 to Wave 2. By Wave 2, the difference as a function of school type was small, as was the effect size.[7]

Figure 6: Social intimacy - how happy would you be to have an outgroup neighbour?

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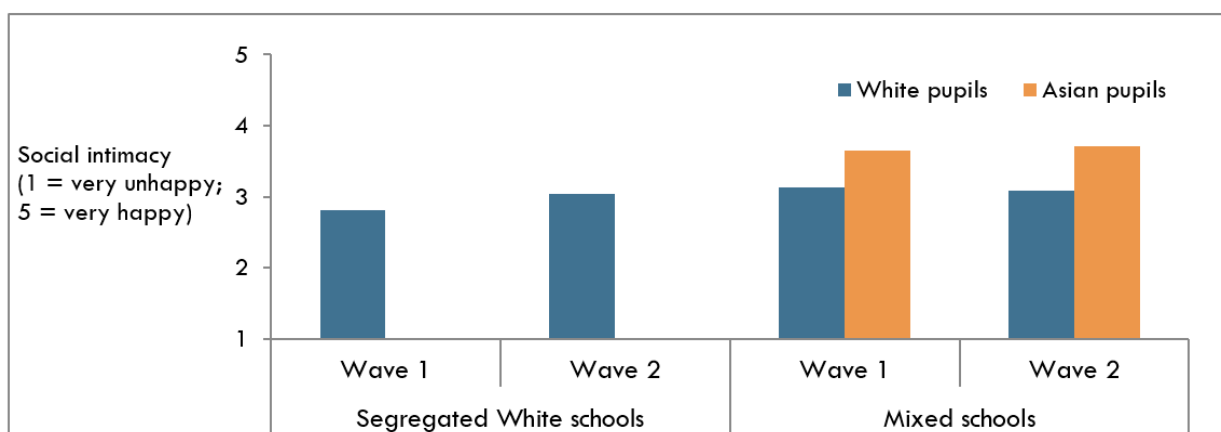
[7] For Asian-British vs White-British in mixed schools: neighbour: W1: $F = 59.51$, $p < .001$, $d = .50$; W2: $F = 90.83$, $p < .001$, $d = .62$; girlfriend/boyfriend: W1: $F = 3.99$, $p < .05$, $d = .13$; W2: $F = 34.95$, $p < .001$, $d = .38$. For White-British in mixed vs segregated White-British schools: neighbour: W1: $F = 31.34$, $p < .001$, $d = .29$; W2: $F = .71$, $p = .40$, $d = .04$; girlfriend/boyfriend: W1: $F = 399.56$, $p < .001$, $d = 1.05$; W2: $F = 7.03$, $p < .01$, $d = .14$.

Figure 7: Social intimacy - how happy would you be to have an outgroup boyfriend/girlfriend?
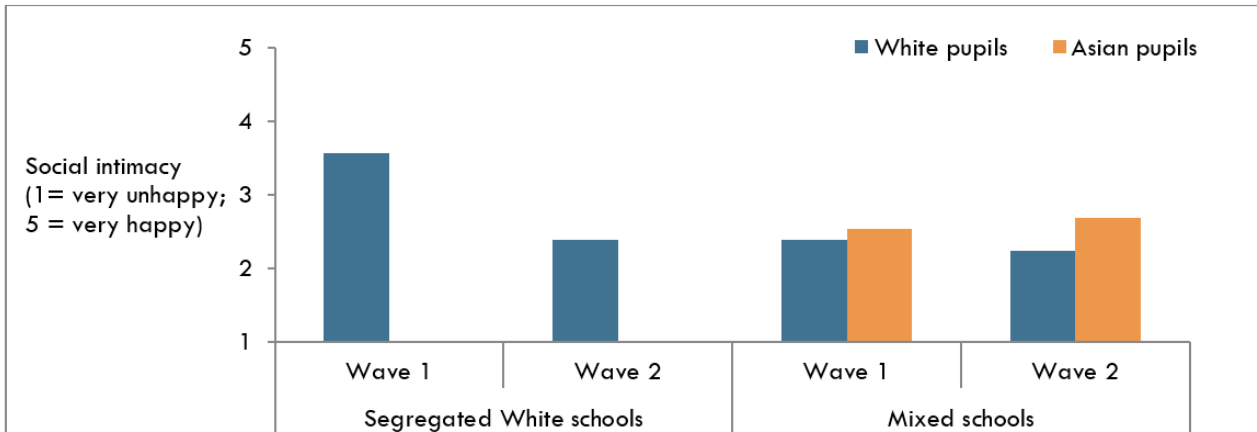
Attitudes and trust

Items include:

Attitudes:

(i) How positive or negative do you feel about people who are [from the outgroup]?

(ii) How much do you like or dislike people who are [from the outgroup]?

Trust:

(i) Do you trust people from the following groups to treat you well?

(ii) Do you trust people from the following groups to be fair to you?

Scores were averaged across the two items for each construct. As shown in Figure 8, Asian-British in mixed schools had more positive outgroup attitudes and more outgroup trust than did White-British at both waves. White-British in mixed schools reported similar outgroup attitudes to White-British in segregated schools at Wave 1, but more positive attitudes at Wave 2, though the effect is small. Figure 9 shows that White-British in mixed schools also reported higher levels of trust than White-British in segregated schools at both waves.[8]

---

[8] For Asian-British vs White-British in mixed schools: attitudes: W1: $F = 56.19$, $p < .001$, $d = .49$; W2: $F = 69.16$, $p < .001$, $d = .53$; trust: W1: $F = 63.61$, $p < .001$, $d = .52$; W2: $F = 44.42$, $p < .001$, $d = .43$. For White-British in mixed vs segregated schools: attitudes: W1: $F = 3.42$, $p = .06$, $d = .10$; W2: $F = 4.63$, $p < .05$, $d = .11$; trust: W1: $F = 4.69$, $p < .05$, $d = .11$; W2: $F = 5.63$, $p < .05$, $d = .12$.

Figure 8: Attitudes towards the outgroup
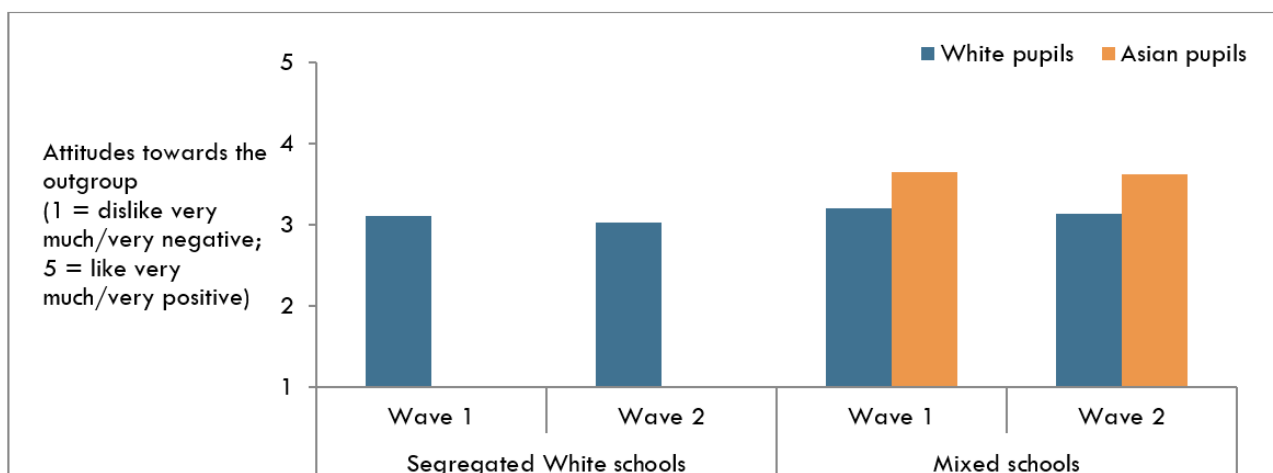
Figure 9: Trust towards the outgroup
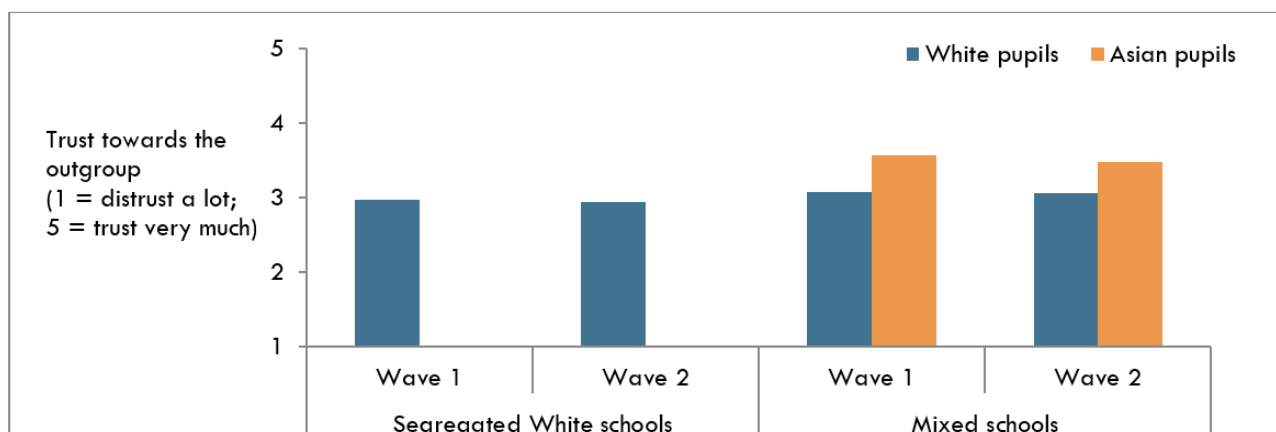
2.4   Other measures: intergroup anxiety, norms, aspirations, life satisfaction

Intergroup anxiety

Items include:

Think of a situation where you might meet people from different ethnic groups. Would you feel nervous towards people who are from [the outgroup]?

Intergroup anxiety refers to how people feel about interactions with unknown members of the outgroup, compared with the ingroup. Figure 10 shows that Asian-British in mixed schools had lower intergroup anxiety than White-British at Wave 1, but equivalent levels at Wave 2. Unexpectedly, the level of anxiety for Asian-British at Wave 2 was

significantly higher than at Wave 1; we do not know why this occurred.[9] White-British in mixed schools reported significantly lower levels of intergroup anxiety than White-British in segregated schools at both waves, though the effect sizes were small.

Figure 10: Intergroup anxiety
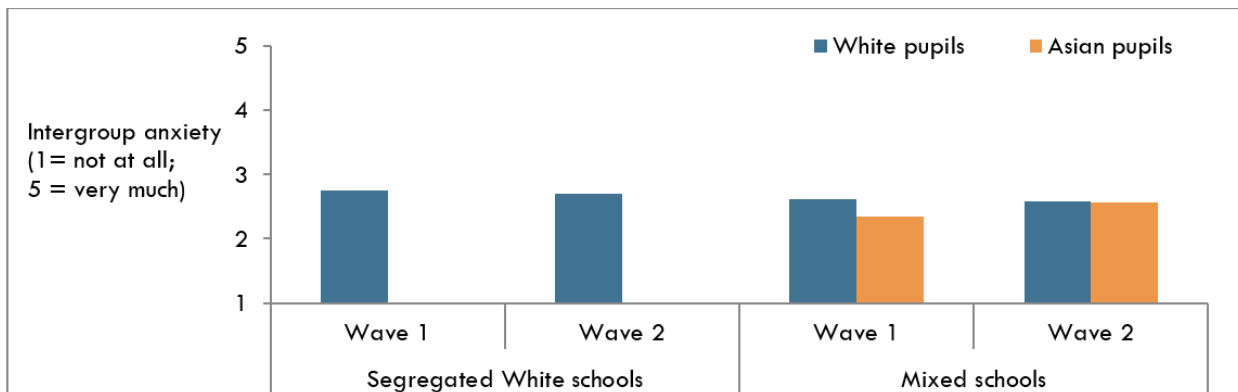
Norms

Items include:

Please think about the people who matter to you in your life, like your family and friends from your ethnic group. Keeping those people in mind, please answer the following:
(i) my family and friends like me to spend time with people who are from [the outgroup],
(ii) my family and friends encourage me to have friends who are from [the outgroup]

Figure 11 shows that Asian-British in mixed schools perceived more positive ingroup norms (i.e., more support for mixing) than White-British at both waves. White-British in mixed schools perceived more positive ingroup norms than White-British in segregated schools at both waves. However, in general, perceived norms were less positive than the mid-point of the scale, except for Asian-British pupils in the mixed schools.[10] Thus, pupils from neither ethnic community saw strong support for mixing from their family and friends.

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[9] Comparison of intergroup anxiety for Asian-British at Wave 2 vs. Wave 1: paired t: *2.85*, $p < .01$, $d = .29$.
[10] For Asian-British vs White-British in mixed schools: ingroup norms: W1: $F = 29.41$, $p < .001$, $d = .35$; W2: $F = 42.37$, $p < .001$, $d = .42$. For White-British in mixed vs segregated White-British schools: ingroup norms: W1: $F = 9.5011.45$, $p < .01$, $d = .16$; W2: $F = 5.98$, $p < .05$, $d = .13$.

Figure 11: Ingroup norms about mixing
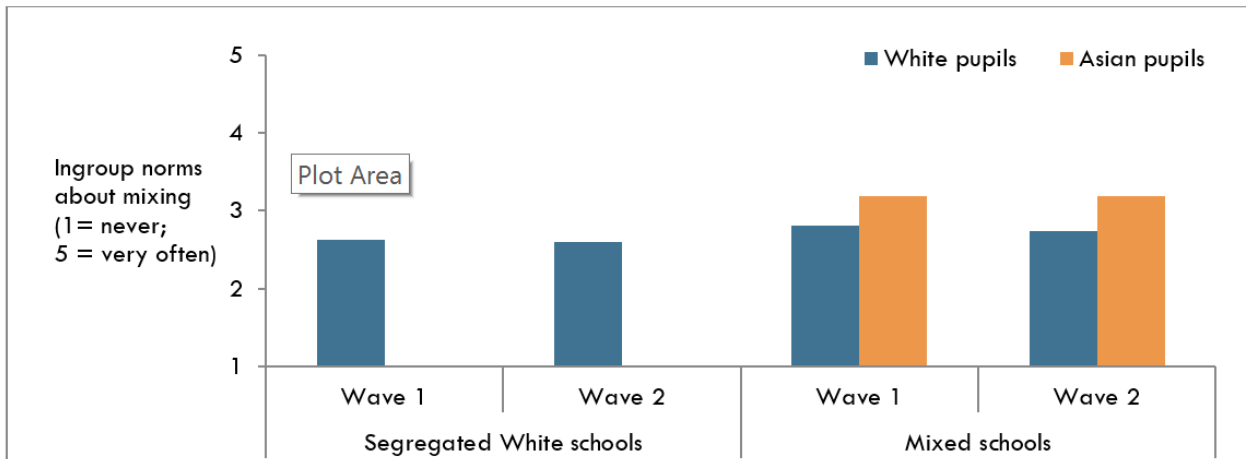
Aspirations

Items include:

To what extent do you agree or disagree with the following statements?

I want to get a university degree.

I want to have a job that pays lots of money.

Figures 12 and 13 show that Asian-British in mixed schools had greater aspirations to get a degree than did White-British at both waves, and to get a high-paying job (only at Wave 2). Both groups had very high levels of aspiration. White-British in segregated schools reported higher aspirations to get a degree than White-British in mixed schools at both waves, and greater aspiration to get a high-paying job at Wave 1, but aspiration levels were equivalent at Wave 2. All effects were small. It should be noted here that three of the segregated White-British schools (*Bluecoat, Saddleworth* and *Crompton House*) are among the highest-achieving schools in Oldham and have the lowest proportion of pupils receiving free school meals.[11] As noted earlier, it should also be remembered that schools differing in their ethnic composition may also differ on educational and socio-economic dimensions, as is the case here.

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[11] For Asian-British vs White-British in mixed schools: degree: W1: $F = 17.15$, $p < .001$, $d = .27$; W2: $F = 10.26$, $p < .01$, $d = .21$; high-paying job: W1: $F = .07$, $p = .80$, $d = .02$; W2: $F = 11.18$, $p < .01$, $d = .22$. For White-British in mixed vs segregated White-British schools: degree: W1: $F = 8.94$, $p < .01$, $d = .16$; W2: $F = 6.53$, $p < .05$, $d = .13$; high-paying job: W1: $F = 8.08$, $p < .01$, $d = .15$; W2: $F = 3.20$, $p = .07$, $d = .09$.

Figure 12: Aspirations - getting a degree
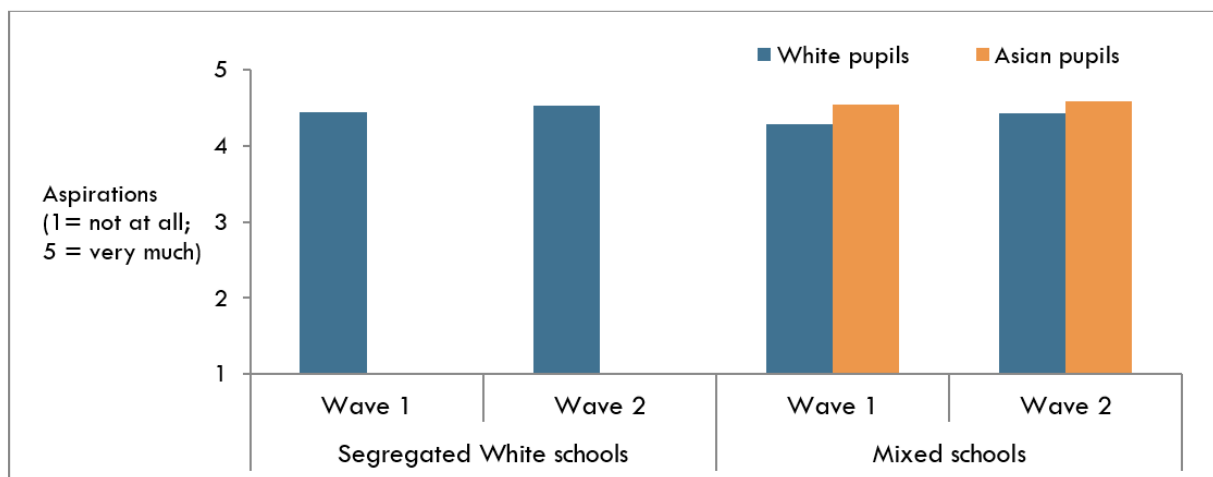
Figure 13: Aspirations - getting a high-paying job
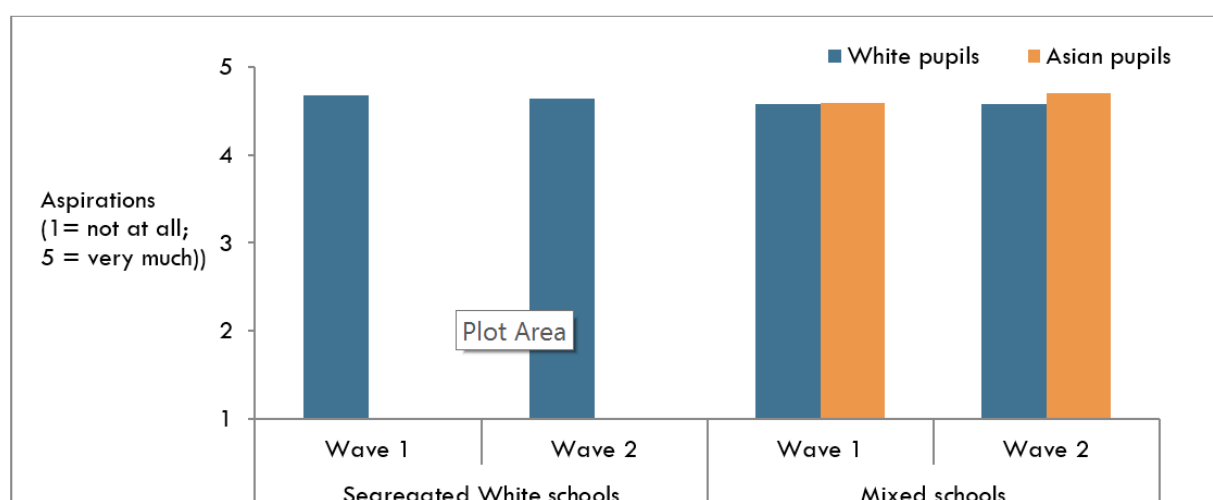
Life satisfaction

Items include:

How happy do you feel with your life?

Figure 14 shows high levels of life satisfaction for pupils from both ethnic groups and both segregated and mixed schools at both waves. There were no significant differences.

Figure 14: Life satisfaction
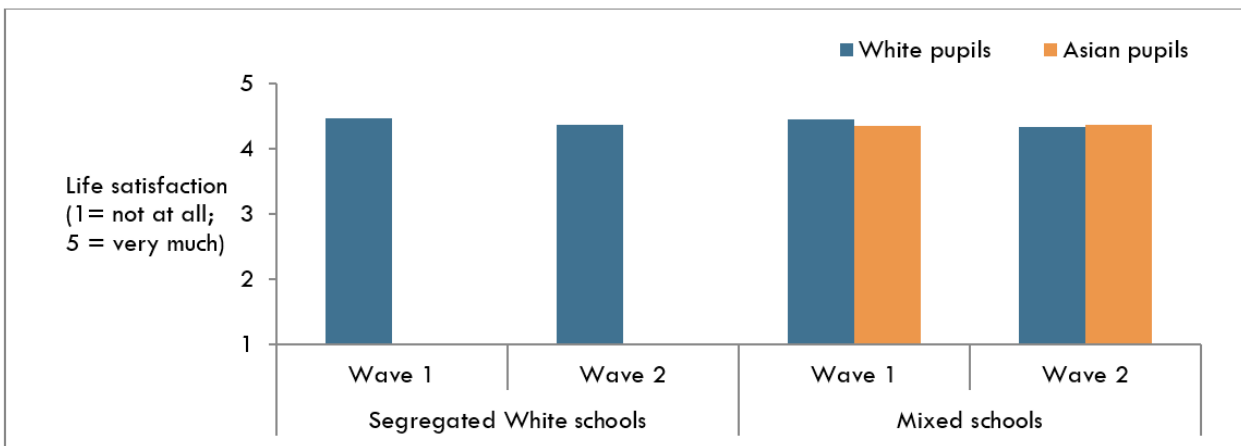
2.5 Does contact predict attitudes over time?

The direction of causality implied by the contact hypothesis is quite clear: more positive contact should, over time, lead to more positive outgroup attitudes. The reverse effect may also be found, due to self-selection (e.g., those with prejudice avoid contact; while those with more liberal attitudes may seek it out). As we demonstrate below, we find clear evidence of contact predicting attitudes, and of the reciprocal relationship from attitudes to contact.

We computed a series of longitudinal analyses to explore these effects across Waves 1 and 2 (W1, W2).[12] Figure 15 shows a cross-lagged model, i.e., a model testing the paths from contact (with outgroup friends) to attitudes, and *vice versa*, for White-British pupils in segregated schools.[13]

We also report how much of the variance (as a percentage) in the measure assessed at Wave 2 is explained by the variables assessed at Wave 1. According to the contact hypothesis, contact at Wave 1 should 'predict' or 'account for a substantial portion of the

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[12] In these analyses we are dealing with *residualized scores* at W2. These analyses do not measure change in terms of W2 minus W1, but rather the W2 variable (e.g., Wave 2 friendship) is regressed on the Wave 1 variable (Wave 1 friendship), so we are predicting the residual component of the Wave 2 variable. Analytic methods using change scores and the regressor variable method (i.e., the method we have used) are computationally equivalent in many cases.

[13] To reiterate: we are interested in the degree to which W1 friendship predicts W2 attitude, controlling for W1 attitude. This is not dissimilar from measuring how W1 friendship predicts change in attitudes from Waves 1 to 2; because when we say that W1 friendship predicts W2 attitudes, we are actually talking about the *residualized* W2 attitudes, which is similar to change in attitudes. We control for self-selection by simultaneously modelling the reciprocal path from wave 1 attitudes to wave 2 contact.

variation in' attitudes measured at Wave 2. We find that proportion of Asian-British friends at Wave 1 significantly predicted attitudes at Wave 2 (explaining 13% of the variation in outgroup attitudes), while attitudes at Wave 1 significantly predicted proportion of outgroup friends at Wave 2 (explaining 20% of the variance in proportion of outgroup friends). The two paths can be equated, indicating that they are statistically equivalent,[14] meaning that in this data set the effect from-contact-to-attitudes was of the same size as the reverse path from-attitudes-to-contact. This demonstrates that even after the self-selection effect has been accounted for, the path from contact to attitudes remained statistically significant.

Figure 15: The relationship between outgroup friends and attitudes for White-British pupils in segregated White-British schools

Friends-Attitudes relationship: White pupils (segregated White schools)

Outgroup friends Wave 1

Outgroup friends Wave 2 Variance explained = 13%

$B = .12$ $p < 0.001$

Attitudes Wave 1

Attitudes Wave 2 Variance explained = 20%

$B = .12$ $p < 0.001$
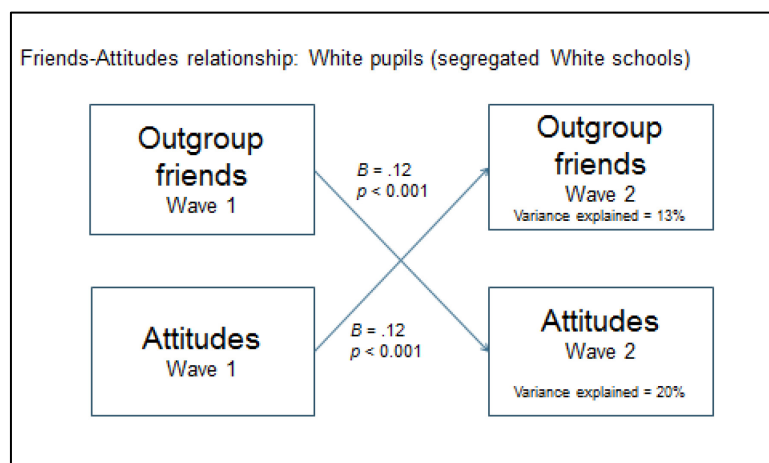
B in Figure 15 denotes *B* coefficients, which are unstandardized regression coefficients. This means they measure the amount of change in one variable that is associated with that in another variable (while controlling for all other variables). For example, the coefficient of 0.12 for outgroup friends at Wave 1 predicting attitudes at Wave 2 means that as the score for outgroup friends increased by 1, the attitudes score increased (on average) by 0.12. (Outgroup friends and attitudes are measured on scales between 1 and 5.[15]) This analysis controls for prior levels of attitudes, and shows that those who have more friends at wave 1 have more positive attitudes at wave 2.

Figure 16 shows a similar cross-lagged model, testing the paths from proportion of outgroup friends to attitudes, and vice versa, but now for Asian-British and White-British pupils in mixed schools. It shows that the paths for proportion of outgroup friends-to-

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[14] $\beta = .12$. $p < .001$ for both. β coefficients are standardized regression coefficients; see explanation of regression coefficients above – here, as one variable increases by 1 standard deviation, the other increases by 0.12 of a standard deviation.
[15] Exact definitions of scales for these two measures can be found in Figures 4 and 8.

attitude and the reverse could be equated for Asian-British and for White-British pupils (indicating that the respective paths were statistically equivalent).

Figure 16: Relationship between outgroup friends and attitudes for mixed schools (White-British and Asian-British pupils combined)
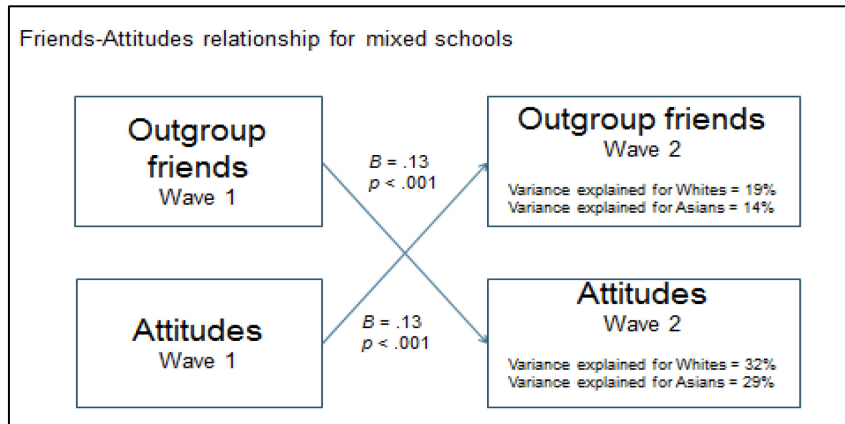
Note: The coefficients are the same for Asian-British and White-British.

2.6 Other measures: intergroup anxiety and norms

Intergroup anxiety

Items include:

Do you feel nervous when you meet young [outgroup] people?

White-British and Asian-British pupils reported feeling similar levels of intergroup anxiety at Wave 1, though White-British pupils reported higher levels of anxiety at Wave 2 than Asian-British pupils.[16]

Norms

Items include:

1. *My family would be happy if I became friends with people from [the outgroup].*

2. *My friends like it when I "hang out" with people from [the outgroup].*

As Figures 17 and 18 show, Asian-British perceived more positive norms about mixing from family and ingroup friends than White-British did. Asian-British perceived less positive family norms over time, but perceived more positive ingroup friends' norms over time.[17]

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[16] Intergroup anxiety: W1: F = .05, p = .82, d = .02; W2: F = 4.41, p < .05, d = .18.

[17] Family norms: W1: F = 41.36, p < .001, d = .54; W2: F = 19.10, p < .001, d = .37.
Ingroup friends' norms: W1: F = 9.04, p < .001, d = .25; W2: F = 14.57, p < .001, d = .32.

Figure 17: Family norms in mixed schools
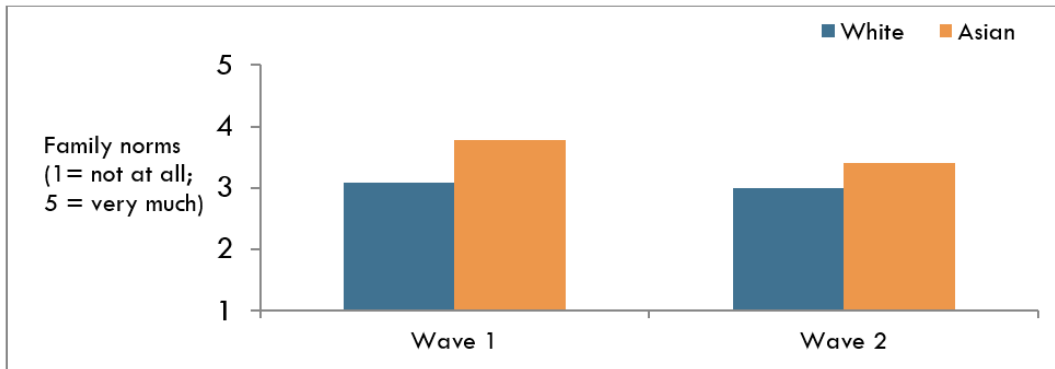
Figure 18: Ingroup friends' norms
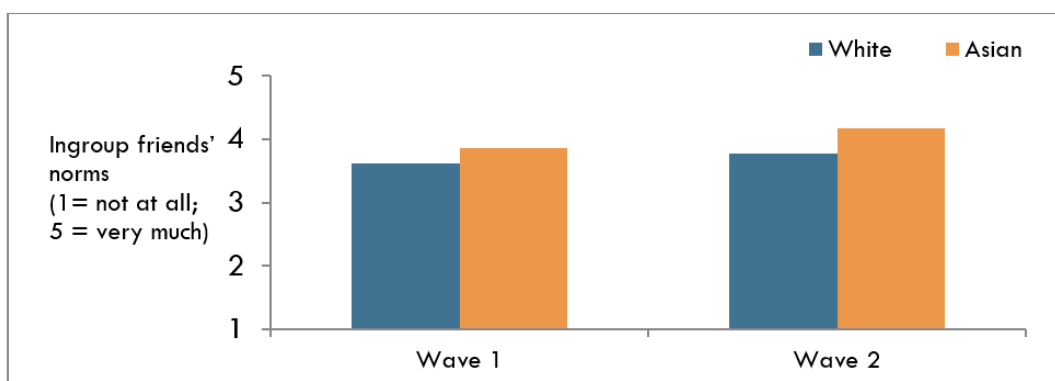
We next asked whether family norms might qualify the effect of contact on outgroup attitudes; for example, might the effect of contact on attitudes be different for pupils who had relatively more positive (vs. negative) family norms? This is, statistically speaking, a *moderation* effect. This was only the case for the Asian-British pupils. Figure 19 shows that both quantity of contact and family norms, measured at Wave 1, positively predicted outgroup attitudes at Wave 2 (controlling for outgroup attitudes at Wave 1). The interaction between these two predictors was also significant, and is decomposed in Figure 19. Figure 19 shows that positive family norms mattered when contact was low. When Asian-British pupils did not have much contact, they tended to have more positive attitudes towards White-British when they perceived positive norms from their family. However, when contact was high, norms did not have as big an impact on attitudes. This result suggests that, for Asian-British, even pupils from homes with negative norms towards mixing still have the opportunity to develop positive outgroup attitudes if they have sufficient positive contact with the outgroup.

Figure 19: Family norms moderate the effect of contact quantity on attitudes (for Asian-British sample in mixed schools)
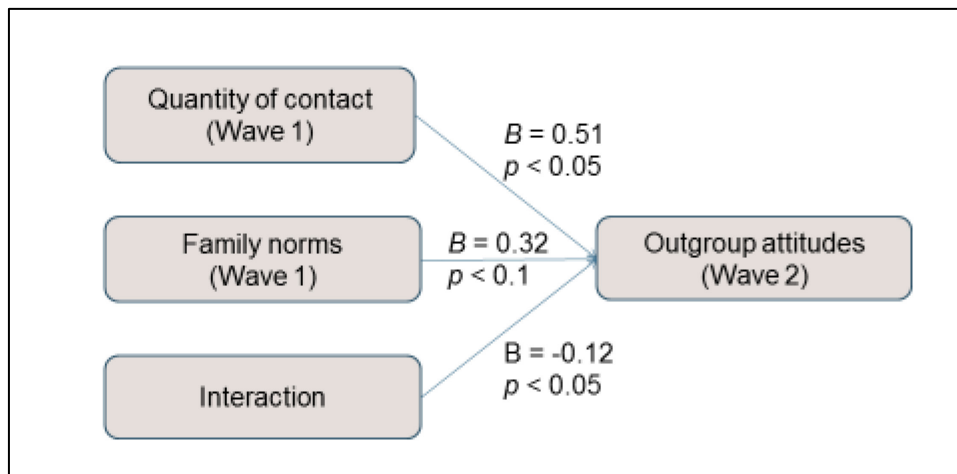
A negative coefficient for the interaction term means that the moderator (family norms) *reduces* the effect of the independent variable (quantity of contact) on the dependent variable (outgroup attitudes). (Conversely, a positive interaction term means that the moderator *increases* the effect of the independent variable on the dependent variable). So in this case, a negative coefficient for the interaction between family norms and quantity of contact means that having stronger family norms *reduced* the effect of contact quantity on outgroup attitudes. This is visualised in Figure 20, which shows that the gradient of the slope for 'high family norms' is less steep than the slope for 'low family norms' (i.e., the quantity of contact matters less, when family norms are high). The significance of the interaction term tells us that the difference between those gradients is statistically significant.

Figure 20: Positive family norms affect attitudes when contact is low (for Asian-British sample in mixed schools)
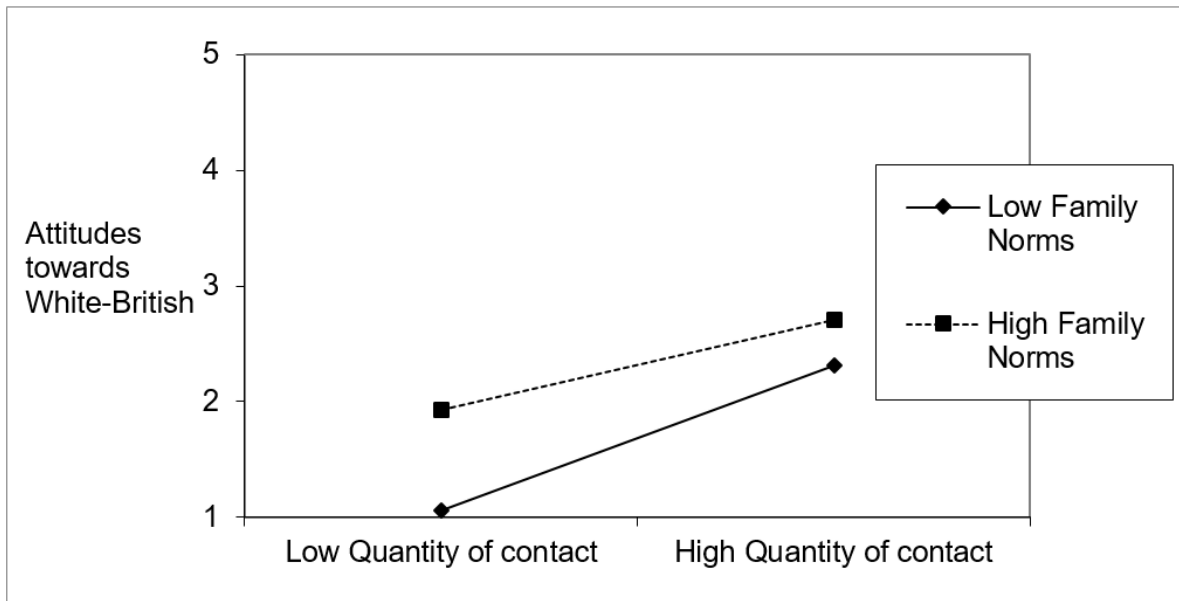
2.7 Negative vs positive contact

A recently-acknowledged feature of mixed settings is that they may be associated not only with increased positive, but also with increased negative contact. This makes sense, because if there is complete segregation, then there cannot be contact, either positive or negative; and when people come together, whether from the same or different groups, some interactions are bound to be negative.

Figure 21 shows that, overall, levels of negative contact were low (the mean is just above 2, on a 5-point scale). In mixed schools, White-British reported having more negative contact than Asian-British at both waves (small effect sizes). White-British in mixed schools also reported considerably more negative contact than White-British at segregated schools at both waves.[18]

Figure 21: Negative contact
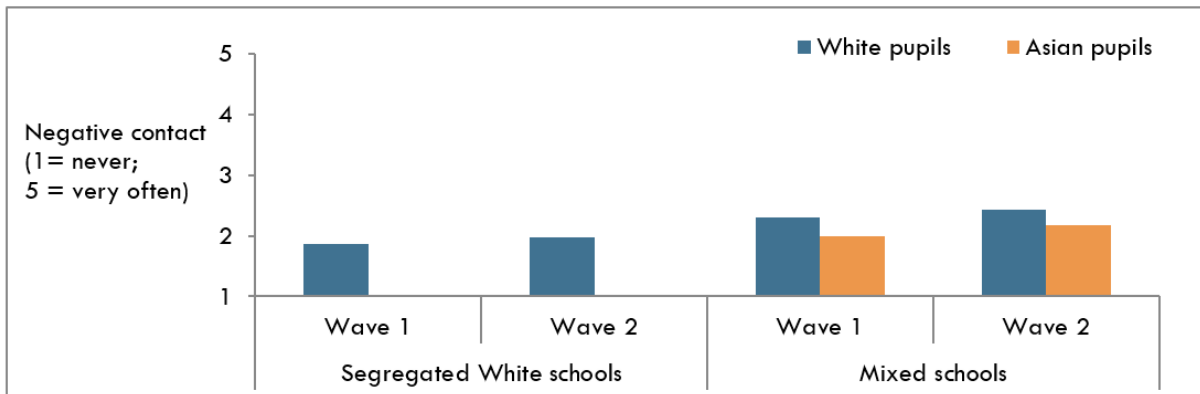
Given the existence of some negative contact[19], and the finding that negative contact is reported to be higher the more outgroup members are present, the question arises as to whether negative contact undermines the positive impact of contact identified above (using exclusively positive measures of contact, such as outgroup friends).

Figure 22 shows that this is not the case; for White-British pupils in mixed and segregated schools, and Asian-British pupils in mixed schools, outgroup friendship had a positive effect on outgroup attitudes, even in the face of some negative contact experiences (which in two of the three cases were not significantly associated with outgroup attitudes).[20]

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[18] For Asian-British vs White-British in mixed schools: negative contact: W1: $F = 19.87$, $p < .001$, $d = .29$; W2: $F = 13.27$, $p < .001$, $d = .24$. For White-British in mixed vs segregated White-British schools: negative contact: W1: $F = 61.33$, $p < .001$, $d = .41$; W2: $F = 65.42$, $p < .001$, $d = .42$.

[19] For White-British pupils in segregated White schools, the majority of pupils (89% at Wave 1 and 85.9% at Wave 2) report never or only rarely having negative contact experiences, and a small proportion report having negative contact quite often to very often (3.6% at Wave 1 and 4.0% at Wave 2). At mixed schools, once again, the majority of White-British pupils (79.8% at Wave 1 and 78.6% at Wave 2) report never or only rarely having negative contact experiences, and a small proportion report having negative contact quite often to very often (6.6% at Wave 1 and 7.1% at Wave 2). And finally, the majority of Asian-British pupils at mixed schools (83.4% at Wave 1 and 80.6% at Wave 2) report never or only rarely having negative contact experiences, and a small proportion report having negative contact quite often to very often (5.6% at Wave 1 and 5.3% at Wave 2).

[20] We have not explicitly compared positive and negative contact, because we do not have equivalent measures of each type of contact across both segregated and mixed schools.

Figure 22: Effects of friendship and negative contact on attitudes
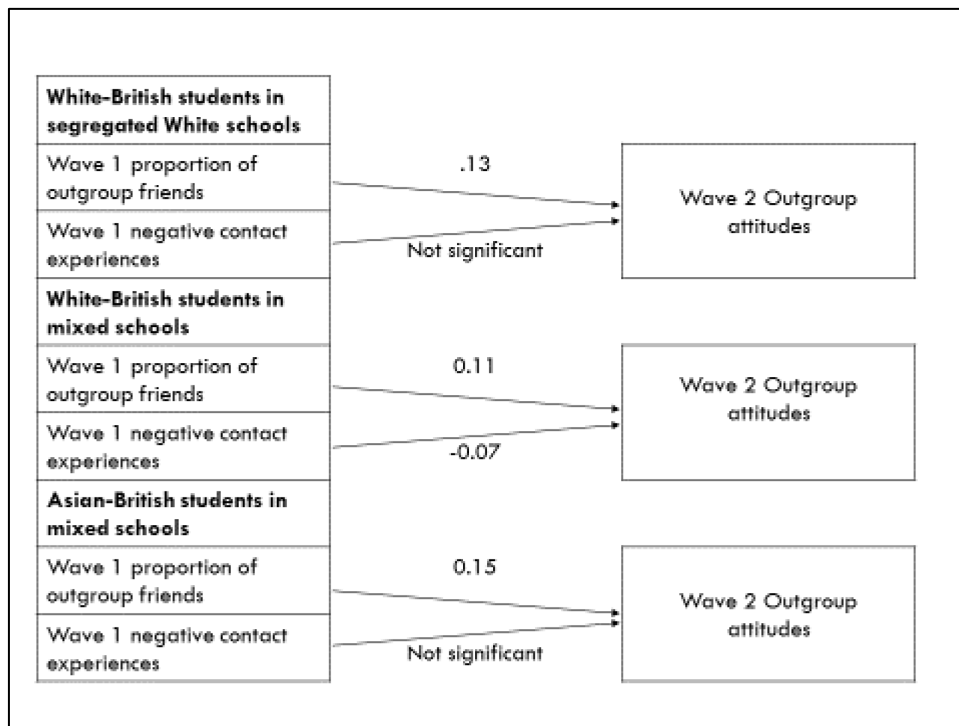
2.8 Additional analyses for mixed schools only

In the four mixed schools there should, of course, be greater opportunities for contact, and of different types, so that we can potentially explore in more detail the extent of different types of contact and how they are related to one another. Figures 23-26 show that all four measures of contact (quantity and quality of contact in the classroom, and quantity and quality of break-time contact) were higher for Asian-British than White-British. Asian-British exceeded White-British on all contact measures at both waves. Asian-British particularly reported higher levels of quantity and quality of break-time (voluntary) contact at Wave 2.[21]

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[21] Class - Quantity of contact: W1: $F = 43.49$, $p < .001$, $d = .43$; W2: $F = 90.55$, $p < .001$, $d = .62$.
Class - Quality of contact: W1: $F = 25.64$, $p < .001$, $d = .33$; W2: $F = 56.70$, $p < .001$, $d = .49$.
Break - Quantity of contact: W1: $F = 33.31$, $p < .001$, $d = .37$; W2: $F = 423.49$, $p < .001$, $d = 1.33$.
Break - Quality of contact: W1: $F = 20.34$, $p < .001$, $d = .29$; W2: $F = 257.77$, $p < .001$, $d = 1.04$.

Figure 23: Quantity of classroom contact in four mixed schools
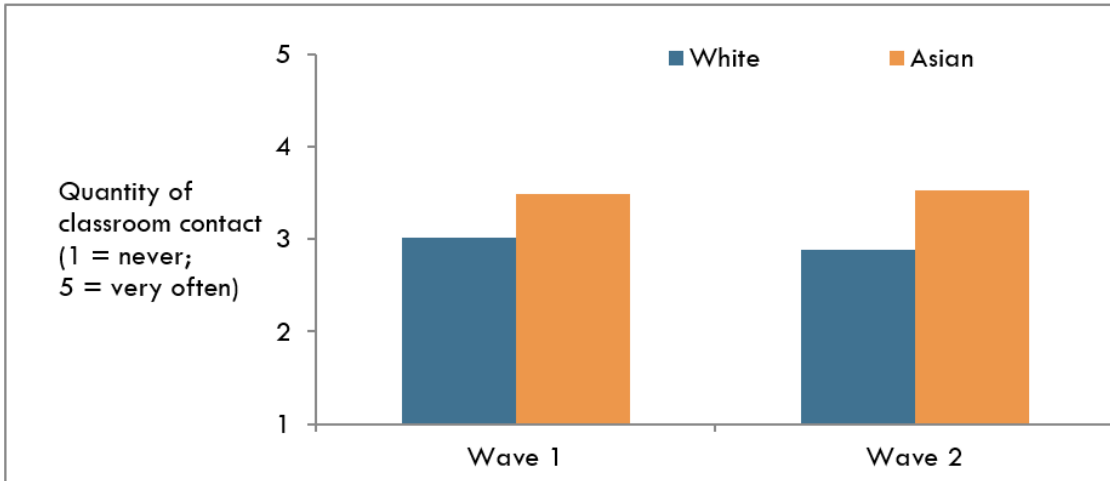
Figure 24: Quality of classroom contact in four mixed schools
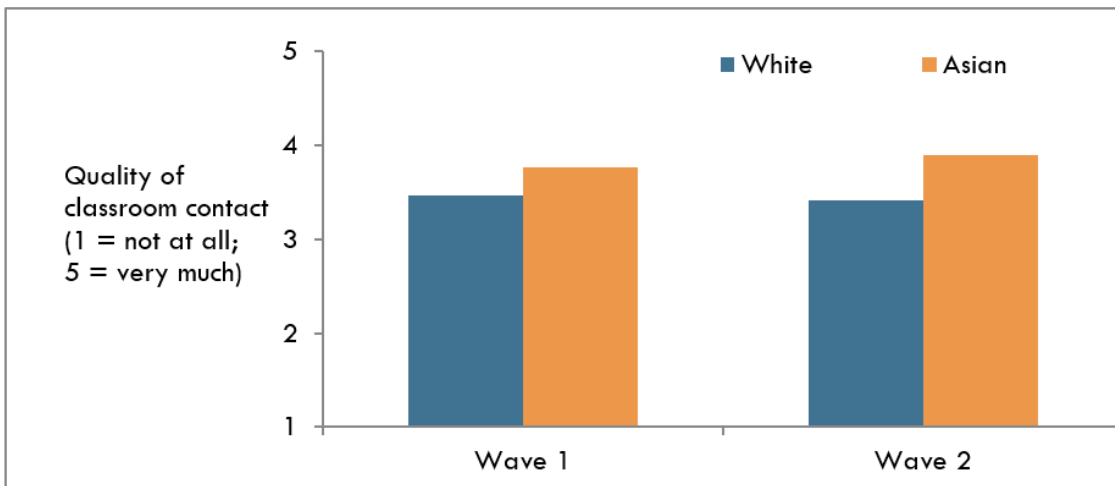
Figure 25: Quantity of break-time contact in four mixed schools
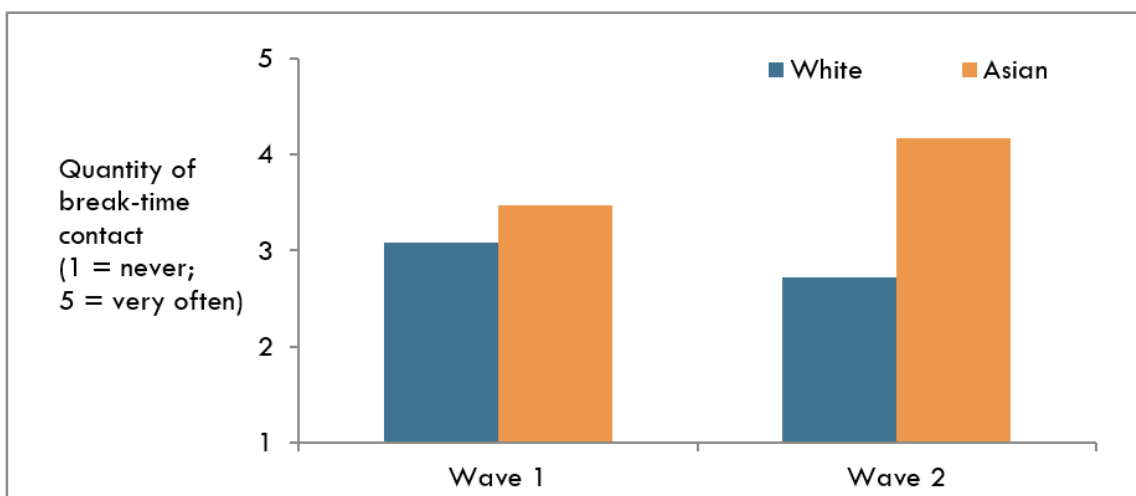
Figure 26: Quality of break-time contact in four mixed schools
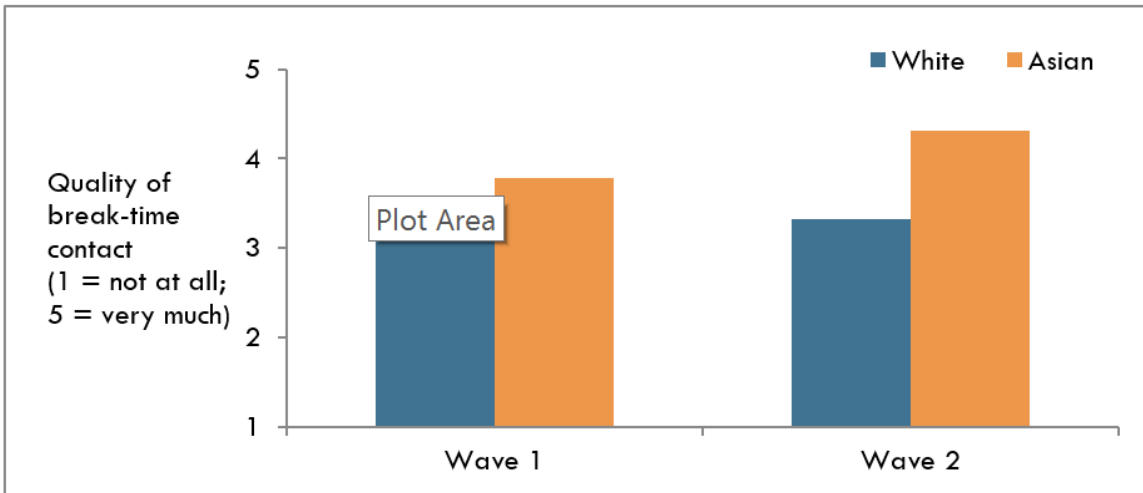
Figure 27 shows that, for White-British and Asian-British, classroom contact during school at Wave 1 predicted contact outside school at Wave 2; likewise, Wave 1 outside-school contact predicted Wave 2 classroom contact. These two directional effects were statistically equivalent, indicating that in-school contact drives outside-school contact as much as the reverse. This generalization across settings is a positive result, because it shows the benefits of mixing in one setting for promoting greater interaction in different settings. To clarify this analysis, consider the example of a pupil who already had extensive outside-school contact at W1, which was maintained until W2, and yet we still find that W1 in-school contact predicted W2 outside-school contact, after controlling for W1 outside-school contact. In other words, despite high levels of outside-school contact at both waves, we find that something beyond prior levels of outside-school contact (i.e., in-school contact) predicted the unexplained part of outside-school contact at W2. Thus, the model effectively measures change, but also allows the two different W1 variables to be correlated with one another, which a pure change-score model does not allow.

Figure 27: Relationship between classroom contact and outside school contact for mixed schools only
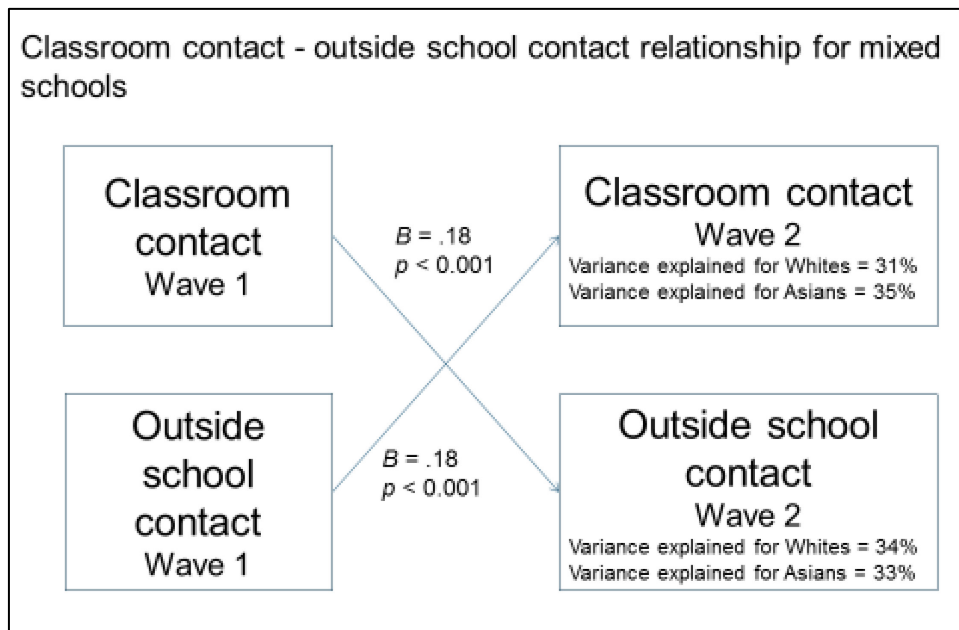
Classroom contact - outside school contact relationship for mixed schools

Classroom contact Wave 1

B = .18
p < 0.001

Classroom contact Wave 2
Variance explained for Whites = 31%
Variance explained for Asians = 35%

Outside school contact Wave 1

B = .18
p < 0.001

Outside school contact Wave 2
Variance explained for Whites = 34%
Variance explained for Asians = 33%

Note: Coefficients were the same for White-British and Asian-British. Classroom contact and outside school contact are measured on scales between 1 and 5, as described above. (See explanation of *B* coefficients below Figure 15.)

Finally, given the extensive support for the positive effects of contact in mixed versus segregated White-British schools, we should be careful to point out that there is some evidence of earlier mixing for pupils in mixed schools. Although Oldham's primary schools are, as noted earlier, highly segregated, Figure 28 shows that for pupils in mixed schools, Asian-British reported more primary-school contact than did White-British. In addition, White-British in mixed schools had more primary-school contact than White-British in segregated White-British schools.[22]

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[22] For Asian-British vs White-British in mixed schools: primary school contact: $F = 16.08$, $p < .001$, $d = .26$. For White-British in mixed vs segregated White-British schools: primary school contact: $F = 68.93$, $p < .001$, $d = .43$.

Figure 28: Primary school contact
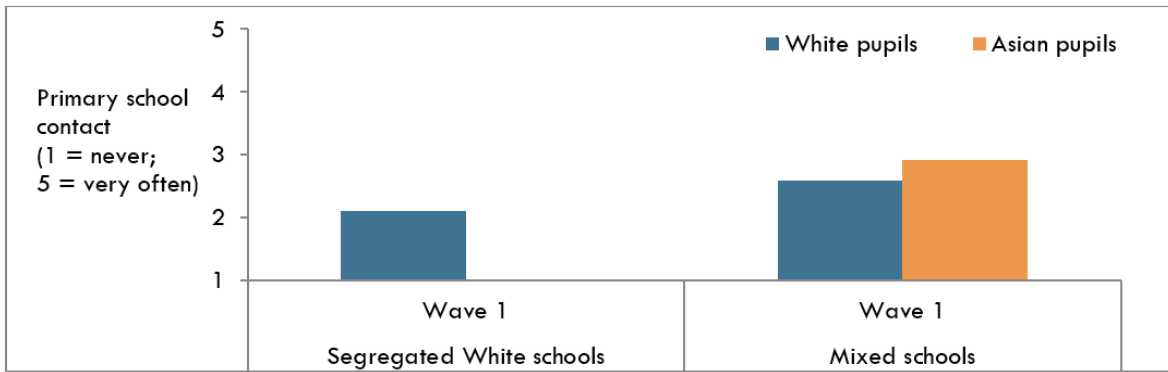
2.9 Summary

Asian-British vs. White-British

Although White-British pupils' responses are quite positive on all variables, Asian-British in mixed schools had even more and better quality contact, in and out of school, and a greater proportion of outgroup friends than White-British. They were even more comfortable than White-British with having outgroup neighbours and romantic partners, and had even more positive attitudes. They were more likely to see mixing as the norm (approved by family and friends), had even greater aspirations and perceived negative contact experiences as less frequent than did White-British. Mean levels of negative contact, however, were low, and outgroup friendship still positively predicted attitudes despite negative contact, whose effect was weak.

Mixed vs. segregated

White-British pupils in mixed schools had more and better quality contact, a greater proportion of outgroup friends and more close outgroup friends than those in segregated schools. They had higher levels of trust in the outgroup and saw mixing more as the norm. The White-British in mixed schools (compared with segregated schools) were more comfortable with having outgroup neighbours, had lower anxiety levels but higher levels of negative contact. The White-British pupils in mixed schools had, in general, more positive attitudes and trust towards the outgroup than their counterparts in segregated schools. Specific questions asked only in mixed schools revealed that contact in one domain (e.g., outside school vs classroom) predicted contact in the other domain (classroom vs outside school).

Effects over time

Over a seven-month period, White-British pupils improved their attitudes and decreased their anxiety, compared to White-British in segregated schools, and reported more outgroup trust. The quantity and quality of contact (both in the classroom and outside) at the first Wave (first point of data collection) increased by the second Wave. Changes over time were smaller for Asian-British, who are already more exposed to the outgroup, and their anxiety levels actually increased over time. On other measures, there were, in general, no large- or even medium-size effects for changes over time, perhaps because of the short period of seven months between waves. However, we found clear evidence, for both Asian-British and White-British, that contact predicted attitudes over time; although the reverse effect was also found. We also found that Asian-British had mixed more in primary school contact than did White-British, and White-British in mixed schools had mixed more in primary school than their counterparts in segregated White-British schools, which may have attenuated the effect of mixing in secondary school.

3. Study of the three most mixed secondary schools in Oldham

In a second study in Oldham, we focused on the three most mixed schools, each of which had at least 20% Asian-British minority pupils (see Figure 1 above).

3.1 Methodological details

We sampled 257 White-British and 312 Asian-British from three mixed schools. Pupils again completed a survey asking about contact, attitudes towards the other group, and other aspects of community relations at two time points (Wave 1: November 2011; Wave 2: June 2012). Pupils were aged 11-12 years, and were in their first year of secondary school; approximately 49% of the sample was female.

3.2 Main findings: contact and attitudes

Contact measures

Quantity

Items include:

1. How often do you chat with young [outgroup][23] people?

2. How often do you "hang out" with young [outgroup] people?

Quality of contact

Items include*:*

In general, when I spend time with [outgroup] pupils…

1. it feels like we cooperate, like we're on the same team

2. it feels like we are equals, like we are treated the same

3. it feels close, like with good friends and family

Number of outgroup friends

Items include:

Please think about your friends right now. How many of them are from [the outgroup]?

---

[23] As noted above, the word "outgroup" is not actually used in the surveys, but replaced with the name of the outgroup, e.g., "White-British" or "Asian-British".

Interest in making outgroup friends

Items include:

In general, how much would you like to become friends with young [outgroup] people?

Figures 29-32 show the mean levels for White-British and Asian-British pupils on four measures of contact. Asian-British exceeded White-British on all contact measures at both waves. Asian-British showed a drop in quality of contact and interest in making outgroup friends over time. It should also be noted that Asian-British are always in the minority, hence they have more opportunity for contact than White-British (which explains quantity of contact and number of friends, but not their higher reported *quality* of contact).[24]

Figure 29: Quantity of contact in the three most mixed schools
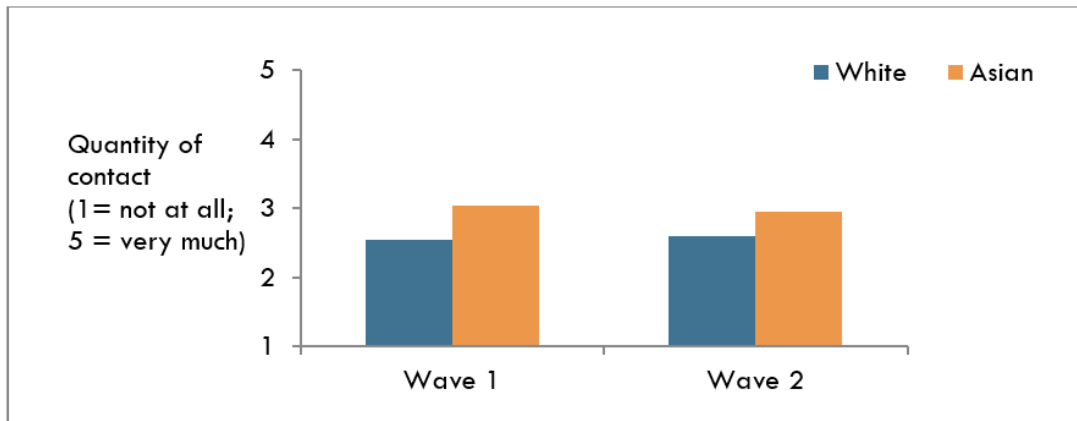
Figure 30: Quality of contact in the three most mixed schools

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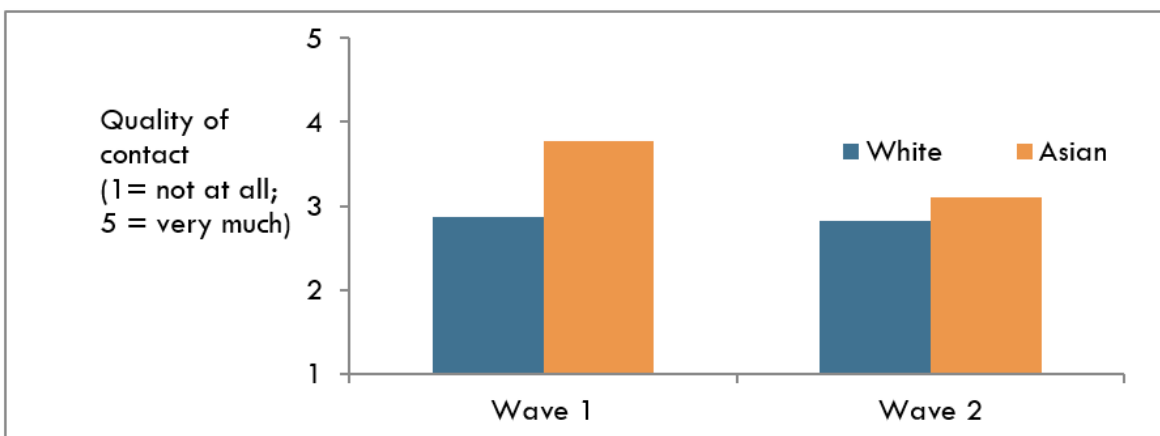
[24] Quantity of contact: W1: $F = 25.75$, $p < .001$, $d = .43$; W2: $F = 14.97$, $p < .001$, $d = .33$; quality of contact: W1: $F = 76.82$, $p < .001$, $d = .74$; W2: $F = 9.61$, $p < .01$, $d = .26$; number of outgroup friends: W1: $F = 33.02$, $p < .001$, $d = .48$; W2: $F = 16.21$, $p < .001$, $d = .34$; interest in making outgroup friends: W1: $F = 79.84$, $p < .001$, $d = .75$; W2: $F = 23.74$, $p < .001$, $d = .41$.

Figure 31: Number of outgroup friends in the three most mixed schools
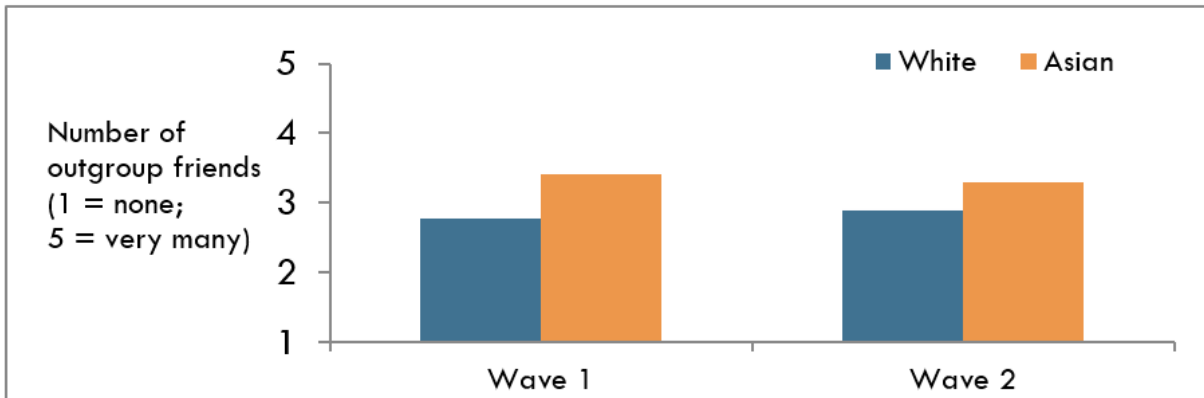
Figure 32: Interest in making outgroup friends in the three most mixed schools
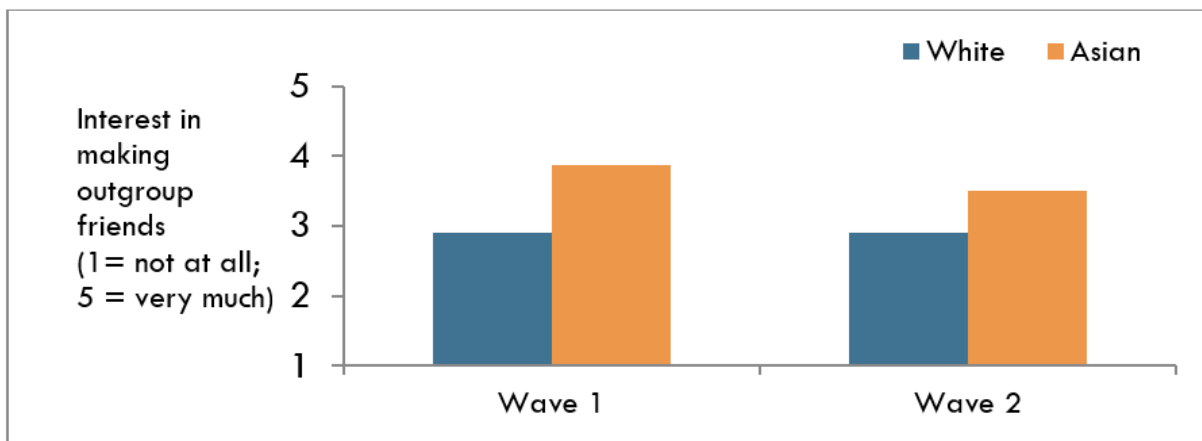
Attitudes

Items include:

1. How much do you like [the outgroup]?

2. How warm do you feel towards [the outgroup]?

Figure 33 shows the mean outgroup attitudes of White-British and Asian-British pupils at Waves 1 and 2. Asian-British had a more positive attitude towards the outgroup, but showed a small but significant drop in positive outgroup attitudes over time.[25]

---

[25] Attitudes towards the outgroup: W1: $F = 61.71$, $p < .001$, $d = .66$; W2: $F = 61.71$, $p < .001$, $d = .45$.

Figure 33: Attitudes towards the outgroup in the three most mixed schools
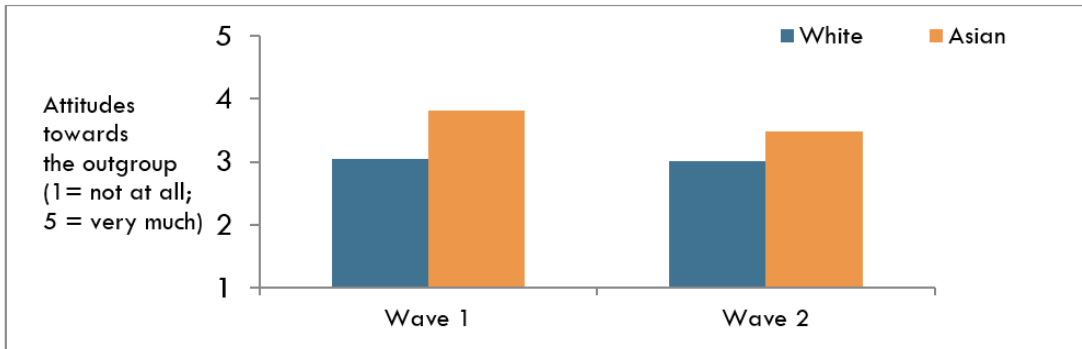
Relationship between contact and attitudes

Figure 34 shows results of a cross-lagged analysis, which finds that contact at Wave 1 significantly predicts attitudes at Wave 2 and *vice versa*. Both paths are statistically significant and equivalent, indicating the presence of both a self-selection and a contact effect, as explained in Section 2. To recap, we see that people who have outgroup contact showed an improvement in their outgroup attitudes, even after accounting for the finding that their more positive attitudes were associated with them seeking out contact. In other words, we see across this study and the one presented in Section 2, evidence that suggests a reciprocal process, where greater contact promotes better attitudes, and better attitudes promote greater contact.

Figure 34: Relationship between contact and attitudes for mixed schools
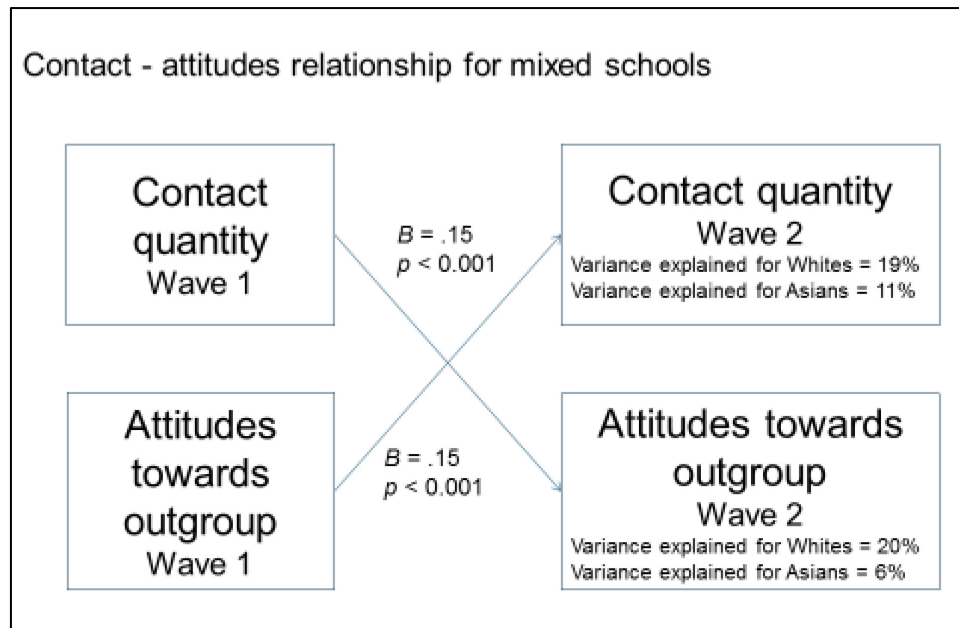
Note: Coefficients were the same for White-British and Asian-British. Classroom contact and outside-school contact are measured on scales between 1 and 5. (See explanation of *B* coefficients below Figure 15.)

3.4 Summary

White-British vs. Asian-British in mixed schools

In the three most mixed schools, the Asian-British, who had higher opportunities for outgroup contact, had greater quantity and quality of contact, number of outgroup friends, and interest in making outgroup friends than the White-British. They also had lower anxiety at Wave 2. Asian-British had more positive attitudes towards the outgroup, and were more likely to perceive mixing to be valued by their family and ingroup. For the Asian-British, when contact was low, positive family norms about mixing improved attitudes towards the outgroup. On the other hand, when the level of contact was high, even if norms were negative these pupils could still develop positive outgroup attitudes.

Effects over time in mixed schools

Asian-British pupils' quality of contact, interest in making outgroup friends, and attitudes towards the outgroup dropped over the months between the two measurement points (a relatively short 7-month period). Their perception of their family's approval of mixing dropped, but perceived approval of ingroup friends increased. White-British pupils' anxiety increased over time. Other variables did not change. Pupils with more outgroup contact showed improved attitudes over time, and those with more positive attitudes engaged in more contact; we conceive of this as a virtuous circle.

4. Evidence from post-16 education

4.1   Ethnic breakdown

In addition to the secondary schools that have provided the majority of our research data in Oldham, we have also been given access to pupils at Oldham Sixth Form College (OSFC). At the time of data collection (2010), OSFC had a relatively large Asian-British pupil population (16% Bangladeshi and 24% Pakistani in our sample). Including this data set allows us to investigate whether patterns observed in the younger cohorts persist into later adolescence, and also the impact of secondary-school contact on contact and attitudes at sixth-form college.

4.2   Methodological details

The OSFC data were collected in October and November 2010 from a sample of 594 pupils aged 16-18 (361 White-British, 93 Asian-British Bangladeshi, 140 Asian-British Pakistani, 255 Male, 339 female). The questionnaire included items on intergroup contact, outgroup attitudes, group identity, as well as a wide variety of other measures. The study was cross-sectional (i.e., the data were collected at a single time point), hence we can only look at associations between variables, but not draw inferences about causal effects.[26]

4.3   Main findings: patterns and predictors of contact

In this section, response scales are indicated below each item, to make presentation of this information clearer for figures in which several variables were aggregated.

Patterns of contact

Quantity of contact

Items include:

1. Classroom contact quantity: How often do you talk to [outgroup] pupils during CLASSROOM activities?

(1 item, 1 = *Never*; 7 = *Very often*)

---

[26] All tests of associations between variables were carried out using linear regression analysis, and interactions were tested using Hayes and Matthews' (2009) MODPROBE procedure. Comparisons of ethnic group and gender differences were made using 2 (Gender: Male vs. Female) X 2 (Ethnicity: White-British vs. Asian-British) between-subjects multivariate analyses of variance (MANOVAs).

2. Break time contact quantity: How often do you talk to [outgroup] pupils during BREAK TIMES?

(1 item, 1 = *Never*; 7 = *Very often*)

Quality of contact

Items include:

1. Classroom contact quality: How much do you enjoy spending time with [outgroup] pupils during CLASSROOM activities?

(1 item, 1 = *Not at all*; 7 = *Very much*)

2. Break time contact quality: How much do you enjoy spending time with [outgroup] pupils during BREAK TIME activities?

(1 item, 1 = *Not at all*; 7 = *Very much*)

As shown in Figure 35, contact between White-British and Asian-British pupils was significantly more frequent and more enjoyable when it occurred in the classroom, as opposed to during break times.

Figure 35: Contact in the classroom and at break times (post-16)
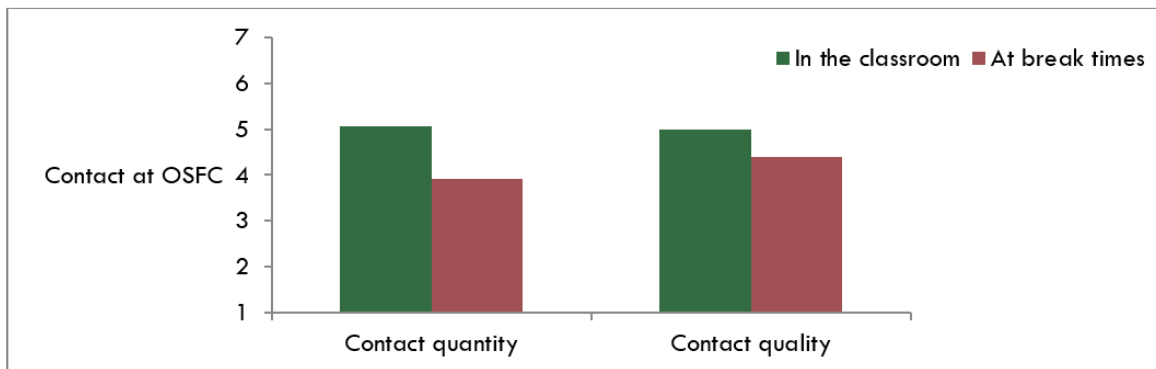
Predictors of contact

Contact

Items include:

1. *Quantity of secondary school contact: Thinking about your secondary school: How often did you talk to [outgroup] pupils during classroom activities or break times?*
(1 item, 1 = *Never*; 7 = *Very often*)

2. *Quality of secondary school contact: Thinking about your secondary school: How much did you enjoy spending time with [outgroup] pupils during classroom activities or break times?*
(1 item, 1 = *Not at all*; 7 = *Very much*)

3. *OSFC contact composed of classroom and break time items (quality and quantity) – see item descriptions in previous section.*

4. *Cross-group friendships: How many of your friends at OSFC are [outgroup]?*
(1 item, 1 = *None*; 7 = *All*)

Extended contact

Items include:

Please think of your [ingroup] friends. How many of them have [outgroup] friends?
(2 items, 1 = *None*; 7 = *All*)

Positive norms

Items include:

Thinking about the people who matter to you in your life, such as your family and close friends, do they encourage you to mix with people who are [outgroup]?
(3 items, 1 = *Not at all*; 7 = *Very*)

Intergroup anxiety

Items include:

When you meet Asian-British people, do you feel anxious?
(4 items, 1 = *Not at all*; 7 = *Very*)

Beliefs about diversity

Items:

To what extent do you agree or disagree with the following statement:
- *the mix of people from different ethnic backgrounds makes OSFC a better place?*

- *the mix of people from different ethnic backgrounds makes Oldham a better place?*
- *the mix of people from different ethnic backgrounds makes Britain a better place?*

(1 = *Strongly disagree*; 7 = *Strongly agree*)

Given the age of respondents in this study (16-18 years), we were able to ask them how much contact they had had at their previous secondary school (from 11-16 years). We found that the single largest predictor of both contact (item 3 above) and cross-group friendships (item 4) between Asian-British and White-British pupils was contact at secondary school (see item 1).[27]

Other variables (see examples of items above) significantly associated with contact included extended contact (having ingroup friends who have outgroup friends) ($r_{\text{White-British}}$ = .52, $r_{\text{Asian-British}}$ = .32), positive norms ($r_{\text{White-British}}$ = .36, $r_{\text{Asian-British}}$ = .33), lower intergroup anxiety, ($r_{\text{White-British}}$ = -.39, $r_{\text{Asian-British}}$ = -.33) and diversity beliefs, ($r_{\text{White-British}}$ = .46, $r_{\text{Asian-British}}$ = .15).[28]

Respondents who reported more cross-group friends also tended to report stronger diversity beliefs.[29] Respondents showed, on average, slightly positive attitudes towards the idea of diversity. Specifically, beliefs about the benefits of diversity for OSFC (mean = 5.28, *SD* = 1.59, *p* < .001), Oldham (mean = 4.83, *SD* = 1.78, *p* < .001), and Britain as a whole (mean = 5.07, *SD* = 1.79, *p* < .001) were all significantly above the scale midpoint of 4. White-British and Asian-British pupils did not differ in their beliefs about diversity in Oldham or Britain, but Asian-British respondents did report significantly more positive beliefs about the value of diversity in OSFC (mean = 6.06, *SD* = 1.37) than did White-British respondents (mean = 4.78, *SD* = 1.53, *p* = .024).

---

[27] Results from linear regression showing variables that most strongly predicted two types of contact: contact at secondary school (contact *B* = .38, *SE* = .03, *p* < .001, cross-group friendship *B* = .41, *SE* = .03, *p* < .001).

[28] Results from linear regression showing variables that most strongly predicted contact: extended contact (*B* = .17, *SE* = .03, *p* < .001), positive norms (*B* = .08, *SE* = .03, *p* = .002), intergroup anxiety (*B* = -.12, *SE* = .04, *p* = .001), and diversity beliefs (*B* = .10, *SE* = .04, *p* = .006).

[29] Results from linear regression showed that having more cross-group friends predicted stronger diversity beliefs (*B* = .07, *SE* = .03, *p* = .026).

Effects of contact on intergroup relations

Contact quality

Items include:

How much do you enjoy spending time with [outgroup] pupils during CLASSROOM activities?

(1 item, 1 = *Not at all*; 7 = *Very much*)

Intergroup anxiety

Items include:

When you meet [outgroup] people, do you feel anxious?

(3 items, 1 = *Not at all*; 7 = *Very*)

Outgroup trust

Items include:

Do you trust [outgroup] people to be fair to you?

(2 items, 1 = *Not at all*; 7 = *Very much*)

The strongest predictor of outgroup attitudes (amongst both Asian-British and White-British) was quality of contact during classroom activities. Quality of classroom contact was also the strongest negative predictor of intergroup anxiety and positive predictor of outgroup trust.[30]

4.4   Effect of social norms

Contact was more strongly associated with outgroup attitudes amongst those who report more negative group norms. Thus, we found that norms moderate, or qualify, the relationship between contact and attitudes: those who reported low positive norms showed a stronger relationship between contact and attitudes than those who report high positive norms. As in Section 3.3, this result once again suggests that even pupils who are exposed to negative norms can still benefit from the effects of positive contact, and indeed benefit more than those in relatively positive normative environments.[31]

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[30] $B = .34$, $SE = .06$, $p < .001$, for trust; $B = -.20$, $SE = .05$, $p < .001$, for intergroup anxiety.

[31] Results from MANOVA: positive outgroup attitudes ($M_{Asian-British} = 5.28$, $SD = 1.30$; $M_{White-British} = 4.53$, $SD = 1.34$; $p < .001$, $d = 0.56$); contact at OSFC ($M_{Asian-British} = 5.05$, $SD = 1.31$; $M_{White-British} = 4.21$, $SD = 1.37$; $p < .001$, $d = 0.63$); cross-group friendships ($M_{Asian-British} = 3.62$, $SD = 1.14$; $M_{White-British} = 2.77$, $SD = 1.00$; $p < .001$, $d = 0.79$); norms ($M_{Asian-British} = 5.16$, $SD = 1.81$; $M_{White-British} = 4.14$, $SD = 1.93$; $p < .001$, $d = 0.55$); perceived discrimination ($M_{Asian-British} = 3.17$, $SD = 1.72$; $M_{White-British} = 2.87$, $SD = 1.70$; $p = .009$, $d = 0.18$);

4.5   Differences between ethnic groups

Amongst the numerous differences between the two ethnic groups, Asian-British pupils reported significantly more positive outgroup attitudes, more contact at OSFC, more cross-group friendships, and more positive norms, but also higher levels of perceived discrimination than White-British pupils. White-British pupils reported more ingroup friendships and stronger negative norms than Asian-British pupils (see Figure 36).

Figure 36: Differences between ethnic groups for a range of variables
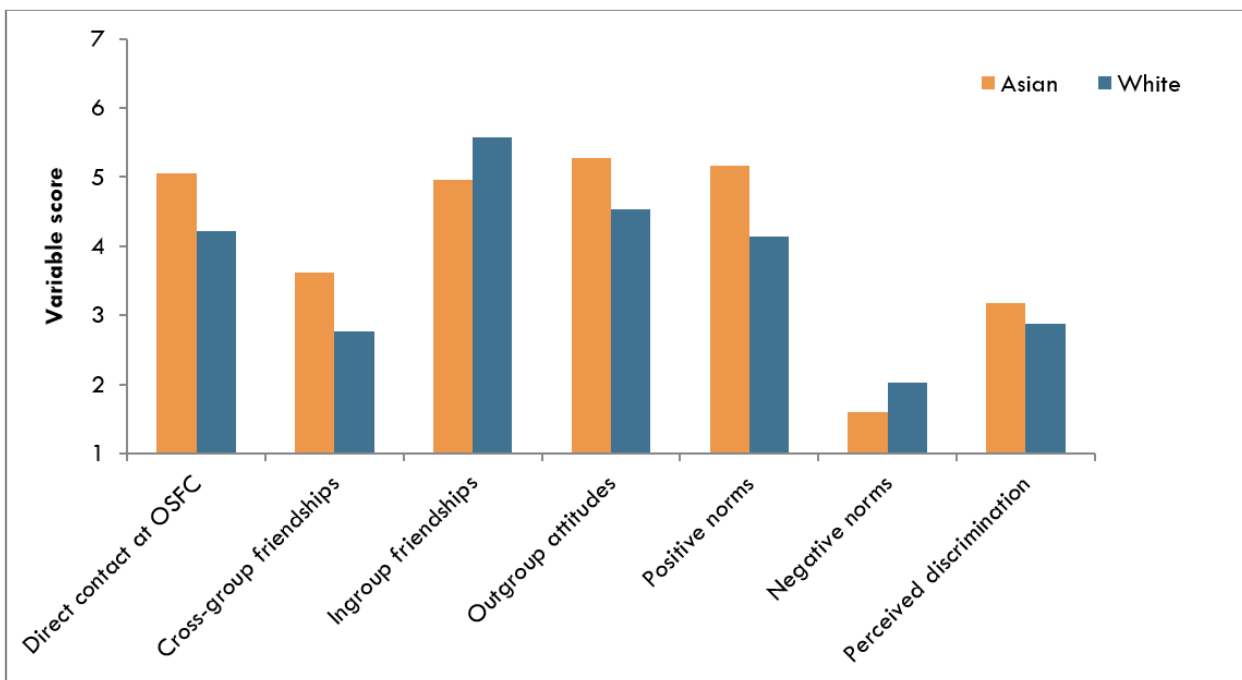
ingroup friendships ($M_{\text{White-British}}$ = 5.57, SD = 0.78; $M_{\text{Asian-British}}$ = 4.96, SD = 1.20; p < .001, d = 0.60); negative norms ($M_{\text{White-British}}$ = 2.02, SD = 1.32; $M_{\text{Asian-British}}$ = 1.59, SD = 1.07; p = .001, d = 0.36).

4.6 Differences as a function of gender

Female pupils reported more frequent interethnic contact at OSFC and more positive norms (Figure 37).[32]

Figure 37: Gender differences
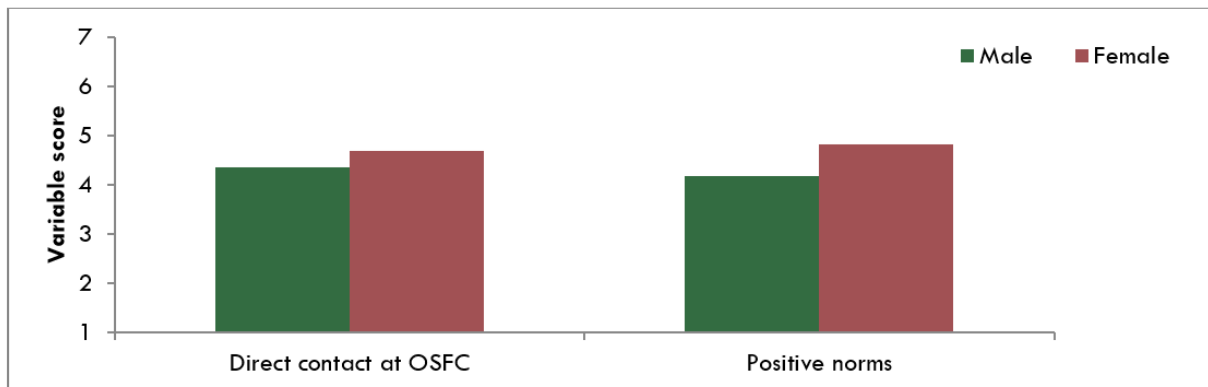
4.7 Summary

Relationships between variables using cross-sectional data

Cross-sectional data on a sixth form college showed that classroom contact was more frequent and enjoyable than break-time contact. Prior contact at secondary schools was the best predictor of contact and number of outgroup friends at sixth form college. Contact was associated with having more ingroup friends that mix, more positive norms about mixing, increased beliefs about the importance of diversity, and reduced anxiety. Quality of contact during classroom activities had the strongest association with attitudes towards, and trust in, the outgroup, and lower intergroup anxiety. Those who perceived less support for mixing from family and friends showed a stronger relationship between contact and attitudes than those who perceived more support. Thus, even those exposed to negative norms can benefit from contact.

Asian-British vs. White-British

Asian-British had more positive attitudes towards the outgroup, more contact, more outgroup friends, and perceived more support for mixing, but perceived more discrimination towards the ingroup. White-British had more ingroup friends and perceived more negative norms about mixing.

Gender differences

Females had more contact and more positive perceived norms about mixing.

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[32] Results from MANOVA: interethnic contact at OSFC (M_{male} = 4.36, SD = 1.43, M_{female} = 4.68, SD = 1.38, p = .054, d = 0.23); positive norms (M_{male} = 4.18, SD = 1.94, M_{female} = 4.82, SD = 1.91, p = .007, d = 0.33).

5. School mergers: evaluation of a social intervention in Oldham

The data reported in this section come from a rare 'natural experiment' that we were given the opportunity to study. Having been given access to all state secondary schools in Oldham, we were then given the opportunity to follow three planned mergers between existing schools (see Figure 38). In each case, the new school was located in a new building on a new site, which was occupied in 2012. *Waterhead Academy* would be a merger of a segregated Asian-British and a segregated White-British school; *Newman Roman Catholic College* would merge two Catholic schools, a segregated White-British school, and a mixed (55% Asian-British) school; and *Oasis Academy* would merge two segregated White-British schools (in fact, *Oasis* subsequently attracted an increased proportion of ethnic minority pupils, as shown in Figure 38). We tracked pupils over a period of three years as they progressed in their new schools; Table 3 provides a graphic of the four measurement waves in each school (shown for *Waterhead* only in the figure). The first two waves were not equally spaced, since we wanted to collect data just before they merged and just after. Subsequently, we collected data once each school year; time lags after the first two waves are unequal, because we had to work around the schools' schedules. The figure shows data for four Waves, but in fact we collected data over five waves. However, there was a technical problem with data from Wave 3, which showed very little overlap in respondents with Wave 5, and so Wave 3 had to be excluded. A final Wave of data collection is imminent.

Figure 38: Overview and timetable for merger schools
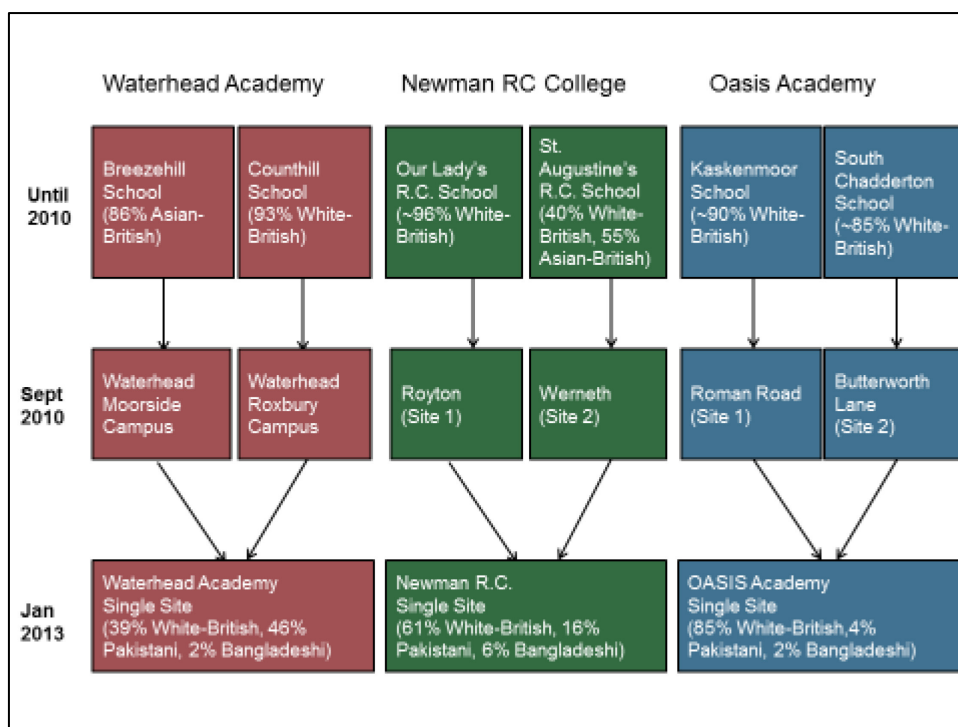
Table 3: Longitudinal design for Waterhead merger (Wave 3 not shown)

Wave 1 June 2012	M E R G E R	Wave 2 December 2012	Wave 4 June 2014	Wave 5 February 2015
Contact W1		Contact W1	Contact W4	Contact W5
Anxiety W1		Anxiety W2	Anxiety W4	Anxiety W5
Trust W1		Trust W2	Trust W4	Trust W5
Liking W1		Liking W2	Liking W4	Liking W5

5.1 Methodological details

We collected data from three year groups (Years 7-9 at the start of the study) *before* the move to each new school site (what we term 'pre-merger') in June 2012; we then followed these cohorts over subsequent years at the school (i.e., 'post-merger'). It is inevitable, especially when following up the same respondents over several years, that some data will be missing. This can arise due to respondents not completing the full survey and respondents' absence during one or more waves of data collection. We dealt with the missing data in a conventional manner by applying a missing data estimation algorithm called 'full-information maximum likelihood' (FIML), using the statistical

program *Mplus*. We examined whether the patterns of missing data (i.e., respondents with scores compared to respondents without scores at the points of data collection) affected the estimation of missing values in the analyses; there was no significant bias in this estimation. Some pupils had to be excluded, however, because they did not provide enough information to have their missing data estimated by FIML.

Because the 'ethnic merger' at *Waterhead* is potentially the most instructive for this report, we first review those data in some detail; we then compare the data from *Waterhead* with data from the other two merger schools (identified only as schools *B* & *C*) to assess the results in each school by comparing them with results in the other two schools (undergoing the same merger process over the same period of time, the other two schools can serve as control groups for the more radical ethnic merger adopted in the case of *Waterhead* where a school comprised very largely of pupils drawn from one ethnic group is merged with a school comprised of pupils drawn almost exclusively from a different ethnic group).

5.2   Main findings

5.2.1 Results for Waterhead Academy

For *Waterhead*, we analysed longitudinal data from four waves, using the same survey items to assess the main constructs of quantity of intergroup contact, intergroup anxiety, and outgroup attitudes (we also assessed intergroup trust, but trust was too highly correlated with attitudes, $r > .86$, $p < .00001$ in all analyses, to be included in the same analysis as attitudes, hence we used only liking in all subsequent analyses in this report). We report these data first, followed in later sections by results of observational research in the school cafeteria at lunch time, and then analyses of social networks based on friendships.

Sample Details

For the final sample, groups of Asian-British (389) and White-British (341) participants were of approximately equal size. The numbers of White-British boys (169) and girls (149) were also similar to the numbers of Asian-British boys (199) and girls (158). The mean age across all three year groups was 13.72 years (standard deviation, *SD*, = .94), which was similar for Asian-British (*M* = 13.71, *SD* = .89) and White-British (*M* = 13.73, *SD* = .97) pupils. At the first measurement time point, there were 408 Year 7s (44.9%

White-British), 93 Year 8s (47.3% White-British), and 113 Year 9s (49.6% White-British).[33]

Use of Latent Growth Modelling

We first analysed these data using Latent Growth Modelling (LGM; Meredith & Tisak, 1990) in order to analyse individual trajectories, or changes over time. The basic assumption of this approach is that a set of observed repeated measures taken on a given individual over time can be used to estimate an underlying trajectory. To describe this trajectory, the raw data is used to estimate two latent variables (variables that are created using an algorithm, based on the data, rather than directly measured): (1) the latent intercept, i.e., the initial level of the measured variable (e.g., intergroup contact); and (2) the latent slope, which expresses the linear growth rate (change from initial level) over time (see Figure 39 for illustrative graphic). Each one of the four waves of measurements is used to estimate individual trajectories, meaning that we estimate the development of each of the three scores of interest for each participant (the estimated scores being quantity of intergroup contact[34], intergroup liking, and intergroup anxiety). Using all individual trajectories together, the program then estimates an intercept, representing the starting point of each construct, and a slope, representing the rate of change from that starting point.[35]

---

[33] By W5, Year Nines had finished Year Eleven and left the school prior to W5.

[34] Findings for contact quality and number of outgroup friends mirrored those for contact quantity and are not included in this report.

[35] As these are latent factors, they do not contain measurement error (see Kline, 2016 for an explanation), which means that (a) the estimation of the starting point and change is more reliable (i.e., contains less error), and (b) statistical power is larger when relating several constructs (e.g., contact and attitudes), compared to just using observed variables. Finally, LGM allows for estimation of missing data, which affords (a) more statistical power and, more importantly, (b) less biased estimates than with list-wise deletion (i.e., the practice of only including participants who fill out all questions, a group that tends not to be representative of the whole sample).

Figure 39: Latent growth modelling
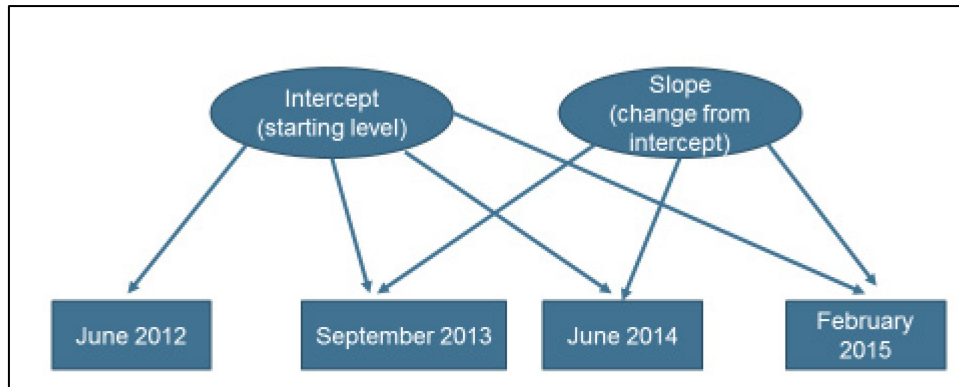
Figure 40: Latent growth models for White-British and Asian-British pupils for anxiety, liking, and contact
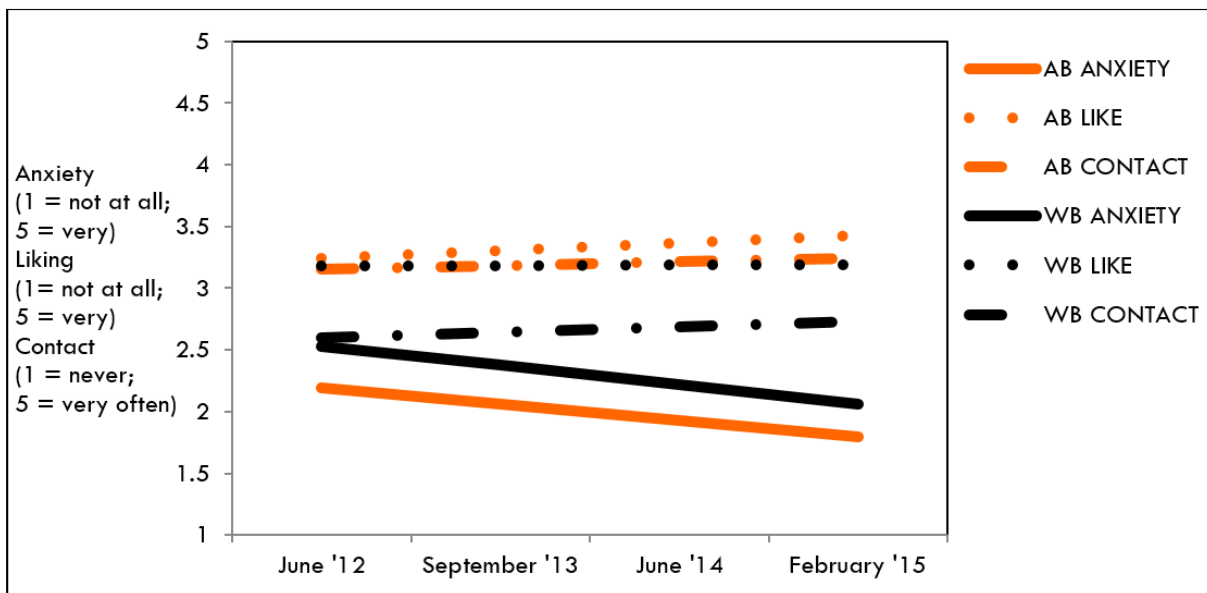
Figure 40 illustrates latent growth models separately for White-British (WB) and Asian-British (AB) pupils, for each of the three main measured variables. Changes are shown in terms of movement along the 5-point rating scales for each variable over time. The greatest changes were evident for Asian-British pupils; and all changes were significant (i.e., over time, there was a significant increase in contact and liking, and a decrease in intergroup anxiety, for both White-British and Asian-British pupils). We can report these changes as effect sizes, expressed in percentages. To illustrate, for intergroup anxiety, White-British pupils expressed their intergroup anxiety on a scale from 1 *not at all* to 5 *very*; on average, they started at a mean level of 2.53 in June 2012. This means that their mean anxiety rating could *possibly* decrease by a maximum of 1.53 on this scale (from 2.53 to 1). It *actually* decreased by 0.47 (to 2.06 on the scale from 1 to 5) in February

2015. This means that, on a scale from 1 to 5, there was a 30.70% reduction in anxiety scores.

For Asian-British pupils, contact increased by 4.66%, (intergroup) anxiety decreased by 33.17%, and liking (i.e., attitude) increased by 10.77%. For White-British pupils, change was more modest, but also significant in each case. Contact increased by 5.55%, anxiety decreased by 30.70%, and liking increased by 0.8%. Concerning individual variation, we found significant variation in the measures for both ethnic groups over time, except in the case of anxiety for both White-British and Asian-British pupils, which decreased consistently across pupils.[36]

The analysis can then investigate further the changes in both liking and contact. (This analysis is not possible for anxiety, because its slope showed no significant variance.)

Use of Multivariate Latent Growth Modelling

We next used Multivariate Latent Growth Modelling (MLGM) in order to associate the multiple LGMs with each other. However, this analysis is only possible if there is significant variance in the slope; on this basis, we had to exclude intergroup anxiety. We then ask: are increases in contact associated with increases in liking? This analysis is different from, and better than, a simple correlation between contact and liking, because we have data for many respondents, across multiple variables, and four time points for each person (see Little, 2013). Therefore, one of the advantages of MLGM analyses is that they provide more reliable results compared to simple correlations. Thus, we have separate *trajectories* over time for each variable (LGM), and we can then investigate the relationship between these trajectories (MLGM).[37]

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[36] Latent growth modelling allows us to estimate the variance of the individual trajectories of a construct (e.g., how people differ in their increases or decreases of liking); this is calculated using the variance of the slope (the slope represents the average change of a construct over time). The variance of the slope equals differences *between individuals* in changes of the construct, and has a certain value (e.g., 0.5). One can then see if this value is significantly different from zero. We found that the slope variance was significantly different from zero for all variables except anxiety.

[37] MLGM offers several key advantages over other longitudinal analyses, such as difference scores (e.g., difference between participant's Wave 1 scores and participant's Wave 5 scores) and repeated-measure analysis. For details, we refer to other published work that explains the exact differences between these analyses (Little, 2013). The advantages of MLGM include:

1. MLGM has more statistical power than approaches based on either difference scores or repeated-measures analysis, meaning that it is more likely to detect an association or effect if it is truly there (i.e., it reduces Type II error). This is a critical advantage because it means that we are less likely to arrive at a biased conclusion concerning whether changes in contact really do go together with changes in liking.

2. Unlike difference scores, MLGM uses all available waves of measurement to estimate changes in contact and liking. This means MLGM estimates will have smaller measurement error, and thus will result

To determine whether increases in contact are associated with increases in liking, we conducted separate analyses for Asian-British and White-British pupils. Figure 41 presents the results for Asian-British pupils, with outgroup attitude (liking) as the outcome or dependent variable. There are four main results to understand here (shown in the figure):

1. There was a significant negative correlation (-.57) between the intercept (the starting level) and slope of contact quantity: if you started with high contact, then it did not increase as much as when you started with low contact.

2. Likewise, there was a significant negative correlation (-.63) between the intercept and the slope of liking: if you started with high liking, then it did not increase as much as when you started with low liking.

3. The intercept of contact was significantly positively correlated (.53) with the intercept of liking: if initial contact was high, then initial liking was high.

4. Finally, and most importantly, the slope of contact was positively correlated (.51) with the slope of liking; thus increases in contact were associated with increases in liking.

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in more reliable estimates of correlations between changes in liking and changes in contact, than if difference scores had been used.

3. MLGM uses latent variables, which means that measurement error no longer affects the correlations between latent variables (Kline, 2016). One large source of measurement error in longitudinal analyses is usually *regression to the mean*, or the tendency for those who initially, at the first Wave, score more extreme (e.g., high on contact) to score closer to the average at subsequent waves. By using MLGM, regression to the mean does not affect correlations between the variables (i.e., when we investigate whether increases in liking go together with increases in contact).

Figure 41: Summary of multivariate latent growth model with example of Asian-British at Waterhead for contact quantity and outgroup liking
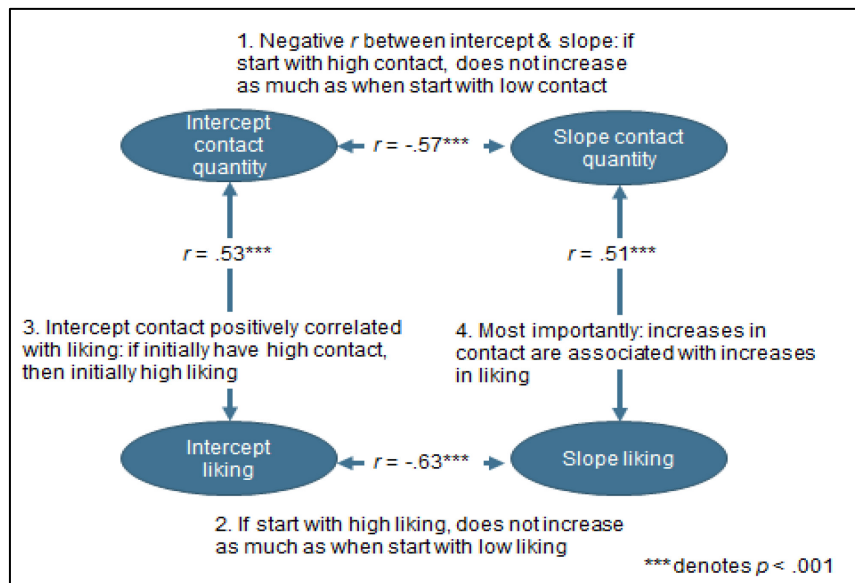
Once again, we have sought to express the *size* of these effects statistically. If the correlations are squared and multiplied by 100, this shows how much of the variance in one variable under consideration (i.e., slope or intercept of contact quantity or liking) is shared with variance in the other variable. The percentage of shared variance is substantial for both the initial levels of contact quantity and liking (28.09%), and the change in contact quantity and liking (26.01%). Thus the positive association between contact quantity and liking means that if contact went up by 1 standard deviation (*SD*) from June 2012 to February 2015, then the liking score also went up half a *SD* (0.51, to be exact). That is, increases in contact went together with increases in liking. Figure 42 presents the results for White-British pupils; all four main results were very similar to those for Asian-British pupils, but the percentage of shared variance was even more substantial for both the beginning levels of contact quantity and liking (36.00%), and the change in contact quantity and liking (46.24%).

Figure 42: Summary of multivariate latent growth model with example of White-British at Waterhead and outgroup liking
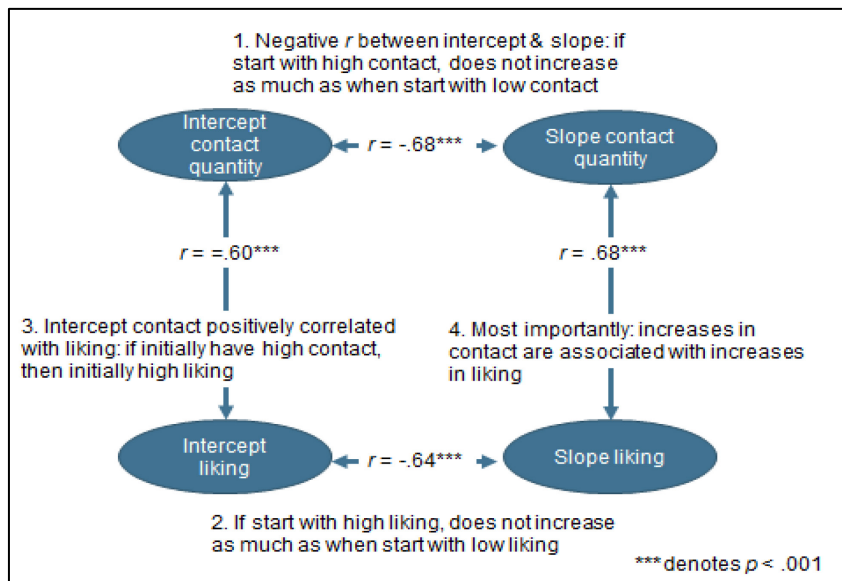
5.2.2 Results for merger schools 'B' and 'C'

Results for the two other merged schools were similar.

For school *B*, correlations between intercepts and slopes for contact and liking were higher:

1. There was a significant negative correlation (-.53) between the intercept and slope of contact quantity: if you started with high contact, then it did not increase as much as when you started with low contact.

2. Likewise, there was a significant negative correlation (-.76) between the intercept and slope of liking: if you started with high liking, then it did not increase as much as when you started with low liking.

3. The intercept, or starting level, of contact was significantly positively correlated (.84) with the intercept of liking: if initial contact was high, then initial liking was high.

4. Finally, and most importantly, the slope of contact was positively correlated (.76) with the slope of liking; thus, increases in contact were associated with increases in liking.

The percentage of shared variance was substantial for both the beginning levels of contact quantity and liking (68.89%), and the change in contact quantity and liking (57.80%). For Asian-British pupils in school *B*, the percentage of shared variance

between the intercept of contact and intercept of liking was very high (78.67%), yet the percentage of shared variance between slopes was substantially lower (36.20%).

For school *C*, results were similar to what we found in *Waterhead*. For White-British pupils, the intercept, or starting level, of contact was significantly positively correlated (.65) with the intercept of liking: if initial contact was high, then initial liking was high. The percentage of shared variance was substantial for the beginning levels of contact quantity and liking (42.25%). The slope of contact was positively correlated (.58) with the slope of liking. This means that those White-British pupils who increased in contact also increased in liking. The percentage of shared variance was lower for the change in contact quantity and liking (33.64%). For Asian-British pupils in school *C*, the percentage of shared variance between the intercept of contact and intercept with liking was very high (51.84%), yet the correlation between slopes was substantially lower (6.04%).

To examine the extent to which increases in contact and increases in liking were different between the three schools, we tested whether the correlation between increases in contact and increases in liking in *Waterhead* was significantly different from the same correlation in schools *B* and *C*. Findings showed that this correlation was not significantly different (*p* > .10) between the three schools. To summarize, the results show that increases in contact went together with increases in liking to the same extent in all three schools.

5.3   Testing for whom the Waterhead merger works best

Although it is encouraging to see overall positive effects for the merger, especially in *Waterhead* where the merger was most dramatic in ethnic terms, in further analyses we asked for whom the merger had the greatest impact, by investigating its effects on pupils with relatively lower versus higher levels of contact with the ethnic outgroup.

Specifically, we compared pupils with low mean levels of contact across the five measurements (i.e., who scored half a standard deviation *below* the mean) with pupils with high mean levels of contact across the five measurements (i.e., who scored half a standard deviation *above* the mean). We again did this analysis separately for White-British and Asian-British pupils (this comparison of ethnic groups was not possible in the two other merger schools as the sample becomes too small for Asian-British pupils).

For White-British pupils, especially for anxiety, those with low contact showed a steeper decline in anxiety. The drop was highly statistically significant ($p < .00001$) and in absolute terms was almost a full point on the scale from 1 to 5: on average, White-British pupils with low contact scored close to 3 in June 2012, and scored close to 2 in February 2015. In fact, as Figure 43 shows, on average, participants' anxiety decreased, but those with low contact showed the greatest decrease, meaning that for those with almost no contact, the impact of the merger was largest. For those with medium and high contact, anxiety did not change significantly ($p > .10$). For liking, the pattern was similar (see Figure 44): only at low levels of contact did liking increase significantly ($p > .05$). Liking did not change significantly ($p > .10$) for those with medium and high contact. In other words, as one might expect, the merger worked best for those who were most lacking in contact.

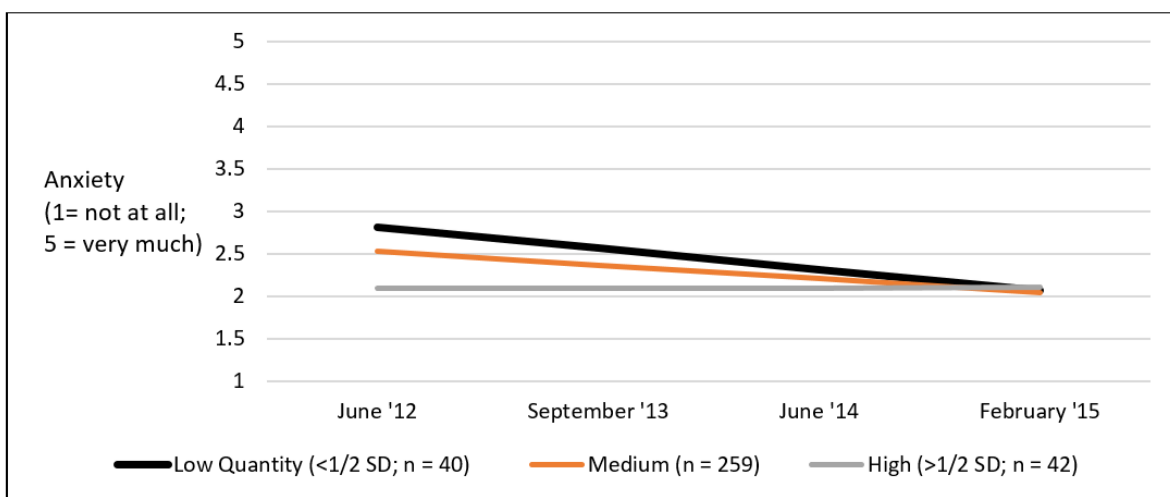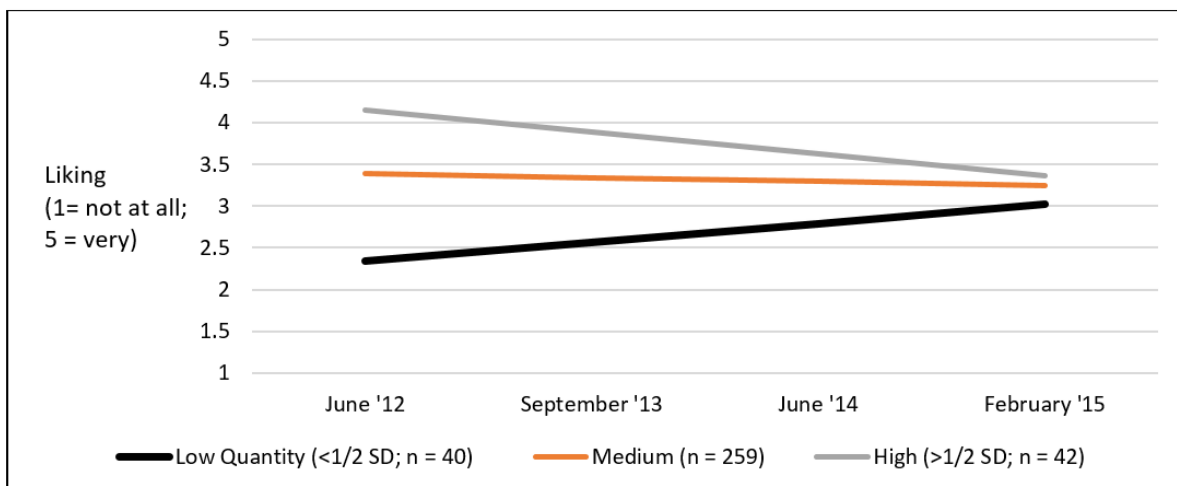**Figure 43: Anxiety scores as a function of level of contact (White-British Waterhead longitudinal)**

Figure 44: Liking scores as a function of level of contact (White-British Waterhead longitudinal)

For Asian-British pupils, the patterns were similar to those for White-British pupils, but less strong (see Figures 45-46). Asian-British pupils in *Waterhead* with low initial contact decreased significantly more strongly in anxiety ($p < .05$) than those with medium and high initial contact. Anxiety levels in the latter two groups did not change significantly ($p > .10$). Liking did not change significantly at any levels of initial contact ($p < .10$).[38]

Figure 45: Anxiety scores as a function of level of contact (Asian-British Waterhead longitudinal)
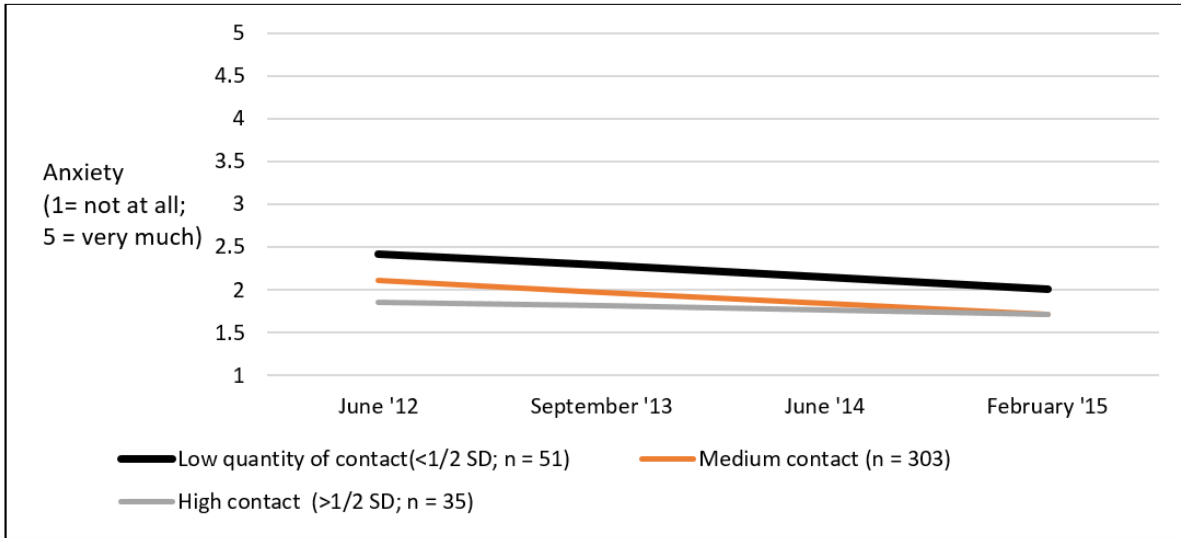
Figure 46: Liking scores as a function of level of contact (Asian-British Waterhead longitudinal)

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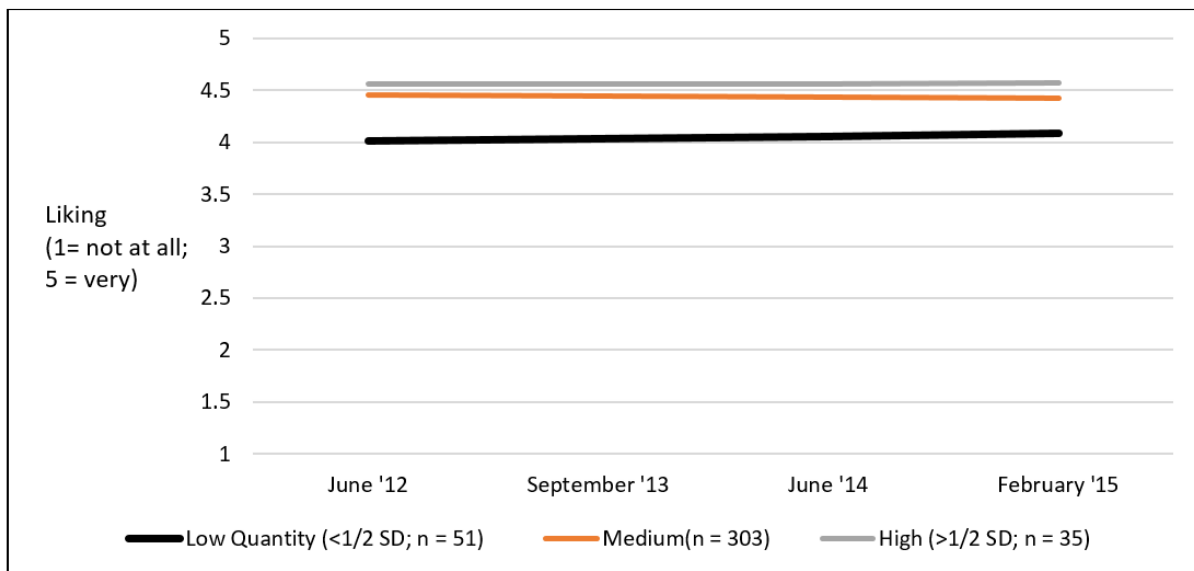
[38] Due to the use of latent variables, these findings cannot be explained by regression to the mean. Regression to the mean is a form of unreliability, and by modelling latent changes over time, unreliability in the observed measurements over time no longer affects the slope. These findings thus indicate that the pupils who had high initial contact *actually* did decrease, so that they scored closer to the average.

5.4   The Value of Gaining an Outgroup Friend

In the broader literature on intergroup contact generally, and in this report specifically, we have placed great emphasis on the value of making cross-group friends. We tested this idea further (again focusing only on *Waterhead*) by investigating the impact of gaining one outgroup friend over the course of the study (i.e., the impact of increasing one's score for outgroup friends by one from Wave 1 to Wave 5). For this analysis, we used unstandardized coefficients in order to be able to talk about 'gaining one friend'. It should be emphasized how this analysis is different from the latent growth models reported above. Latent growth models show how much the pupils change, on average, for these two variables (liking and anxiety); but this new analysis shows how much of this change is *specifically* due to gaining an outgroup friend.

As shown in Table 4, we found that gaining one outgroup friend had more impact on White-British than Asian-British pupils: it affected anxiety and liking for White-British pupils, but only liking for Asian-British pupils. Moreover, the explained variance for liking was 22% for White-British pupils, but only 4% for Asian-British pupils. For anxiety, the explained variance was 5% for White-British, and 0.01% for Asian-British pupils. Thus, the impact of gaining one outgroup friend was greater for pupils from the ethnic majority group; this makes sense, as the ethnic majority typically have more contact with the minority than *vice versa.*

Table 4: The value of gaining an outgroup friend between Waves 1 and 5 in explaining changes in liking and anxiety over the same period (Waterhead)

	Explained variance	
	White-British	Asian-British
Liking	22%	4%
Anxiety	5%	0.01%

5.5 Comparing Waterhead with merger schools '*B*' and '*C*'

Perhaps the simplest, if unsophisticated, demonstration of how effective the merger intervention at *Waterhead* has been, is shown by looking at changes in the proportion of pupils who have no friends from the ethnic outgroup. At Wave 1 (June 2012), as Figure 47 shows, approximately 20% of White-British and Asian-British pupils reported that they had no outgroup friends (White-British: *n* = 66, 19.4%; Asian-British: *n* = 82, 21.1%). By Wave 5 (February 2015), these figures had dropped to approximately 5% (White-British: *n* = 17, 5.0%; Asian-British: *n* = 22, 5.7%). This drop of 14.4% for White-British (from 19.4% to 5%) and a drop of 15.4% for Asian-British (from 21.1% to 5.7%) in the number of pupils with no outgroup friends was highly statistically significant ($p < .05$).

Figure 47: Percentage of pupils reporting no outgroup friends (Waterhead)
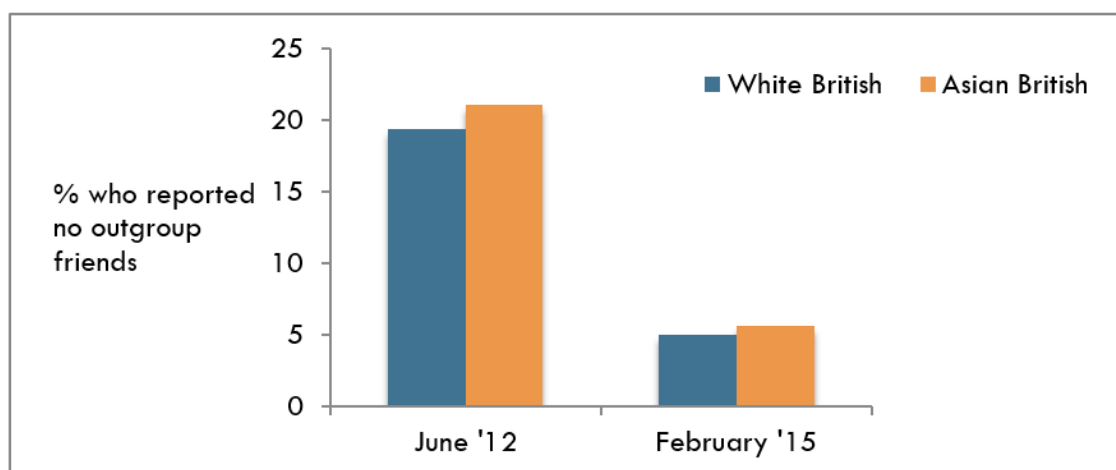
We can attempt a comparison with schools *B* and *C*, but the sample size for Asian-British becomes very small in some cases (either at a specific wave, or in a specific school). By comparison, this change in the number of pupils with no outgroup friends was smaller in schools *C* and *B*. In *C*, 27.5% (*n* = 93) of White-British and 0% Asian-British pupils reported that they had no outgroup friends at Wave 1. By Wave 5, these figures had changed to 18.8% (*n* = 30) for White-British and 2.2% (*n* = 1) for Asian-British. The change was significant for White-British pupils ($p < .05$), but not for Asian-British pupils ($p > .10$). In school *B*, approximately 15% of White-British and Asian-British pupils reported that they had no outgroup friends at Wave 1 (White-British: *n* = 28, 16.5%; Asian-British: *n* = 9, 14.28%). By Wave 5, these figures had dropped to approximately 10% (White-British: *n* = 18, 12.5%; Asian-British: *n* = 6, 8.7%). These changes in school *B* were not statistically significant ($p > .10$).

It might appear that one school is doing worse/better than another, but we emphasise that we are making relative comparisons here between the schools, not an absolute evaluative assessment. Again, it is important to distinguish between mean-level descriptive trends (in this section), and the earlier MLGMs (see Sections 5.2.1 and 5.2.2). The earlier analyses show that pupils in school *C* who did increase in contact did not fare badly, as they increased in liking. But of course the opportunity for outgroup contact with Asian-British for White-British pupils was substantially lower in schools *B* and *C* than in *Waterhead*.

5.6   Observation of seating positions in school cafeteria at Waterhead

To provide a more nuanced study of integration in the most dramatic of the mergers, we also studied seating patterns of pupils when they were free to sit where, and with whom, they wished at lunch time in the school cafeteria. In our previous work we have reported segregation in cafeteria seating choice at lunchtime (albeit in the sixth form college; see Al Ramiah, Schmid, Hewstone, & Floe, 2014), which follows the well-documented principle of homophily, whereby "birds of a feather flock together" (McPherson, Smith-Lovin, & Cook, 2001), or people sit with and spend time with similar others (with 'similarity' based on criteria including ethnicity, gender, and physical appearance).

We conducted observations using multiple observers and at three different time points during the lunch break. We did this to sample all 'sittings' of lunch, which was separated into year groups - Years 7-8, Years 9-10 and Year 11 pupils - and we did this at two points in the school year (January 2014 and July 2014). We focused our analysis on the ethnic and gender composition of the discrete, clearly identifiable 'social units' in which pupils interacted during lunch break. (A social unit is identified as a small group of people clearly interacting with each other, even if, sometimes, some of them might be sitting at adjoining tables, rather than all at the same table.)

Figures 48-53 show the modest degree of cross-ethnic mixing at lunch-time in each of the three different year-group sittings, and at each of the two calendar periods.

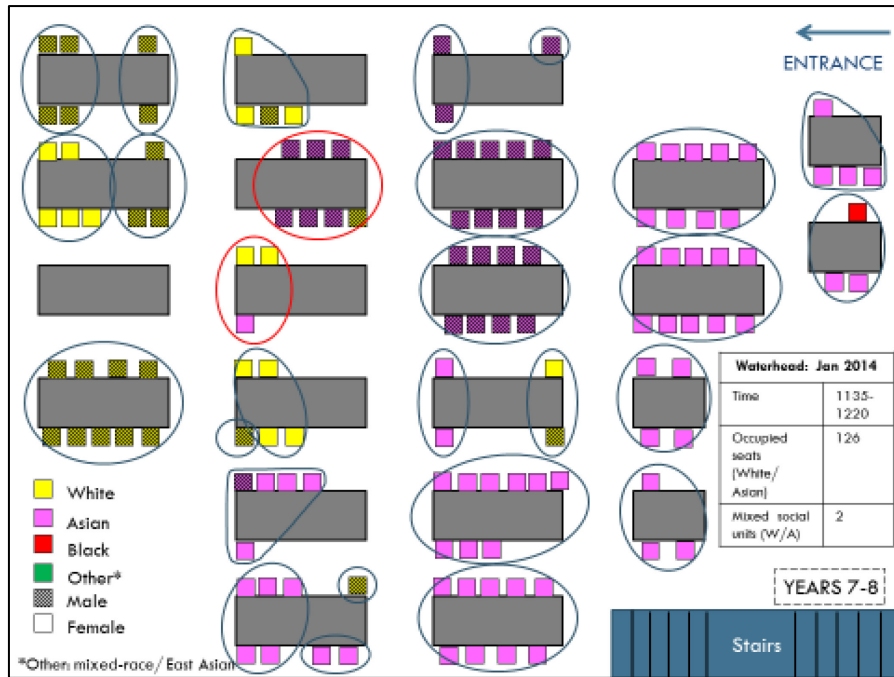**Figure 48: Mixing at lunch-time Year 7-8 Waterhead Jan 2014**

Figure 49: Mixing at lunch-time Year 9-10 Waterhead Jan 2014
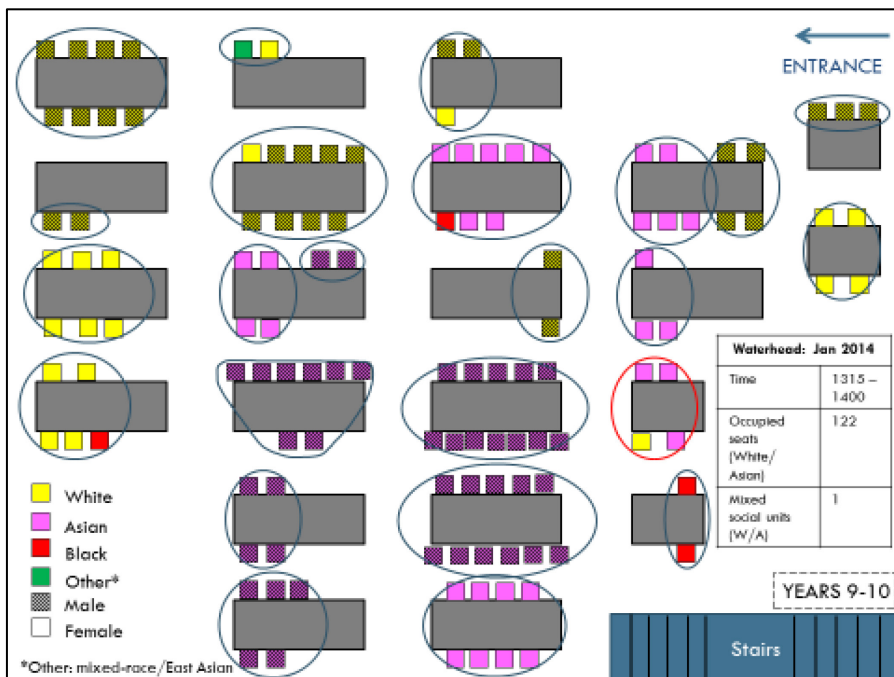
Figure 50: Mixing at lunch-time Year 11 Waterhead Jan 2014

Waterhead: Jan 2014	
Time	1225 – 1310
Occupied seats (White/Asian)	108
Mixed social units (W/A)	2

YEAR 11

White — yellow
Asian — pink/magenta
Black — red
Other* — green
Male — grey hatched
Female — white

*Other: mixed-race/East Asian

ENTRANCE

Stairs

Figure 51: Mixing at lunch-time Year 7-8 Waterhead July 2014

Waterhead: July 2014	
Time	1135-1220
Occupied seats (White/Asian)	62
Mixed social units (W/A)	1

YEARS 7-8

White — yellow
Asian — pink/magenta
Black — red
Other* — green
Male — grey hatched
Female — white

*Other: mixed-race/ East Asian
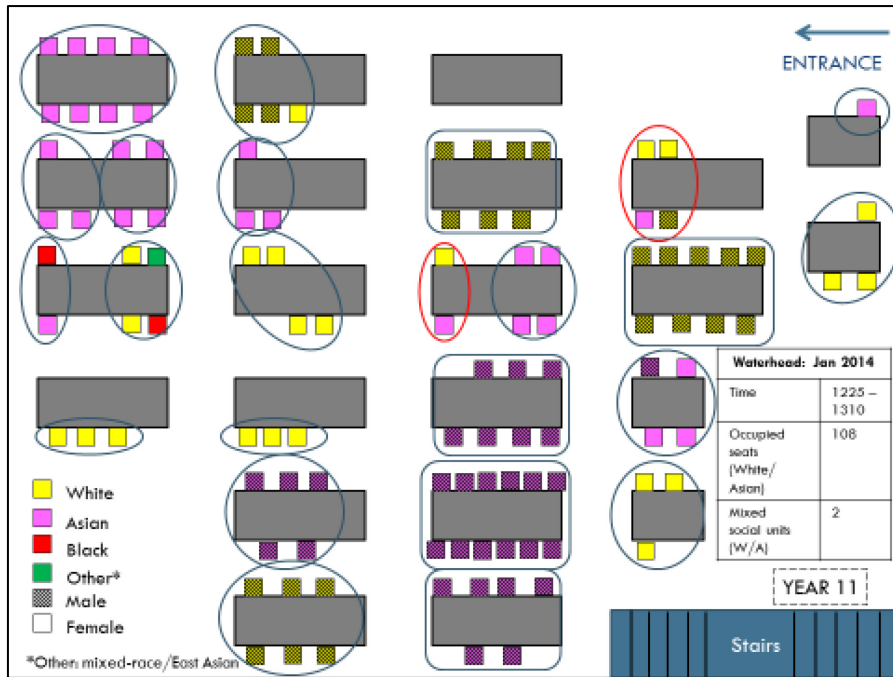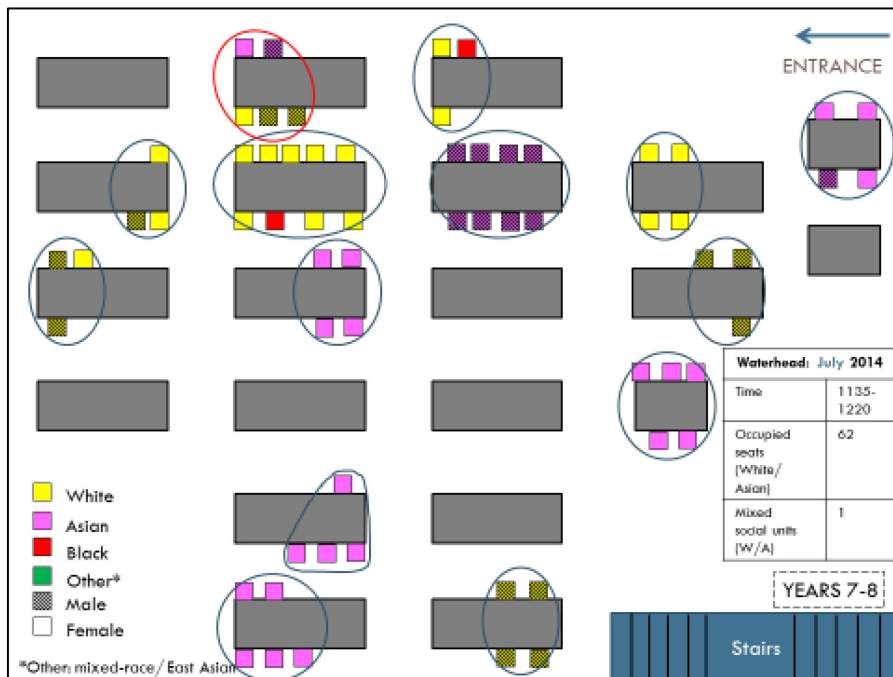
ENTRANCE

Stairs

Figure 52: Mixing at lunch-time Year 9-10 Waterhead July 2014
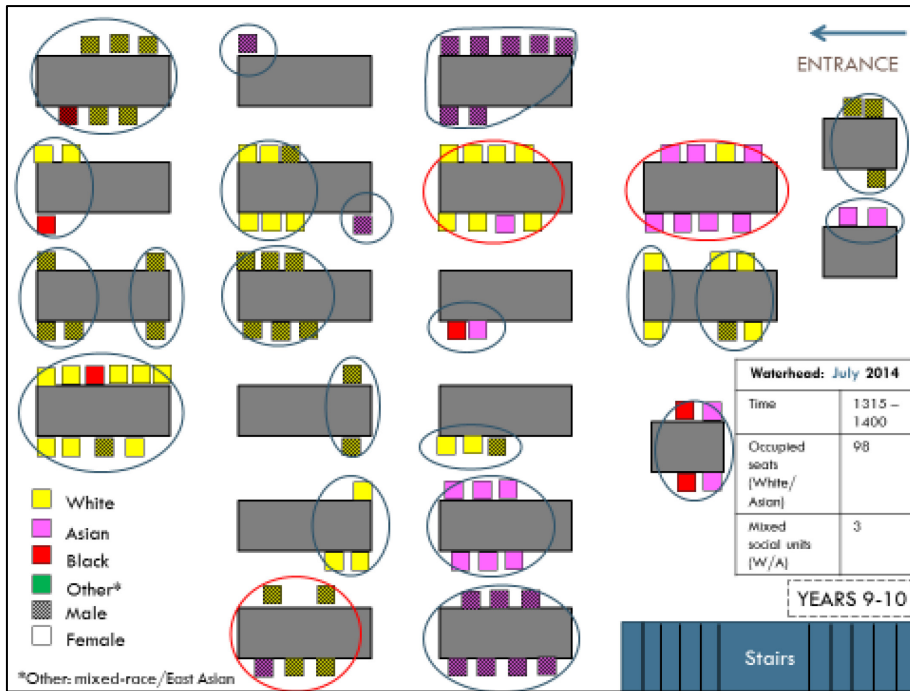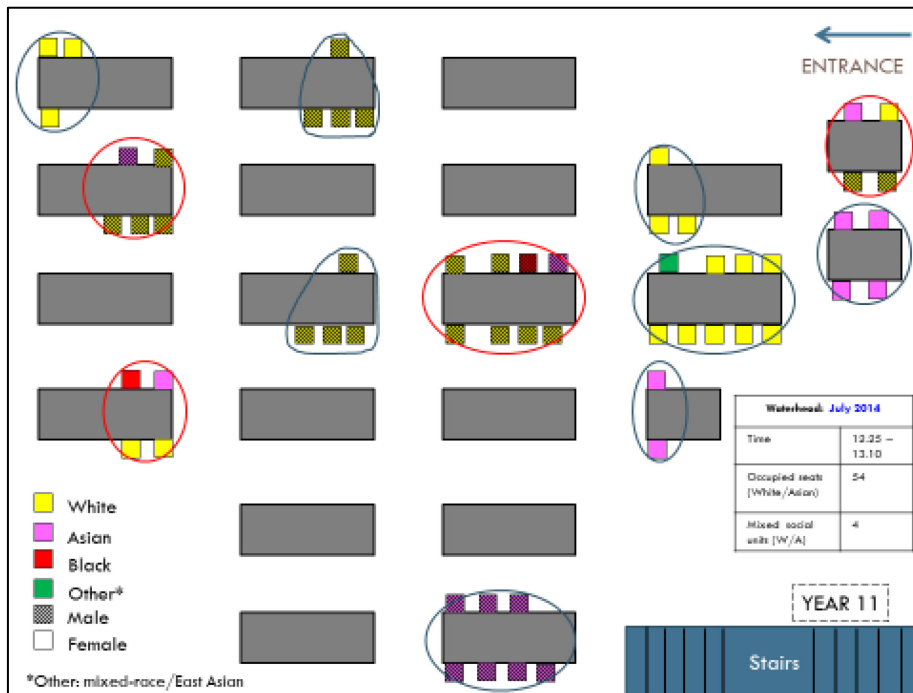

Figure 53: Mixing at lunch-time Year 11 Waterhead July 2014

Tables 5 and 6 summarize the data across year groups and calendar periods. They report 'exposure' (the term used for deliberately chosen mixing, i.e., choosing to sit next to a member of the ethnic outgroup) as a function of both ethnic and gender groups. Thus, they report Asian-British pupils' exposure to White-British pupils, and *vice versa*; and male pupils' exposure to females, and *vice versa*. Values for exposure can range from 0-1, where 0 denotes complete segregation (social units are completely single-ethnicity or single-gender) and 1 denotes complete integration (social units are as integrated as they can be, by either ethnicity or gender). The values shown in Tables 4 and 5 are very low, but show some increase between Waves 1 and 2, particularly for the older years (who have been in the school longer). Pupils self-segregated by gender and, to a significantly greater degree, by ethnicity.[39] Statistical analysis reveals a significant increase in ethnic integration between waves.[40] The effect of year group is not significant, but there is a statistical trend[41] shown in Figure 54: over the two time points, Year 11s showed a greater increase in lunchtime mixing with the ethnic outgroup compared with Year 9-10s or Year 7-8s. There are fewer Year 11s present in July (54 compared with 108, probably due to pupil absence following summer exams, with 4/12 and 2/24 social groups integrated at each time period, respectively). It is, however, unclear how this would have affected the exposure indices, which are based on the *proportions* of White-British/Asian-British pupils present, and the mixing between them.

Table 5: Exposure as a function of ethnicity and gender at Waterhead using seating observations for January 2014

Year	Asian-British contact with White-British	White-British contact with Asian-British	Male contact with female	Female contact with male
7-8	0.007	0.02	0.05	0.03
9-10	0.01	0.02	0.02	0.03
11	0.02	0.03	0.04	0.05

[39] $t(8.76) = -3.77$, $p = 0.05$, $d = -2.19$.
[40] $t(10) = -2.72$, $p = .02$, $d = 1.56$.
[41] $p = .07$.

Table 6: Exposure as a function of ethnicity and gender at Waterhead using seating observations for July 2014

Year	Asian-British contact with White-British	White-British contact with Asian-British	Male contact with female	Female contact with male
7-8	0.04	0.04	0.15	0.08
9-10	0.09	0.04	0.07	0.06
11	0.18	0.08	0.03	0.04

Figure 54: Changes in integration over time for different year groups
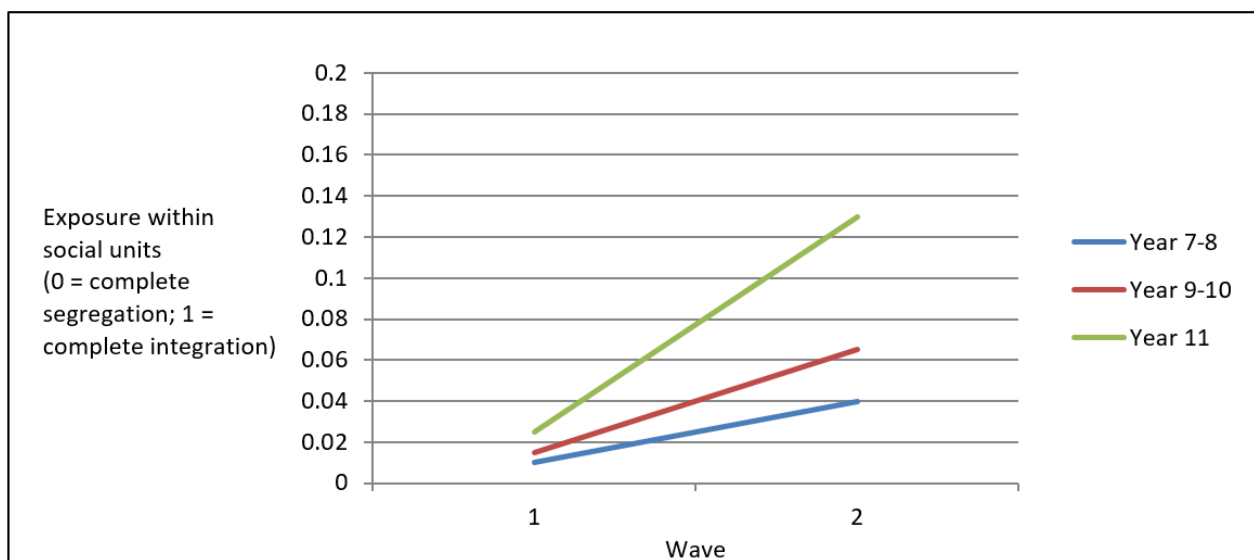
5.7 Analysis of friendship social networks at Waterhead

Much of the data we have reported so far indicates that mixing does take place, where the opportunity is provided, and that contact increases over tim7e, and has a positive impact on measures of anxiety and attitudes. However, it is important not to be overly optimistic. We therefore wished to ask how closely integrated Asian-British and White-British pupils were, by asking whether they were integrated into each other's social networks. Previous research has reported that such social networks, based on a small number of one's best friends, tend to be segregated (Windzio & Bicer, 2013).

Social networks were assessed very simply by asking respondents to list up to ten closest friends from their year group. We assessed social networks of all pupils in Year 7

(final sample: 121 male, 82 female; 109 Asian-British, 90 White-British, 4 Black) in January 2014 of their first year at the school. We also repeated this process over two further time points (July 2014 and July 2015), following the same pupils as they went into Year 8. Using sophisticated programs for Social Network Analysis, we can plot a 'network' of all the links between Year 7 pupils. Most popular pupils (denoted by an arbitrary identification number in Figures 55-57) have many links to other pupils in the year; less popular pupils have fewer, or even no, links to others. The figures show the extent to which the network is clustered as a function of ethnicity and gender. One of the most useful aspects of data generated by this kind of analysis is that it shows *reciprocal* friendships. It might, for example, be relatively easy for a White-British or Asian-British pupil to say, "Yes, I have [outgroup] friends" or even to nominate "Mohammed" or "Michael" as one such friend. But social network analysis requires that Mohammed nominates Michael and *vice versa* if it is to count as a reciprocal friendship.

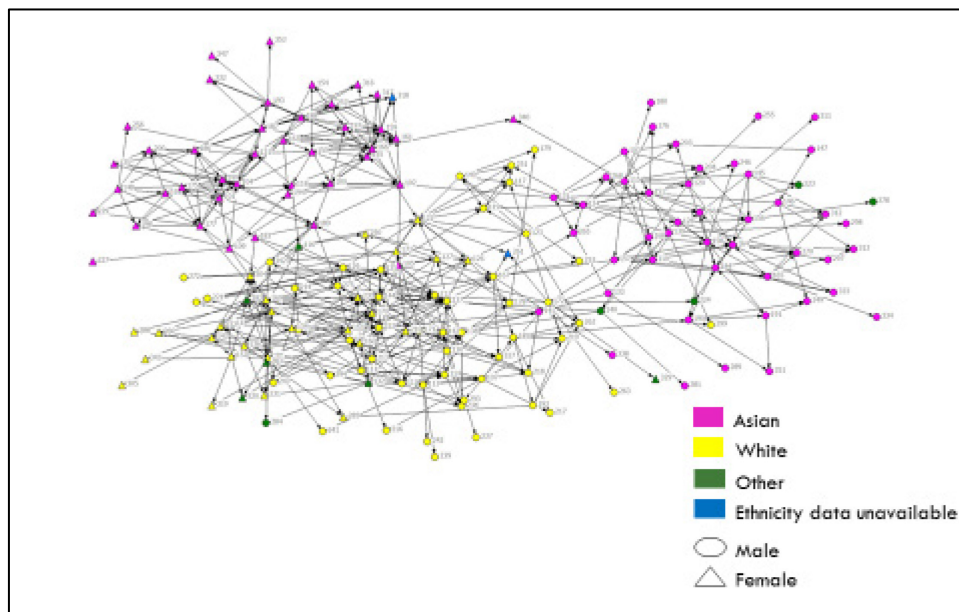**Figure 55: Waterhead social networks (January 2014)**

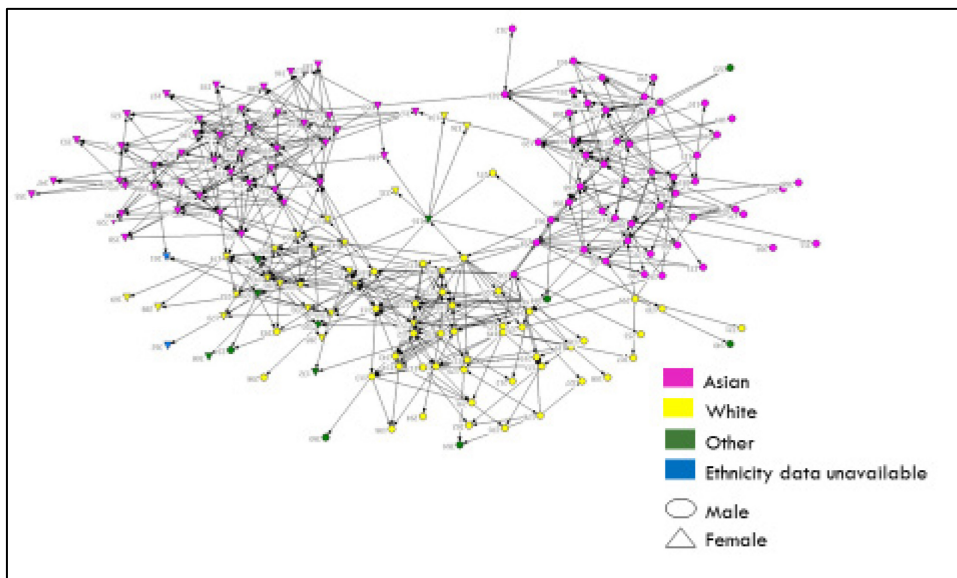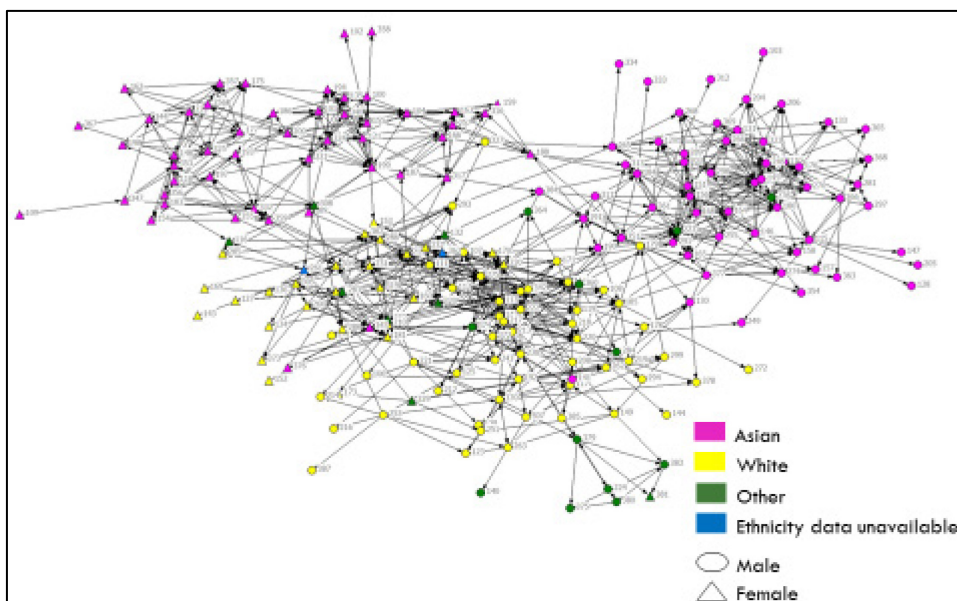**Figure 56: Waterhead social networks (July 2014)**

Figure 57: Waterhead social networks (July 2015)

In Figure 55 (January 2014), there are two distinct clusters of Asian-British pupils, which can easily be identified as Asian-British females (left) and Asian-British males (right). In contrast, the large cluster for White-British pupils was much more integrated by gender. Links between the two Asian-British and the White-British clusters were relatively few. White-British pupils reported more Asian-British friends in July 2014 (Figure 56), and yet more in July 2015 (Figure 57); Asian-British pupils' outgroup friends remained roughly the same, and this may perhaps indicate that Asian-British pupils consider White-British pupils to be their friends earlier than this is reciprocated by White-British pupils.

Nonetheless, the social network analysis shows that pupils primarily had friends of the same ethnic group as themselves; indeed, 90% of the friends nominated by Asian-British pupils and 95% of friends nominated by White-British pupils were own-ethnicity: this discrepancy indicates a degree of non-reciprocated friendships. Gender segregation, as noted above, was much greater in Asian-British pupils, but both groups segregated more by gender over time.

5.8 Summary

At the three merger schools, four waves of data were collected over a four-year period. Of the three merger schools, *Waterhead*, merging previously segregated White-British and Asian-British schools, represents the most radical merger in ethnic terms of the three, since the others merged two Catholic schools and two mainly White-British schools. By considering the results of all three mergers, we can separate the effects of merging *per se* from the specific effects of mixing. The results below are for *Waterhead* unless otherwise specified.

Effects over time for White-British vs. Asian-British

Using latent growth model (LGM) analyses, we studied individual trajectories, or changes over time. There were significant changes over time in reduced anxiety and increased liking and contact, especially for Asian-British. In percentage terms, calculating observed change as a function of possible change along each response scale, White-British showed a reduction of 31% for anxiety, and increases of 6% and 1% for contact and liking. Asian-British pupils showed a reduction of 33% for anxiety, and increases of 5% and 11% for contact and liking.

Using multivariate LGMs, we showed that increases in contact over time were associated with increases in liking. For Asian-British pupils, if quantity of contact went up by 1 standard deviation from June 2012 to February 2015, then liking increased half a standard deviation. For White-British pupils, over the same time period, if quantity of contact went up by 1 standard deviation, then liking increased .68 of a standard deviation.

High initial contact did not result in as much of an increase in contact compared with low initial contact, and the same was true for liking. Contact had most impact on those with low initial contact, who decreased in anxiety and increased in liking the most. Thus, for

Asian-British, and especially for White-British, the *Waterhead* merger worked best for those who were most lacking in contact.

A simple metric for assessing the value of the merger is to assess the impact of gaining one outgroup friend, between Waves 1 and 5, on liking and anxiety. Gaining just one outgroup friend had more impact on White-British than Asian-British pupils, affecting anxiety and liking for the former, but only liking for the latter. The greater impact for the White-British of gaining one outgroup friend is consistent with the ethnic minority pupils having more outgroup contact, including outgroup friends, than the majority.

Comparing Waterhead with the two other mergers

Anxiety showed a significant decrease in all schools, but this decrease was not significantly different between the three schools. This held for both White-British and Asian-British. For White-British pupils, improvements were consistently found in *Waterhead*, and these improvements were consistently stronger than in school *C*. However, improvements for White-British were similar in *Waterhead* and school *B*. Asian-British pupils in *Waterhead* and school *B* showed more improvements than in school *C*, with the exception of contact quantity. In school *C*, Asian-British pupils remained stable in liking, yet in *Waterhead* and school *B*, they *increased* in liking. Across the three schools, however, increases in contact went together with increases in liking to the same extent.

A simple metric for comparing across the three schools is to look at the proportion of pupils in each who have *no* friends from the ethnic outgroup. In *Waterhead,* there was a significant drop of about 15% in the numbers of White-British and Asian-British pupils with no outgroup friends. Small sample sizes for Asian-British pupils in schools *B* and *C* make comparisons difficult, but the reduction was smaller than in *Waterhead*, and significant for school *B*, but not school *C*.

Lunch-time seating choices at Waterhead

With whom you sit at lunch may be considered to reflect your choice of closest friends, and has the advantage of being directly observable behaviour that is not subject to socially desirable responding, which can affect self-reports to survey questions. Levels of *homophily* (sitting with similar others, based on either ethnicity or gender) were high, and evidence of cross-ethnic mixing at lunch-time was low. However, over a seven-month period of one school year, there was an increase in the number of pupils choosing to sit

with an outgroup member, especially for Year 11. There was, however, still a high level of self-segregation by gender and, even more, by ethnicity.

Social network analysis at Waterhead

Social networks assess people's closest friends and allow us to assess whether pupil A's nomination of pupil B as a friend is reciprocated by pupil B; this can be considered a purer form of friendship that does not reflect socially desirable responding. Pupils nominated their top ten friends at three time points over an 18-month period. This data also revealed high levels of homophily. Asian-British segregated more by gender than White-British, and there was substantial ethnic segregation. Over time, the number of outgroup friends increased for White-British but not Asian-British, and gender segregation increased (as would be expected from a developmental perspective); 90% (Asian-British) to 95% (White-British) of nominated friends were from the ethnic ingroup, meaning that there is still much work to be done to exploit the potential of such a diverse environment as that found at *Waterhead*.

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