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Inter-ethnic relations of teenagers in England's schools: the role of school and neighbourhood ethnic composition

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Inter-ethnic relations of teenagers in England's schools: the role of school and neighbourhood ethnic composition

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Abstract

The paper presents an empirical analysis of inter-ethnic relations among adolescents in England's schools, the first national study of schools throughout England to relate inter-ethnic attitudes to both school and area ethnic composition. We combine survey data on 'warmth' of feeling for specific ethnic groups, friendships and attitudes with administrative data on the shares of those groups at school and area level. We confirm that the pupils have warmer feelings for their own ethnic group than for others. Second, we show that in schools with more pupils from another ethnic group the gap between a pupil's views of those from her own group and from another ethnic group is smaller. This is true for attitudes of the majority and of minority ethnic groups. Third, we show that school composition (interpreted as contact) mitigates area composition (interpreted as exposure).

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1. Introduction

The consequences of immigration for Western societies have been subject to substantial academic attention and political debate. While the economic consequences (for immigrants, their offspring and the receiving societies) have been the traditional focus of the integration literature, research has also focused on issues of cultural assimilation and difference, and concerns of national identity and belonging (Duffy 2014; Manning and Roy 2010; Nandi and Platt 2015). Following the publication of Putnam's (2007) paper, *E Pluribus Unum*, which demonstrated a negative association between 'diversity' and both trust and a whole range of other measures of cohesion, a substantial body of literature has investigated the salience of ethnic diversity for both generalised orientations, such as 'trust', and more specific intergroup attitudes. Findings have been mixed, and have shown substantial cross-national variation in the impact of diversity at local area level (Janmaat 2014; McLaren 2003). This issue has also captured substantial policy attention. For example, the UK Government commissioned a major review of integration in 2016 with the aim "to consider what divides communities and gives rise to anxiety, prejudice, alienation and a sense of grievance" (Casey 2016). More recently, a Green Paper on an Integrated Communities Strategy (HMG 2018) links concerns with the new migrants' engagement with British society, the impact of diversity on local communities, and the consequences of ethnic segregation of young people.

In this paper we provide an empirical analysis of the responses of pupils to those from different ethnic groups across schools in England. To our knowledge, this is the first national study of schools throughout England to relate inter-ethnic relations to both school and area composition. Exploring patterns across both majority and minority groups, we use two measures of inter-ethnic relations: a simple directly-reported index of the warmth of feeling towards specific ethnic groups, and a richer measure constructed to also include friendships and attitudes. We match survey data on pupils' warmth of feeling towards other groups, on their friends and on their attitudes, to administrative data on both school and area ethnic composition. We locate our analysis within social identity theory (Tajfel 1981) and contact theory (Alport 1954; Pettigrew 1998; Pettigrew and Tropp 2006). Recognition of group difference is the precondition for hostility towards others; but through contact it can also lead to more positive attitudes (Pettigrew and Tropp 2006; McLaren 2003). The literature suggests that increasing contact between groups will either ensure more positive attitudes between them or that it will lead to greater antagonism. We therefore distinguish between 'bad contact' or contact not necessarily involving meaningful interaction, and 'good contact' that is expected to result in greater positive feelings to those from other groups. We argue that schools are settings with the potential to foster 'good contact' as the numbers of those from other groups increase.

We find a strong and precisely estimated relationship between attitudes and composition. Pupils have greater warmth for those from their own group: with a gap between their feelings for their own and other groups of 9-18 points on a 100 point scale. But they feel more positive towards another group if they encounter more pupils from that group in their school, reducing the gap. For example, the net warmth of a Black British pupil for White British pupils increases by 1.04 points (or 12 per cent of the gap in warmth) for each ten percentage points increase in the share of White pupils in her school. Reciprocally, the net warmth of a White British pupil for Black British pupils increases by 1.74 points (or 14 per cent of the gap) for each ten percentage points increase in the share of Black British pupils in her school. These are equal to around 5% and 10% of a Standard Deviation of their respective distributions. Using our richer indicator of composite orientation, we find the same: pupils are much more likely to have a positive orientation toward another group in schools in which that group is more numerous, and much less likely to have a negative orientation.

The paper makes a number of contributions. In terms of scientific contributions, the dataset we construct from survey and administrative data is very well suited to the problem, allowing us to advance understanding of the role of contact in fostering positive intergroup attitudes in school. The survey, the UK sample of the cross-national CILS4EU has a rich set of in- and out-group measures. It provides 'warmth of feeling' data for each of the major ethnic groups towards each of the others. This includes attitudes between the two largest minority groups. This is supplemented by information on friendships, attitudes to multiculturalism, and personal and school characteristics. Schools in England offer a particularly interesting context to study this issue. Cities and towns around the country show very varied fractions of non-White British pupils, and significant variations within minority groups. Also, there are many mixed schools, with different shares of those from different ethnic groups, so we have a useful range of levels of segregation. Finally, unlike many countries, it is not the case that minority groups perform worse than the majority group in school attainment, so segregation by attainment does not lead to ethnic segregation. The administrative data on school composition provide complete measures of the school ethnic composition and offer a large range of variation in ethnic composition (for example, from 0% Asian to 40% Asian, from 14% White to 98% White). There are three main disadvantages to our dataset: the sample size is not large, around 4000 pupils altogether; some of the ancillary variables are not well measured, for example pupils' parents' education and occupation; and this is observational data, with no exogenous variation in school composition, so we have no straightforward way of getting at causation. We undertake supplementary analyses that provide suggestive evidence that there is a causal relationship to our main finding. That is, that school composition proxies 'good contact', fostering more positive outgroup orientations when the shares of outgroups are larger.

In terms of a contribution to policy and public debate, this paper provides new evidence on an issue of considerable policy interest (HMG 2018; Casey 2016). This is the first study relating inter-ethnic attitudes to school and local authority ethnic composition in almost one hundred schools across England. It adds valuable new findings to the discussion about the potential for greater intergroup understanding among young people (and hence the future population), and highlights the importance of schools in ameliorating the tendency towards preferences for one's own group.

The next section outlines the theoretical underpinnings of the paper, reviewing the evidence on homophily and on contact and attitudes, distinguishing 'good' and 'bad' contact, and drawing on evidence from non-causal as well as some few causal studies. Section 3 describes the datasets we use, and how we match them. We then present the results. The final section offers some broader conclusions.

2. Literature

Homophily

The theoretical foundation for our study comes from homophily and from contact theory. Homophily describes the pervasive finding that people tend to associate with those who are 'like' themselves. This is a general principle that has been shown in a wide range of contexts. While homophily is both an endemic trait and can be positive for psychological development (Phinney 1990) and group solidarity, it also has consequences. In their behaviour, people orient themselves by recognition of in-groups (and therefore out-groups). They will tend to value those recognised as in-group and may develop negative conceptions of or behaviours or attitudes towards those constructed as out-groups (Tajfel, 1981). Tajfel (1981) has noted the ease with which in-group identification can be mobilised to construct others as outgroups and foster antagonism towards them as well as to attribute such outgroups negative characteristics. The extensive literature on ethnic competition and conflict highlights the role of such in- and out-group identifications. Recognition of both those 'like' and those 'unlike' is necessary for such outgroup hostility; but it can also, through processes of attitude adjustment based on contact, form the basis of more positive group relations and more positive attitudes to the outgroup as a whole (Pettigrew and Tropp 2006; McLaren 2003).

We therefore start from the premise that homophily – or liking those like you – is a basic and rather consistent trait that will be reflected in our study sample. While homophily operates across a range of dimensions, it has been demonstrated that race and ethnicity are widely recognised as bases of similarity leading to ethnic homophily (McPherson, Smith-Lovin and Cook 2001). We expect that young people can and do recognise others as similar or different on the basis of commonly applied ethnic distinctions. Yet, while homophily is a general tendency that does not mean that it is

either fixed in degree or intensity or that it necessarily precludes positive attitudes towards other groups. We expect therefore that even in the context of positive contact, homophily will still be prevalent. Nevertheless, positive contact will reduce the size of relative preference for one's own group, resulting in more equal warmth towards own and other ethnic groups and more positive behaviours and orientations towards others. This derives from the extensive literature highlighting the positive potential of intergroup contact, to which we turn next.

Contact

The core hypothesis of contact theory is straightforward – greater contact between groups can lead each to more favourable views of the other. It can weaken the identification of the others as 'outgroups', and at the same time enable the updating of views to be more positive about people in the outgroup overall (Pettigrew and Tropp 2006). These benefits from contact are, however, not guaranteed. The originator of intergroup contact theory argued that contact could in fact be positive or negative (Allport 1954). As summarised in Pettigrew and Tropp's (2006) review, while 'good' contact leads to reciprocal understanding, undermining stereotypes and preconceptions that flourish in the absence of contact, 'bad' contact can lead to resentment, competition and conflict, as well as exclusionary attitudes (Enos 2014). More specifically, awareness or exposure to others without meaningful or positive contact may lead to mistrust, sense of 'threat' (Schneider 2007), and more negative orientations (Bowyer 2009). At the same time, such exposure is the pre-condition for the possibility of 'good contact' (Pettigrew 1998; Schmid and Hewstone 2015).

Good contact

Allport (1954) outlined four conditions conducive to positive consequences of contact for intergroup relations: the groups have equal status in that context; they share common goals; inter-group cooperation is required to complete the tasks; and there is an authority figure sanctioning cooperation. While subsequent literature has suggested that these requirements can, to a large extent, be relaxed (Pettigrew 1998; Pettigrew and Tropp 2006; Hewstone 2015), we note that these conditions fit pupils in a school well (see also Hewstone 2017; Bubritzki et al. 2017; Janmaat 2014).

The positive consequences of contact for intergroup relations as argued in contact theory achieve substantial empirical support in the social-psychological literature (Pettigrew 1998; Pettigrew and Tropp 2016; Hewstone 2015). These positive conclusions have been supported by a range of observational studies (e.g. McLaren 2003; Schmid, Al Ramiah and Hewstone 2014), including those demonstrating positive schoolroom effects (Bubritzki et al. 2017; Plenty and Jonsson 2016; Janmaat 2014). Yet, in line with the original theory, there may be circumstances under which contact is experienced as negative and does not lead to more positive outgroup attitudes (Allport

1954; Pettigrew et al. 2011; Bowyer 2009). Hewstone has referred to the ways in which 'negatively valenced' contact may undermine the positive effects of contact, while Stark, Mäs and Flache (2015) point the ways in which positive outgroup attitudes are contingent on 'liking' the outgroup. Thijs and Verkuyten (2014) discussed in relation to the school context specifically, the limits to ethnic diversity alone in driving positive interethnic relationships.

Given the noted tendency towards homophily within ethnic groups, and Tajfel's insight that in-group recognition and preference can heighten negative out-group attitudes and behaviours, there are therefore broadly speaking two theoretical predictions about the consequences of increasing contact between groups. One is that it will ensure more positive attitudes towards the other groups and another that it will lead to greater antagonism or exclusionary attitudes. There is evidence to support both propositions. Studies which measure contact in specific settings or by direct interpersonal relationships, often in a somewhat limited range of settings, tend to support the positive implications of 'contact'. Those studies that have focused on the composition of neighbourhoods or local context, often with more general and broader samples, but only indirect measures of contact through proximity, or where contact is rather incidental and based more on observation, have found more evidence for negative consequences of implied contact (Enos 2014) or more mixed results (Bowyer 2009). Specific examples can be found in the 'diversity' studies which followed from Putnam's influential 2007 study on the negative impact of diversity and trust. Kruse et al. (2016) showed that for schoolchildren in the Netherlands the neighbourhood 'exposure' of children was not associated with the homophily of their school friendships. Both types of contact are therefore potentially relevant to the experience of schoolchildren aware of their own ethnic group and sensitive to the contexts in which they are embedded (Shaafsma et al 2010).

From our review of the literature as briefly summarised here, we would take away that in a controlled environment such as a school with clear sanctions against negatively valenced contact, positive consequences of contact are likely to prevail. However, it may be relevant to consider the implications of the corresponding potential of exposure or negative contact for also shaping school children's outgroup attitudes.

Bad contact

Factors that may impede the effectiveness of contact for intergroup understanding include 'resegregation' (see also Laurence forthcoming) or 'negatively valenced contact' (e.g. racist encounters) (Hewstone 2015). These latter forms of interaction could be classified as 'bad contact', that is, forms of awareness or exposure to others that do not result in meaningful interaction. Such bad forms of contact could arguably be both more likely in contexts in which contact with others offers opportunity for negative encounters or in which individual experience simple 'exposure' to

others, without the mediating role of positive interactions. It may help to demonstrate why the predictions of (positive) contact theory have been subject to more equivocal findings in the literature assessing neighbourhood composition or using neighbourhood composition as a proxy for contact.

There is now a substantial body of work which has explored Putnam's concerns that diversity reduces trust (Putnam 2007; see also Alesina and La Ferrera 2000). This has explored the role of neighbourhood context on a range of outcomes broadly conceived as social capital/social cohesion, and either measured as separate outcomes or combined, including trust (Dinesen and Sønderskov 2015; Letki, 2008; Gijsberts, van der Meer and Dagevos, 2012; Laurence 2011; Sturgis, Brunton-Smith, Kuha and Jackson, 2014), and also volunteering and informal help (Gijsberts etal. 2012, Letki 2008), reciprocity (Laurence 2011; Sturgis et al. 2014) and neighbourhood belonging (Sturgis et al. 2014). The results from these studies are mixed in terms of the relationship between ethnic diversity (itself variously defined and operationalised) and trust / social capital, with some positive, some null and some negative associations. Overall, the evidence would appear to support a negative relationship – at least between ethnic diversity and trust. In terms of prejudicial intergroup attitudes, Bowyer has shown concurrent evidence for both contact and conflict. The importance of context and norms and sanctions on contact emphasised by Pettigrew (1998) are likely to be relevant both for which prevails.

For some of these studies, exposure in neighbourhoods, however defined, is regarded as a proxy for contact, in others the role of neighbourhood composition is not otherwise specified. Moreover, distinct from the contact literature, the outcome measures are typically not intergroup attitudes as such. Yet, the level of contact within these settings may nevertheless shape the impact of exposure on various attitudes and orientations. That is, the mixed findings potentially stem from the fact that there are dual processes operating. If diversity is the necessary precondition for contact (Hewstone and Schmid 2014), then while the diversity of context may lead to more negative orientations, this can be countered by the greater levels of contact that lead to more positive orientations (McLaren 2003; Schmid, Al Ramiah and Hewstone 2014; Laurence 2011). At the same time, exposure to outgroups may be experienced as challenging for some, militating against the potential positive experience of contact (Stark et al. 2015).

We therefore posit that while (good) contact in school is likely to result in positive outgroup orientations, 'exposure' (cf. the use of this term for neighbourhood composition in Kruse et al. 2016) to other groups at the neighbourhood level are likely to result in neutral or more negative outgroup orientations. Undetermined is the extent to which potentially positive school effects might moderate the consequences of neighbourhood exposure.

We note that the majority of studies we have discussed are observational and are not fully able to demonstrate the causal impact of contact. An ongoing issue is accounting for selection. That is, those who have more positive outgroup orientations may select into contexts where they are more likely to have contact with outgroups (see e.g. Martinovic, van Tubergen and Maas 2009). While it has been argued that this is less likely to be the case in schools, which are not (solely) chosen by young people themselves (Hewstone and Wolfer 2017), in a context of parental school choice and given intergenerational transmission of attitudes, this is not a fully defensible argument. Our own study is also subject to this criticism, we discuss further how we engage with it below. Despite the challenge of allocating adults or children to situations in which contact can be tested, there are some examples of studies that exploit experimental conditions to ascertain the potential for contact to shape attitudes, which further inform our expectations.

Causal studies

Few studies have been able directly to test the causal effect of contact, and under the conditions set out by Allport (1954). A recent exception, however, is a study by Finseraas, Hanson, Johnsen, Kotsadam and Torsvik (2016). This study was able to use an experimental design involving the assignment of conscripts to rooms with different shares of immigrants (where the room sharers had equal status, joint tasks, and cooperation sanctioned by the authority), and to implement a rather complete test of the theory using pre and post results from a trust game. With information on the residence of the soldiers they were also able to compare the original levels of immigrant share on trust in 'Norwegian' and 'immigrant' named participants in the game. They found that direct room contact increased the level of trust in the immigrant-named participant in the game, while this was particularly the case who came from areas with higher proportions of immigrants, reversing a strong negative effect of neighbourhood immigrant density.

Lowe (2017) also demonstrated the positive impacts of collaborative contact through an experiment allocating young Indian men to either mixed or homogenous caste cricket teams. By these means, he explored not only the impact of being assigned to a mixed-caste team, but also the impact of the composition of the opposing team. He was thus able to distinguish contact for common cooperative purposes, which increased out-group (other caste) friendships with competitive or adversarial contact, which decreased out-group (other caste) friendships. The paper thus highlights the relevance of context in which contact occurs.

Rao (2013) also explored contact in India but among school children. He capitalised on the causal potential offered by a policy change which required many private schools in Delhi to take a quota of poor students. The study investigated not only attitudes of rich students towards poorer students but also their more general pro-social attitudes. The study found that personal interactions

in the school context resulted in both less discrimination towards poor students but also increased their prosocial behaviours and orientations.

Rather than addressing the contemporaneous impact of contact on attitudes, Schindler and Westcott (2017) looked to the long-term implications. They used the allocation of black US army units across the UK during World War II to demonstrate the persistence of the impact of contact on attitudes, with these areas continuing to show lower levels of anti-minority prejudice and fewer members of far right parties well into the 21st Century. The study is important in demonstrating how changes in attitudes dependent on contact can be transmitted across generations, highlighting the relevance of fostering more positive inter-group contact for the long term.

Enos (2014) by contrast, aimed to test the effect of demographic change on exclusionary attitudes by assigning Hispanics to wait with commuters for randomly assigned trains (the control comprised matched trains with no assigned Hispanic passengers). He found an increase in exclusionary anti-immigrant attitudes among the experimental group of commuters, demonstrating the negative effect of minimal contact but observational exposure to others.

Hangartner et al. (2017) also tested the impact of demographic change on attitudes. Exploiting the flows of refugees to Greek islands in the Aegean sea, they used distance to Turkey to instrument differences between islands in exposure to refugees. They found that the greater exposure was associated with more hostile attitudes towards immigrants, refugees and Muslim minorities. They noted that these flows involved limited intergroup contact, demonstrating the lasting impact of exposure when unmediated by positive contact on attitudes and orientations – and on the willingness to act on those attitudes.

While these studies take place across a range of different contexts and address rather different research questions, they tend to endorse the claims of contact theory for the positive impact of intergroup contact on outgroup attitudes, while also highlighting the ways in which the nature of the contact is relevant. Competitive contexts that highlight the outgroup as an outgroup and those in which interactions are superficial or limited to awareness of the outgroup without corresponding interpersonal interaction may result in an absence of positive, or even negative impacts on attitudes. From a policy perspective, promoting opportunities to translate such negative consequences into positive outcomes through 'good contact' is therefore of key interest. While the Rao study suggests school may present such an opportunity it still remains open to investigation how far that is the case in the UK context and how it relates to broader exposure stemming from demographic change.

Before turning to our study, we note that, like many, even if not all of the observation studies, with the exception of Lowe (2017) these papers focus on the impact of contact on majority

groups or those who are advantaged relative to the outgroup considered. Yet, academic work on and policy concerned with segregation typically focuses on minority groups (Battu, Mwale and Zenou 2007; Simpson and Finney 2010; Casey 2016; HMG 2018). The impact of contact on minorities is of substantial interest, but it also raises the question of whether we might expect it to operate in the same way.

Asymmetric relationships

As noted, the majority of studies of majority-minority contact have tended to focus on the majority group, or some cases minorities only (e.g. Martinovic et al. 2009; Shaafsma et al. 2010). Those that have covered both tend to assume a symmetric effect. That is, that minorities and majority will be comparably affected by outgroup contact. However, there are good reasons for thinking that both exposure and contact may have asymmetric effects: that is, they will have different meanings and implications for the majority compared to minority groups. Majority experience tends to be normalised and their own sense of ethnic group only become salient in the context of others. By contrast, minorities are likely to be continuously aware of their ethnicity, and hence, be less sensitive to specific variation in context in identity formation. To the extent that attitudes to others are contingent on ingroup identification, the majority is more likely to be susceptible to different contexts or 'exposure', which trigger such ingroup identification (Nandi and Platt 2017). This is supported by Abascal and Baldassari's (2015) findings which indicate that living among 'outgroups' predicts lower trust for white respondents, while living among outgroups has no effect on minority groups. On the other hand, contact may not only result in more positive outgroup orientations among both majority and minorities, but may be especially consequential for minorities given social psychological evidence that contact can result in the less dominant group likely to developing more positive expectations of the dominant group than are actually justified (Saguy et al. 2009; Dixon et al. 2012). Immigrant-origin children, have also been found to be particularly vulnerable to processes of exclusion in low-immigrant classrooms (Plenty and Jonsson 2016), though these experiences may also shape the extent to which they are willing to engage with majority group members (Shaafsma et al.2010). As a result, it is important not only to consider how far contact and exposure is associated with outgroup attitudes for both minorities and majority but also to explore the effects separately to allow for asymmetric relationships.

This study

In this study we investigate the relationship between school composition and local authority composition on school children's attitudes and relationships towards to those of other ethnic groups. We explore these relationships for both majority attitudes to minorities and minorities to

majority group pupils, focusing on three broad groups: White British, Asian British and Black British. Specifically, we investigate the association of both within-school 'contact' as proxied by school ethnic composition and 'exposure' proxied by local authority ethnic composition with two measures of outgroup attitudes. We first explore the association with warmth towards the outgroup and we then examine the association with a more complex measure that combines warmth with friendships and pro-majority or pro-minority attitudes. We are thus able to illustrate the extent to which (small) increases in school composition foster increases in positive outgroup orientations, that this is consistent across both our measures, that school composition partly moderates the association with local area composition, and that the patterns are consistent – but not of identical magnitude – for majority-minority and minority–majority attitudes.

3. Data

In this section, we describe the main dataset, how we merged in other information, and how we define the key variables.

a) Survey data, UK sample of the CILS4EU study

We use the UK (England) sample of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) study (Kalter et al. 2017; see http://www.cils4.eu/). This is a longitudinal study of adolescents across four European countries (Germany, the Netherlands, Sweden and England) with the fieldwork taking place in 2010/11. (The study focused on England rather than the UK given the differences in school systems across the four countries of the UK). The harmonised samples aimed to survey around 4000 14-year-olds, of which around 1500 would be of immigrant origin, in each of the four countries, as well as their teachers and parents.

In England, schools stratified by their predicted proportion of immigrant origin children were sampled using the National Pupil Database (NPD). Private schools are not covered in the NPD, so were separately sampled (though we do not include them in our analysis as explained below). In each school two classes of Year 10s were randomly sampled and the whole of each class was invited to complete a self-completion questionnaire. The student sample's parents were also invited to complete a questionnaire. Response rates among the initial school sample were low at 14%. However, non-responding schools were substituted with equivalent replacements. By the end of fieldwork, which took place across the school year 2010/11, 65 per cent of the target of 140 schools had been reached, delivering a total sample of 96 state and 11 private schools, containing a sample of 4,315 children, of which 3,958 were in state schools. We focus on those children in state schools only, since it is only for these we have administrative data on school composition. Within school

response among students was around 80 per cent of the eligible population (of the two classes). Non-response was due to refusal or absence. The pupils were surveyed with a PAPI questionnaire, and questionnaires were also administered to teachers and to consenting parents.

b) School ethnic composition data

We use the National Pupil Database (NPD), an administrative dataset covering all pupils in the state sector in England. The state sector educates 93% of all pupils. The dataset includes demographic data on pupils, their exam score history, and their home location and schools attended. We obtained school identifiers to enable us to match at the school level rather than the individual level; therefore, in this paper, we simply use the school-year ethnic composition. We match this on to the schools participating in CILS4EU to cover the duration of the time the students have been in the school, rather than simply the single year of the survey. We also match the ethnic composition of the local authority where the students are living.

c) Defining key variables

We take two approaches to measuring 'inter-ethnic relations' or outgroup orientations: a straightforward approach simply measuring positive/negative feelings (or 'warmth') – (i.), below – and a richer, composite measure that combines that measure with data on friendships (ii) and relevant socio-political attitudes (iii). We describe these in turn.

i. Positive/negative feelings

Our measure of 'warmth' of feeling is derived from a 'thermometer' with a scale from 0-100 measuring warmth towards a specified higher level ethnic group (Asian British, Black British or White British). The exact wording of the question is:

> *"Please rate how you feel about the following groups on a scale that runs from 0 to 100. The higher the number, the more positive you feel, and the lower the number, the more negative you feel towards this group."*

An individual's response will be influenced by many things, including her/his own general disposition, her idiosyncratic differences in sociability, extraversion and so on. In order to remove the influence of idiosyncratic responses to the thermometer question, we construct a measure that captures the attitudes towards another group net of the warmth towards one's own group. For example, thinking of the warmth of feeling by a Black British pupil towards Asian British students, we would compute this 'net warmth' as her thermometer score for Asian British minus her

thermometer score for Black British. We therefore have measures of net warmth of White for Asian, of White for Black, of Asian for White, of Black for White, of Asian for Black and of Black for Asian.

ii. Friendships

Survey participants are also asked about their friendships. The wording is as follows:

> *"Thinking now about all of your friends. How many of them are from a White British background? Black or Black British background? Asian or Asian British background? any other background?"*

with response options of 'Almost all or all', 'A lot', 'About half', 'A few', 'None or very few' for each group. These are fractions not absolute numbers, so again to a degree they are purged of differences in sociability.

It could be argued that there is simply a mechanical link between friendships and school composition – the more of a group you meet, the more friends you will automatically have from that group. In fact, while opportunities for friendship are clearly important, taking those opportunities for cross-group friendship is still likely to be a major step for many teenagers; and we would argue that it is far from 'automatic' that this would happen. Indeed, some have argued (see Ramiah et al, 2015) that there is a great deal of self-re-segregation in mixed schools. Thijs and Verkuyten (2014) in their review also highlight the possibilities for within-school segregration, and that classroom composition only provides the opportunity for contact, rather than presupposing contact. We show below the effectiveness of schools as sites of mixing and enabling interactions, even as there are individuals who have almost all of their friends from their own group, even in mixed schools.

iii. Attitudes

The survey also contains data on respondents' responses to four statements describing how relationships between White British and ethnic minority people. The statements are as follows:

> *"White British people should do all they can to keep their customs and traditions." (1)*
>
> *"Ethnic minority groups should adapt to British society." (2)*
>
> *"White British people should be open to the customs and traditions of ethnic minorities." (3)*
>
> *"Ethnic minority groups should do all they can to keep their customs and traditions." (4)*

Available responses are: 'Strongly agree', 'Agree', 'Neither agree nor disagree', 'Disagree', or 'Strongly disagree'.

These could be grouped in different ways, for example into 'pro majority' (1&2) or 'pro minority' (3&4); or pro-open (2&3) or pro-closed (1&4). We chose the distinction between 'pro majority' and 'pro minority' attitudes, as this fitted more straightforwardly with the warmth of

feeling and friendships questions and was more closely associated with those variables empirically (see Appendix Table A1). In terms of their correlation with school composition, school level pro-minority attitudes among White British students are positively associated with school percentage Asian British pupils and with school percentage Black British pupils. For Black and Asian pupils, neither pro-majority nor pro-minority attitudes are associated on their own with school percentage White British students. Nevertheless, for conceptual completeness and consistency, we included pro-majority attitudes in our measure of composite orientation of Black British and Asian British pupils as we describe below.

iv. Composite orientation

To form a richer measure of inter-ethnic relations we combine the data on net warmth, on friendships and on attitudes into a single index which we term an individual's composite orientation. We do this in a simple way to maintain a straightforward and transparent connection to the underlying responses. Clearly there are other ways of combining the variables, and different thresholds to use within this approach. We define two binary variables, labelled as high or low orientations (these are not exhaustive categories, most people are neither).

It is easiest to illustrate. Consider defining the orientation of a White British pupil for Asian British. We say you have a 'high orientation' if you satisfy two of these three conditions, and 'very high orientation' if three out of three:

- Feelings: your warmth of feeling for Asians is in the upper quartile (among non-Asians)
- Friends: you report the fraction of your friends who are Asian is: half, a lot, or all
- Attitudes: you report agreement with the (combined) pro-minority attitudinal questions (3&4)

We say you have a 'low orientation' if you satisfy two of these three conditions, and 'very low orientation' if three out of three:

- Feelings: your warmth of feeling for Asians is in the lower quartile (among non-Asians)
- Friends: you report the fraction of your friends who are Asian is none/ almost none
- Attitudes: you report disagreement with the (combined) pro-minority attitudinal questions

For Asian British and Black British orientations to White British pupils, we used instead their agreement with the pro-majority attitudinal questions (1&2).

v. Ethnicity

Our ethnicity variable from CILS4EU is constructed from information on own / parental country of origin to give country of origin connection (see further Dollman, Jacob and Kalter 2014). We

aggregate this measure as appropriate (e.g. to construct Black African and Caribbean) categories and update with a further question on what group respondents "feel they belong to" (other than British). This enables us to reallocate those whose country origins are elsewhere to their 'felt' ethnic group (e.g. East African Asians to Indian). By these means we construct a measure that maps as closely as possible the Office for National Statistics self-reported ethnic group categories for England and Wales used in Census and surveys, as well as in administrative data such as the NPD. We then aggregate respondents to four broad groupings to correspond to the ways that the warmth of feeling and friendship questions were asked, namely, White British, Asian British, Black British, or a residual category of 'Other'. Since 'other' is a heterogeneous group we do not discuss it further or include it in our analysis. We checked that responses for the more fine-grained groups mapped onto the aggregate responses (e.g. that Indians identified as 'Asian'), as we discuss further below (see also Table A4).

vi. Contact, exposure and ethnic composition

We proxy the abstract concepts of 'contact' (or contact opportunity) and 'exposure' using measures that capture the likelihood of their occurring. Specifically, we use school and neighbourhood ethnic composition: for example, a high fraction of Asian pupils in a school makes some contact more likely. These data are clearly not suitable for picking up the subtleties of different levels and types of contact. In fact, we see that as a positive; those measures would be endogenous, much more like the dependent variables in the analysis, whereas the ethnic composition of the school of a child is simply a given once the child is in the school.[1] We noted above that composition may not be a good proxy for contact since pupils may not interact much in a mixed school if they simply stay with their own ethnic group. On the other hand, in a school environment, small-scale contact is inevitable, potentially leading to more significant contact.

We used an average of school ethnic composition over the five years to the study, that is from 2007-2011 to match the CILS4EU survey dates 2010/11. This has a number of advantages. First, it smoothed out the data and avoided the problem of using data from an unrepresentative year. Second, this approach approximated the environment that the survey pupils were placed in over their time in secondary school. Averages for any given year correlate highly with this overall mean. The ethnic groups are aggregated to match as closely as possible onto the CILS4EU ethnic group measures that were used in the questions about warmth and friends. One further advantage of the administrative data is that we can compare this to the survey data and evaluate how representative the chosen classes actually were for the schools. Interestingly, the distribution of respondents

[1] The choice of school in the first place is of course not exogenous and we discuss this at length below.

slightly over-weighted minority ethnic groups relative to the composition of the school (see Appendix Figure A1).

Given the focus in the survey on schools with relatively high proportions of minority group students, the distribution of ethnic composition of the schools in our sample does not reflect the distribution across schools in England as a whole. But, as illustrated in Table 1, the sample does show a substantial range across the distribution of the three aggregate ethnic groups, from 0-40% Asian British, 0-25% Black British and 14% to 98% White British. In addition, the location of the schools is varied, covering both metropolitan, urban and rural local authorities (see Appendix Table A2).

[Table 1 about here].

We use a Local Authority (LA) as the neighbourhood over which we consider 'exposure'; that is, the context in which respondents perceive the ethnic composition of their environment. By exposure we encompass the perception of ethnic composition and incidental forms of interaction that may occur in passing. Such exposure may also include more meaningful forms of (positive) contact, but they may also include negatively valenced contact, as discussed above. In many places, an LA does not represent a small 'neighbourhood' but there are advantages and disadvatanges of focusing too narrowly on small areas.

vii. Pupil characteristics

The CILS4EU survey contains a number of standard demographic and socio-economic variables. We use parental education as a measure of family resources. Since response from parents was partial (we have responses from around 36 per cent of parents), we construct an index of parental education combining reports from parents and the child and using four categories: primary or less, lower secondary, higher secondary and university. We also use a measure of the number of books in the home reported by the student. This provides a proxy for the home learning environment (Melhuish 2010) or for academic/intellectual home environment (Marks, Cresswell and Ainley 2007) and 'scholarly culture' in the home (Evans et al. 2010). It is also a further indicator of parental resources, used as a standard proxy for socio-economic status, or as an (important) part of a composite socio-economic status as used in, for example PISA (Jerrim and Micklewright 2014; OECD 2016). Overall, books are correlated with socio-economic status but are linked to additional educational development and commitment to learning. The harmonised multi-country nature of the study means that we do not have measures of pupil ability, so we use variables describing academic self-concept, namely, "How well are you doing in the following subjects?" (Maths and English), with

five response options from very well to not well at all. We also adjust for the sex of the pupil. Descriptives of these pupil characteristics in our sample can be found in the Appendix, Table A3. For robustness we also explored the contribution of some other individual level variables such as the type of school, but they did not add to the explanatory power of the model.

Analytical approach

The core of our analysis is the relationship between the feelings of pupils from one ethnic group towards other ethnic groups, and the association of this with school and LA ethnic composition. We analyse data from the three largest ethnic groups, Asian/Asian British, Black/Black British, and White British. In line with existing studies, our focus is on relationships between Asian British and White British pupils, and Black British and White British pupils, but we explore the attitudes in both directions and allow for asymmetric effects. In these cases, the inter-ethnic comparisons are also entwined with dominant majority – minority relations. We therefore also consider the views between Asian British and Black British pupils.

Our main results are based on linear regressions at pupil level, relating that individual's feelings for another group to the ethnic composition of her school, and her own characteristics. We have not experimented with the functional form of the regression to 'optimise' the fit. By using a simple linear form across all analyses, we maintain comparability and transparency, albeit at some cost of fit and explanatory power. This only seems to matter significantly in one case, that of warmth of White pupils to Asian pupils, which we discuss further in the results.

We do, however, adopt a more flexible and exploratory approach using graphical analysis. We take school means of the feelings of one group for another, and plot these against school ethnic composition. We fit LOWESS smoothers to the data to summarise the general pattern of the data. Since the number of pupils per school does not vary enormously, weighting by school size is not a first order issue; we have replicated the graphs omitting schools with very few pupils in a particular ethnic group and nothing of consequence changes.

4. Results

a) Homophily

We start by describing the different measures that form the basis of our analysis of inter-ethnic relationships: warmth, friendships and attitudes. Table 2 establishes that the principle of homophily applies to our data. The top panel shows that for each ethnic group, on average they have the warmest feelings for their own group, and by a considerable (and statistically significant) margin. The middle panel shows a similar pattern for friendship patterns. All of these broad ethnic groupings are

more likely to have all or most of their friends from their own group, though the pattern is particularly strong for the White British majority.

Given that Asian and Black are broad categories that might be interpreted in different ways by those from different ethnic groups, we checked that these patterns held for more fine-grained categories (for example, Indian's warmth towards the Asian group, and Caribbeans' friends from the Black group). It is clear that they did, consistent with general understandings of what these categories represent in the UK context (see Appendix Table A4).

The bottom panel of Table 2 is not concerned with homophily directly but shows the differences in attitudes between minority and majority groups, specifically their average support for 'pro-majority' or 'pro-minority' attitudes as defined in the data section. Since responses on each of the pairs of questions have been summed and then averaged for each of the individual, the responses reflect the average group score on a 10-point scale ranging from 1-5 (with half-points). The pattern is clear:minorities hold stronger pro-minority group attitudes and the majority holds stronger pro-majority group attitudes. While the differences are not large, they are statistically significant and amount to one-third or one-quarter of a standard deviation in the distributions.

Overall, then it is clear that the three ethnic groups are oriented towards their own group. The question then arises the extent to which this is responsive to the contexts in which they find themselves.

b) Positive feelings and school composition

i. Simple measure

We begin the exploration of the data in a flexible way using a graphical approach. We graph school mean net warmth for one group to an outgroup against the fraction of outgroup pupils in that school. Figure 1 displays the results of this for four leading cases: school mean net warmth of British Asians for White British; warmth of White British for British Asians; of Black British for White British and of White British for Black British. We use a LOWESS smoother to capture the general trend in the data, and do not consider statistical significance here (see the following pupil-level regressions; simple linear regressions are provided in the Appendix, Table A5). We truncate the horizontal scale for each graph at the 90th percentile of the national distribution of the relevant group composition as the best way to cope with very different ranges (for example, for the fraction of White British pupils this point is at 98%, for Black British it is less than 15%).

[Figure 1 about here]

In all four cases, there is a positive relationship between the simple measure of inter-group positive feelings and school ethnic composition. The pattern is consistent with our expectation that contact in schools is associated with more positive feelings towards other groups. Most of the variation in the share of Black or Asian pupils experienced by White pupils is at the lower end of the distribution, whereas most of the variation in the share of White pupils experienced by Black or Asian pupils is towards the top of the distribution. Nevertheless, in most of these cases, the smoothed relationship is approximately linear across the range. It is worth noting that for Black and Asian respondents net warmth approaches 0 (i.e. their feelings for the majority are the same as those for their own group), when they are in schools with 60 per cent or more white, which is the case for the majority of English schools (see Table 1). However, for White British respondents net values remain clearly negative at all distributions suggesting a somewhat asymmetric relationship, in line with Saguy et al's (2009) argument.

To consider statistical significance we turn to the individual pupil level data and regression analysis.[2] We adopt a simple OLS approach, clustering standard errors at school-level to deal with within-school correlation of errors. The regression results are presented in Table 3, covering the same four cases as Figure 2. All of these regressions also contain the set of individual characteristics described above. In three of these four cases, the graphical evidence is strongly confirmed, with substantial and significant effects of school composition on net warmth. A higher fraction of 'outgroup' pupils in a school is associated with more positive feelings towards that group. The coefficients are of similar magnitude across these three cases.[3]

The fourth case – White British warmth for Asian British -- suggests no effects of school composition. That is, the share of Asian British pupils is inconsequential (or possibly even negative) for White British pupils' response towards the group. Further analysis (see Appendix Table A6) suggests that the relationship may be somewhat non-linear. Specifications using dummy values for the share of pupils or a quadratic in composition both suggest that the share of Asian British pupils has a positive effect on White British pupils' attitudes and then tails off and becomes negative at school compositions of around 30 per cent Asian: schools with higher shares of Asian British represent only a small minority of schools in England. We take away from this, first, that not only are attitudes between minorities and majority not necessarily similar, they may also vary with the specific group under consideration – a finding in line with the neighbourhood analysis of Bowyer (2009). In addition, we conclude that the linear functional form we employ does not necessarily do justice to the complexity of the relationships between out-group orientations and the way they

[2] All observations are included in the regressions, not restricted to those below the national 90th percentile.
[3] These results are about specific contact, not diversity – if we include both 'other' school composition variables on the right hand side, they are generally statistically different from each other.

develop in contexts in which potential for contact is increased. We may see here some suggestion of the ways in which (good) contact and conflict can both be implicated when groups are more highly represented. This may itself reflect the differences in neighbourhood composition which we incorporate into the next stage of our analysis. At certain levels the positive and negative aspects of contact may cancel each other out. We nevertheless retain the linear function in our analysis as the most transparent and one that avoids the potential criticism of cherry-picking a form which optimises our results.

We raised the question of the extent to which the relationships we observe are symmetric, that is, whether we see equivalent effects of changes in school composition for White British warmth for Black British as for Black British warmth for White British. As the findings suggest, and as confirmed by formal tests,[4] these effects were indeed not symmetric. Given the relevance of majority and minority status per se for informing the extent to which out-group orientations are symmetric and are susceptible to the impact of contact, we also explore the relationship between school composition and attitudes for Black British relative to Asian British (and vice versa). While the effects were imprecisely estimated, they were positive and of a similar magnitude (see Appendix, Table 7), and comparable to the effect of share of White British for each of these groups. This suggests that it is not just the hierarchy implied in intergroup contact, which may render minorities more responsive to contact for shaping their responses and orientations. We revisit this point in the conclusion, but first we turn to a more complex measure of intergroup orientations and consider its relationship with school composition.

ii. Composite measure

Our measure of warmth is likely to be embedded in, and also drive, friendships and, consequent on friendship, to be associated with more positive generalised attitudes towards outgroups (Pettigrew 1998). Exploratory analysis illustrated the interconnectedness of these dimensions. For example, friendship composition was associated with warmth: more friends from a group was linked to higher levels of warmth towards that group (see Appendix, Table A9); and greater warmth towards Asian and Black British was associated with strong pro-minority attitudes among White British. Without an experimental context in which to plot the development of these interrelated processes, we instead constructed a composite measure which combines warmth, friendships and broader attitudes to ascertain the extent to which this measure is sensitive to the ethnic composition of schools. More

[4] p-value for equivalence of school composition on positive feelings for other group, White British and Asian British = 0.003; p-value for equivalence of school composition on positive feelings for other group, White British and Black British =0.06.

specifically, as described in the Data section, we construct a composite measure of 'high' positive orientations (in terms of warmth, friendships and attitudes) and 'low' positive orientations (in terms of warmth, friendship and attitudes). As well as better capturing the multidimensionality of attitudes and contacts (Eagly 2007; Thijs and Verkuyten 2014), by combining the interrelated mechanisms of attitudinal and behavioural engagement with others, they potentially provide a more relevant and meaningful illustration of positive and negative orientations, and by splitting into low and high composite measures, we can lessen the influence of noise in the measure.

We again illustrate our findings graphically and with tables of estimation results. Figure 2 shows how high and low orientations towards the other groups vary with school composition, again using a LOWESS smoother. The pattern is clear: high composite orientations increase and low composite orientations decrease with the share of that group in the school. The pattern is approximately linear for high orientations towards White British pupils among Black and Asian pupils. Among White British pupils the pattern for low outgroup orientations is the same: it starts from a higher level and declines more steeply with increases in the shares of Asian British and Black British pupils in the school. That is, not only are greater levels of contact associated with more positive orientations, they are also associated with lower rates of negative orientations among the majority – experiences which are highly relevant for the experience of minorities and intergroup relations into adulthood.

[Figure 2 about here]

Regression analysis at the individual level and including the individual level characteristics shows the same results: see Table 4. Again, for the regression analysis we do not truncate the distribution and retain a linear specification for transparency. In all cases a higher share of the other ethnic group is associated with significantly higher proportions with high positive orientations and significantly lower proportions with low outgroup orientations. A 10% increase in the share of Black British pupils in the school is associated with a 9% increase in the proportion of those White British pupils with high composite orientations towards Black British pupils, while a 10% increase in the share of Asian pupils is associated with 4% increase in high positive orientations. For Asian and Black British pupils the increase associated with a 10% increase in the share of White British pupils is 6%.

iii. *Personal characteristics*

Before we turn to consider how local authority composition combines with school composition we briefly summarise the results for the pupil covariates we included in the individual regressions. We find that boys have lower warmth for all groups (including their own). Parental education had very little association with outgroup attitudes, though, being primarily recorded by the young people it is likely to be subject to considerable measurement error (Jerrim and Micklewright 2014). Taken at face value, it suggests that family background plays only a limited role in outgroup attitudes, net of attainment. Academic self-concept is generally associated with more positive feelings towards outgroups. However, one of our most consistent findings is for 'number of books in the home', which is strongly and significantly associated with more positive outgroup attitudes. This measure is often used as a proxy for family background; it has also been argued to reflect – or proxy for – cognitive ability to some degree. The number of books in the home is also argued to indicate "scholarly culture" by Evans et. al (2010), a culture which itself shapes cognitive development (Evans et al. 2014). It seems plausible that all these interpretations may play a role; if books can be associated with education to some degree, it may suggest that more positive outgroup attitudes may be fostered by education, though this interpretation must remain tentative.

c) Positive feelings and school and LA composition

The second part of our results revisits our two measures of positive outgroup attitudes but introduces a measure of area composition alongside our measure of school composition. As noted, without the benefit of positive contact we anticipated that the share of outgroups in the local area (or 'exposure') might be associated with more negative orientations, particularly for the majority for whom area composition makes salient their ethnicity (Nandi and Platt 2017). We therefore anticipated that exposure at the area level combined with limited in-school contact would tend to reduce positive feelings to the outgroup compared to lower exposure, while contact at the school level would reverse that effects. We expected that these effects would be clearest for White British pupils. In order to test these expectations, we estimated a simple specification distinguishing high and low composition at the area and school level relative to the median. For robustness we estimated the median as the overall median, but also relative to the group under consideration and weighted by the number of individuals. Since the results were broadly consistent across specifications, we retain the simplest one, which is the mid-point of the overall share of the group. This gives us four measures of local authority and school composition for each group: Low LA –Low School (reference) High-LA-Low School, Low LA-High School, High LA-High School. Comparison of High LA- Low School with the reference category illustrates if there is a negative effect of local

authority composition absent school contact. We also test whether the High LA-High School combination is significantly different from the High LA- Low School category to ascertain if school contact mitigates or reverses such a negative effect of neighbourhood composition. We estimate these effects for both the simple measure of positive feelings and the richer composite measure.

Table 5 shows the results from estimating the combined effect of local authority and school composition on our simple measure of positive feelings towards the outgroup. We see that for White British pupils high levels of (neighbourhood) exposure at low levels of (school) contact is significantly more negative than low exposure combined with low contact. This emphasises the way in which contact moderates the (negative) effect of higher exposure. We can also see that those with high exposure and high school contact are significantly more positive towards the outgroups than those with low school contact. Among minorities, the neighbourhood effect is less negative, as we expected: what dominates here is the school contact effect regardless of levels of neighbourhood exposure to the outgroup.

[Table 5 about here]

When we turn to the richer measure, the story is consistent, and in some respects clearer. Table 6 shows that while for White British pupils, the effect of high neighbourhood exposure is not significantly worse than low neighbourhood exposure on composite attitudes in the absence of high contact in school, high contact in school in high exposure neighbourhoods results in significantly higher rates of high positive composite orientations and significantly lower rates of low composite orientations than both low and high exposure neighbourhoods. For the minority groups we see that both neighbourhood and school contact increases their positive orientations towards White British pupils, but the effect is strongest were both school contact and neighbourhood concentration combine, and significantly higher than in high neighbourhood exposure but low school contact settings.

[Table 6 about here]

d) Causality?

We have established a strong relationship in the data between school ethnic composition and inter-ethnic group feelings. Pupils who come across more pupils from a different ethnic group have on average more positive feelings towards them. This association might be generated by a causal mechanism or by selection – there are plausible stories for both. The causal mechanism is simply the 'good contact' hypothesis, as reviewed earlier. The selection story is also straightforward: the school

assignment mechanism in England is based on parental choice, and families with very negative (positive) feelings towards other ethnic groups would if possible choose schools with a low (higher) fraction of 'outgroup' pupils.

The data we have are observational, and the research design is not conducive to establishing causality. We therefore explored avenues that provide some suggestive evidence; we do not claim that we have clinched the case for a causal link.

First, we exploit the class identifiers in the CILS4EU data, allowing us to define ethnic composition at class level as well as the school level[5] we have used until now, and contrast the relationship using school- and class-variation in ethnic composition. We assume that assignment to class is uncorrelated with inter-ethnic warmth. [6] Under the selection hypothesis, there is no causal effect of composition and so, given our class assignment assumption, there should be no relationship between composition and inter-ethnic warmth. Under the causality hypothesis contact matters, so we would expect to see a similar relationship between class composition and inter-ethnic warmth within-school as we do between schools. We note two caveats that composition differences between classes are not large, typically just one or two pupils for non-white groups, and we do not know how long the pupils have been in these class groupings and exposed to the implied level of contact.

The results are in Table 7. The top panel is identical to the earlier analysis, except we use the class ethnic composition rather than the school ethnic composition as the measure of contact that a pupil experiences. We do not include school fixed effects, so this includes variation in composition both within and between schools. The coefficients are very similar to those in Table 3. In the lower panel, we introduce school fixed effects so that the key coefficients of interest are estimated solely from variation in composition within the school, between classes. Two points are clear. First, for three out of the four cases, the estimated coefficients are very similar indeed to the top panel, less than one standard error (SE) different; the other case, the warmth of Black British for White British changes sign and is further apart. The second point is that the coefficients are not well determined, and have larger SEs than the top panel; this should not be surprising given the low variation in class composition within-school. This leaves the final verdict unclear – the effects are not significantly different from zero (favouring selection), but the point estimates are remarkably similar to the between-school estimates (favouring causality).

[5] The school composition data comes from the NPD not from CILS4EU, as discussed above.

[6] These classes are unlikely to be teaching classes, for example maths classes. They are more like form groups or tutor groups. Assignment to these may be random, or may be correlated with ability, or choice of subjects, but it is hard to see how it would be correlated with inter-ethnic group feelings.

[Table 7 about here]

Second, we focus on the process by which families are assigned to schools. As noted, this is based on parents making choices of schools, and these choices put together with school priorities are then fed into an algorithm that determines assignments. In making their choices, parents face a trade-off between the different characteristics of schools that they value. For our purposes, the two ones of interest are the academic quality of the school and its ethnic composition.[7] It seems likely that low performing schools will be applied to by families who place a relatively high valuation on other characteristics, such as ethnic composition, relative to their valuation on academic quality. Necessarily therefore, fewer such families will apply to the higher performing schools. This is where we can contrast our two hypotheses. If the observed relationship in the data is all about selection, then focussing on high-performing schools only, with fewer pupils whose families highly value ethnic composition, then the estimated correlation between composition and feelings should be much reduced. If the relationship is causal, then estimating only on the high performing schools should make no difference.

The results are in Table 8. The top panel simply repeats Table 3 above, estimating for all schools. The lower panel restricts to the top-performing half of schools in the sample.[8] For three out of the four cases, the coefficients are practically identical. For example, for the first column, the net warmth of White pupils for Black pupils, the coefficient estimated on the full sample is 17.35 on 1747 observations, compared to 17.69 estimated on 949 observations. In the fourth case the coefficient is different, but by less than a SE. These findings suggest that it is unlikely to be the case that selection accounts for all or most of the relationships we see in the data.

[Table 8 about here]

One idea to gauge the role for a causal component in the association is to exploit any large changes in school composition between entry into the school and the measurement of attitudes four years later. However, there is very little variation in school composition over the period to enable us to distinguish a causal effect. Specifically, there are so few large changes that this does not provide a way forward. There is only one school in which the percentage of Asian students changes by at least

[7] Of course, school-home distance is also important, but we have no way of addressing that here.
[8] We take the school's key performance metric of the percentage of pupils achieving at least 5 grade C's or better including English and Maths. We take this from 2007, when the sample children would have been choosing schools. In order to normalise this for the performance of other local schools, we divide it by the Local Authority mean score.

20 percentage points, no schools for percentage of Black British students with such a change and only two schools for this percentage of White students. There are (obviously) more schools with absolute changes above 10 percentage points, but not enough for a useful analysis.

The final point we make to help distinguish between causality and selection is simply to note that small differences in school ethnic composition seem to matter for inter-ethnic feelings. For example, in Figures 1 and 2 there is a monotonic and generally linear pattern in the relationships. Even at low fractions of the 'outgroup', small differences make a difference. This fits well with the causal contact hypothesis: slightly more contact slightly improves positive feelings. It seems harder to reconcile that with a selection story. We might expect to see more threshold effects, significant jumps in mean positive feelings at particular composition thresholds, but flat for small changes. We reiterate that none of these points clinch the case that this is a causal relationship; they do, however, offer suggestive evidence that causality might be a substantial part of it.

e) Robustness tests

We carried out a number of checks on the robustness of our results to different specifications. We included school characteristics (Key Stage 2 results and proportion of pupils on Free School Meals) in our main analyses as proxies for individual low income and ability, which might arguably drive differences in outgroup orientations. There were few effects of these variables on our measure of positive feelings (warmth) or composite orientations and the results for our key variables of interest did not change (see Appendix, Tables A8a-c).

We also consider the robustness of our results to the effects of school policies. Many schools will have policies to improve the climate of inter-ethnic relations in their school. Through official school inspections,[9] we have a measure for each school of "The effectiveness with which the school promotes equality of opportunity and tackles discrimination". Like all OFSTED grades, this is scored 1, outstanding, down through 4, unacceptable. We included a measure of school anti-discrimination effectiveness in our main regressions. The interpretation of this effect is unclear: the school net-warmth measures may be high because its policies are effective (positive relationship), or particularly effective policies may be introduced where they are most needed (negative). But our aim here is not to evaluate policies, simply to check that our results are robust to inclusion of policy variables. The results in Appendix Table 10 show that they are: our key coefficients are almost unchanged. The policy variable seems to have a positive relationship with the feelings of White

[9] Carried out by the Office for Standards in Education (OFSTED), https://www.gov.uk/government/organisations/ofsted

British for other groups, and no association with the views of Black and Asian British pupils – who are arguably not their target.

Other checks involved testing that our results were robust to different specifications and cut-offs. For example, we checked whether our results were altered if we took the individual-weighted or group-specific median for the distinction between high and low school and neighbourhood composition, as discussed above. We also tested different non-linear specifications. While, as noted, in some cases these added additional insight into the relationship between observed patterns in the data, as with the median cut-offs we chose the simplest specification for transparency in our final analysis.

5. Conclusions

In this paper we present an empirical analysis of inter-ethnic relations among adolescents in England's schools. We first show that pupils in schools in England have on average warmer feelings for their own ethnic group than for others. Only around 2% of White British pupils have positive net warmth for Black British pupils; reciprocally, only about 7% of Black British pupils have positive net warmth for White British. The gap in warmth ranges from around 9 per cent (Black British for own group compared to White British) to around 19 per cent (White British for own group compared to Asian British). This property of homophily is pervasive in human relations, and is no surprise in this context.

The second and main result of the paper is more positive – a pupil's views of pupils from different ethnic groups become much more favourable as that focus pupil encounters more people from the other group. To be concrete, the net warmth of a Black pupil for Whites increases by 1.04 points for each ten percentage points increase in the share of White pupils in her school. This is a reduction in the "homophily gap" of 12 per cent. Reciprocally, the net warmth of a White British pupil for Black British pupils increases by 1.74 points for each ten percentage points increase in the share of Black pupils in her school, a 14 per cent reduction in the homophily gap. These are significant differences, equal to around 5% and 10% of a standard deviation of their respective distributions. Given the number of factors influencing attitudes, we would not expect more dramatic changes (Pettigrew 2011). Such changes endorse the role of schools in developing positive contact through mixing. Broadening the view to our indicator of composite orientation, and focusing on strong positive and negative orientations we find the same: pupils are much more likely to have a positive orientation toward another group in schools in which that group is more numerous, and much less likely to have a negative orientation. These findings are again supportive of contact

theory, suggesting that in this context most of what happens in schools is 'good contact', and involves reciprocal relationships between attitudes and friendships. This pattern also holds true for views between the two main minority ethnic groups, Asian British and Black British pupils: in both directions, warmer feelings result from a higher percentage of the other group in your school.

Third, we show that school composition (interpreted as contact) mitigates LA composition (interpreted as exposure). In LAs with high fractions of (say) Asian British pupils, White British pupils have substantially and significantly higher net warmth towards those pupils in schools where they are numerous than in schools where they are not. We find the same direction of effect in the two minority groups' feelings for White British pupils, but not precisely estimated. We stress that the interpretation of these findings is not straightforward, and we cannot be sure that they represent a causal relationship.

Given that establishing warmer inter-ethnic relations is an important policy goal, it is worth considering the implications of our findings, on the assumption, consistent with our suggestive evidence, that there is a causal element. Contact in school is a positive force, and therefore school ethnic composition matters for inter-group orientations. And if we take the ethnic composition of LAs as given, based on choices of where to live and work, then the issue comes down to the level of ethnic integration or segregation in schools. In towns and cities with substantial ethnic minority populations, we have shown that a highly segregated school system will generate a lot of pupils with negative orientations towards other groups.

To illustrate this, consider a hypothetical city with 20% Asian pupils and 80% White. A fully segregated system would imply that Asian students experience 0% White pupils and White pupils experience 0% Asian students. Using the more flexible estimates in Figure 2,[10] this would yield the result that approximately 47% of Whites would have a low orientation towards Asian pupils and around 30% of Asians would have a reciprocal low orientation; so overall 44% of all pupils in the city would be ill-disposed to the other group. By contrast, in a fully integrated system, again using estimates from Figure 2, overall around 20% of pupils would have low orientations. Bearing in mind our definition of a low composite orientation (feelings for the other group in the lower quartile; no or almost no friends in the other group; and disagreement with the pro-multicultural and pro-openness statement), this halving of the number of pupils with such views in an integrated school system seems valuable. In terms of high orientation, if this city's schools were fully segregated, only 18% would have high orientations to the other ethnic group, compared to 53% if fully integrated. Again, a very substantial effect.

[10] It seems more appropriate to use the flexible estimates in Figure 2 rather than extrapolate a linear regression to the extremes.

Encouragingly for policy-makers, the results also show that even small moves away from largely mono-ethnic schools towards a more integrated system produce positive changes. It is not the case that anything short of full integration is pointless. The policy questions then focus on how to encourage mixed schools, and how to encourage contact. To the extent that the relationship between school composition and positive feelings is linear, then (somehow) moving pupils between schools simply redistributes the warmth around the country. However, we may imagine that high concentrations of negative feelings in one place may have particularly (nonlinearly) bad further consequences; it also seems possible from the raw data that the core relationship itself may not be linear at the extremes. So policies to encourage mixing are supported by these findings.

Of course, this is not easy. Some, such as Katwala et al. (2017) have argued that the political climate in the UK now (2017-2018) is more conducive to pursuing pro-integration policies with a government manifesto commitment to this, the large-scale Casey Review, the current Green Paper on integration (HMG 2018) and the importance attached to integration by the Mayor of London. Focussing particularly on schools,[11] policies for encouraging contact are largely about creating opportunities for pupils from different backgrounds to mix, either in school, or outside school activities, or specifically in altruistic activities.[12]

Our paper offers some new evidence to this debate. We show that towns and cities with ethnically segregated schools have much lower levels of mutual regard among teenagers from different ethnic groups. The value to researching and implementing policies to encourage integration and contact is therefore clear.

[11] Another macro scale policy that impinges on this is the setting up of new schools. These can be explicitly about creating new integrated schools (for example the Waterhead Academy in Oldham), but given the capital expenditure, this can only ever be a marginal contribution. It has also been argued that the current Free School programme actually exacerbates the problem by allowing new faith-based schools to open.

[12] See Casey (2017) Executive Summary, point 39.

References

Abascal, M. and Baldassari, D. (2015). Love they neighbor? Ethnoracial diversity and trust re-examined. *American Journal of Sociology* 121(3): 722-82.

Alba, R. and Foner, N. (2015). *Strangers No More. Immigration and the challenges of integration in North America and Western Europe*. Princeton and Oxford: Princeton University Press.

Alesina, A. & La Ferrara, E. 2000. Participation in Heterogeneous Communities. *The Quarterly Journal of Economics* 115 (3): 847–904.

Allport, G.W. 1954. *The Nature of Prejudice*. Cambridge, MA: Addison-Wesley.

Battu, H., Mwale, M. and Zenou, Y. (2007). 'Oppositional identities and the labor market'. *Journal of Population Economics* 20: 643-667.

Bowyer, B.T. (2009). The contextual determinants of whites' racial attitudes in England. *British Journal of Political Science* 39: 559-586.

Bubritzki, Swantje, van Tubergen, Frank, Weesie, Jeroen, and Sanne Smith (2017): Ethnic composition of the school class and interethnic attitudes: a multi-group perspective. *Journal of Ethnic and Migration Studies*, doi: 10.1080/1369183X.2017.1322501

Burgess, S., Lupton, R. and Wilson, D. (2005) Parallel Lives? Ethnic Segregation in Schools and Neighbourhoods. Urban Studies, vol. 42 (7) pp. 1027-1056

Cantle, T. (2001) Community Cohesion: Report of the Independent Review Team – The 'Cantle Report' London: Home Office. http://tedcantle.co.uk/pdf/communitycohesion%20cantlereport.pdf

Casey, L. (2016) The Casey Review A review into opportunity and integration. Department for Communities and Local Government. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/575973/The_Casey_Review_Report.pdf

Dinesen, P. T., & Sønderskov, K. M. (2015). Ethnic Diversity and Social Trust: Evidence from the Micro-Context. American Sociological Review, 80(3), 550-573.

Dollmann, J., Jacob, K. & Kalter, F. (2014) Examining the Diversity of Youth in Europe. A Classification of Generations and Ethnic Origins Using CILS4EU Data (Technical Report). Mannheim: Mannheim Center for European Social Research – Working Paper 156].

Eagly, A. H. & Chaiken, S. (2007) The advantages of an inclusive definition of attitude. *Social Cognition* 25: 582–602.

Enos, R.D. 2014. Causal effect of intergroup contact on exclusionary attitudes. *PNAS* 111(10): 3699-3704.

Evans, M., Kelley, J., Sikora, J., and Treiman, D. (2010). Family scholarly culture and educational success: Books and schooling in 27 nations. *Research in Social Stratification and Mobility* 28:171–197.

Evans, M.D.R., Kelley, J., and Sikora, J. (2014). Scholarly Culture and Academic Performance in 42 Nations. *Social Forces* 92(4): 1573-1605.Fieldhouse, E. & Cutts, D. (2010). Does Diversity Damage Social Capital? A Comparative Study of Neighbourhood Diversity and Social Capital in the US and Britain. *Canadian Journal of Political Science* 43(2):289–318.

Finseraas, H., Hanson, T., Johnsen, A.A., Kotsadam, A. and Torsvik, G. 2016. Trust, ethnic diversity, and personal contact: experimental field evidence. Seminar presentation at Universidad Carlos III, November 2016.

Gijsberts, M., Van der Meer, T., & Dagevos, J. (2012). 'Hunkering Down' in Multi-Ethnic Neighbourhoods? The Effects of Ethnic Diversity on Dimensions of Social Cohesion. European Sociological Review 28(4):527–37.

Hangartner, D., Dinas, E., Marbach, M., Matakos, K and Xefteris, D. (2017). *Does exposure to the refugee crisis make natives more hostile?* IPL Working Paper 17-02.

Hewstone, M. 2015. Consequences of Diversity for Social Cohesion and Prejudice: The Missing Dimension of Intergroup Contact. *Journal of Social Issues*, Vol. 71, No. 2, 2015, pp. 417—438.

Hewstone, M. and Schmid, K. 2014. Neighbourhood Ethnic Diversity and Orientations Toward Muslims in Britain: The Role of Intergroup Contact. *The Political Quarterly*, 85(3): 320-325.

Her Majesty's Government [HMG] (2018). *Integrated Communities Strategy Green Paper*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/696993/Integrated_Communities_Strategy.pdf

Janmaat, J.G. 2014. Do Ethnically Mixed Classrooms Promote Inclusive Attitudes Towards Immigrants Everywhere? A Study Among Native Adolescents in 14 Countries, *European Sociological Review*, 30(6): 810–822

Kalter, Frank; Heath, Anthony F.; Hewstone, Miles; Jonsson, Jan O.; Kalmijn, Matthijs; Kogan, Irena; Tubergen, Frank van; (2017): *Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) - Reduzierte Version.* Reduzierter Datenbestand zum Download und zur off-site Nutzung. GESIS Datenarchiv, Köln. ZA5656 Datenfile Version 3.3.0, *doi:10.4232/cils4eu.5656.3.3.0*

Katwala, S., Rutter, J., Mohammad, A. and Ballinger, S. (2017) Integration: from national rhetoric to local reality. British Future. http://www.britishfuture.org/wp-content/uploads/2017/04/Mayors-and-integration-report.FINAL_.pdf

Kemeny, T. and Cooke, A. 2017. Urban immigrant diversity and inclusive institutions. *Economic Geography* DOI:10.1080/00130095.2017.1300056.

Kruse, H., Smith, S., van Tubergen, F., Maas, I. (2016). From neighbors to school friends? How adolescents' place of residence relates to same-ethnic school friendships. *Social Networks* 44: 130-142.

Laurence, J. (2011). The Effect of Ethnic Diversity and Community Disadvantage on Social Cohesion: A Multi-Level Analysis of Social Capital and Interethnic Relations in UK Communities. European Sociological Review 27(1):70-89.

Letki, N. (2008). Does diversity erode social cohesion? Social capital and race in British neighbourhoods. Political Studies 56 (1), 99-126 Li, Y., Pickles, A. & Savage, M. (2005). Social Capital and Social Trust in Britain. European Sociological Review 21(2):109–23.

Lowe, M. (2017). 'Types of contact: a field experiment on collaborative and adversarial caste integration. November 10 2017.

Marks, G.N., Cresswell, J. and Ainley, J. (2007). 'Explaining socioeconomic inequalities in student achievement: The role of home and school factors'. *Educational Research and Evaluation*, 12(2): 105-128.

McLaren, L.M. 2003. Anti-immigrant prejudice in Europe: contact, threat perception , and preferences for the exclusion of migrants. *Social Forces* 81(3): 909-936.

McPherson, M. Smith-Lovin, L. and Cook, J.M. 2001. Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27:415–44.

Martinovic, B. van Tubergen, F. and Maas, I. 2009. Dynamics of interethnic contact: a panel study of immigrants in the Netherlands. *European Sociological Review* 25(3): 303-318.

Nandi, A. and Platt, L. (2015). 'Patterns of Minority and Majority Identification in a Multicultural Society'. *Ethnic and Racial Studies*, 38:15, 2615-2634.

Nandi, A. and Platt, L. (2017). 'Ethnic identity in context: the influence of forms of contact on majority and minority social identities.' Seminar paper, TCRU seminar, UCL, 28 February 2017.

OECD. (2013). 'The fiscal impact of immigration in OECD countries'. Chapter 3 in *International Migration Outlook*. OECD.

OECD. (2016). *PISA 2015 Results (Volume One): Excellence and Equity in Education*. Paris: PISA, OECD.

Papademetriou,D.G., Somerville, W. and Sumption, M. (2009). *The Social Mobility of Immigrants and their Children* Migration Policy Institute.

Pettigrew, T.F. 1998. Intergroup contact theory. *Annual Review of Psychology*, 49: 65-85

Pettigrew, T.F. and Tropp, L.R. 2006. A Meta-Analytic Test of Intergroup Contact Theory. *Journal of Personality and Social Psychology*, 2006, 90 (5): 751–783.

Plenty, S. and Jonsson, J.O. (2016). 'Social exclusion among peers: the role of immigrant status and classroom immigrant density. *Journal of Youth and Adolescence*. DOI: 10.1007/s10964-016-0564-5.

Ramiah, A., Schmid, K., Hewstone, M. and Floe, C. (2015) 'Why are all the white (Asian) kids sitting together in the cafeteria? Resegregation and the role of intergroup attributions and norms.' Br J Soc Psychol. Vol 54(1) pp. 100-24

Rao, G. (2013). *Familiarity Does* Not *Breed Contempt: Diversity, discrimination and generosity in Delhi schools.* December 30, 2013.

Saguy, T., Tausch, N., Dovidio, J.F. and Pratto, F. (2009). 'The irony of harmony: intergroup contact can produce false expectations for equality. *Psychological Science* 20(1): 114-121.

Schindler, D. and Westcott, M. (2017). *Shocking racial attitudes: Black G.I.s in Europe*. CESifo Working Papers 6723.

Schaafsma, J., Nezlek, J.B., Krejtz, I. and Safron, M. (2010). Ethnocultural identification and naturally occurring interethnic social interactions: Muslim minorities in Europe. *European Journal of Social Psychology*. 40: 1010–1028.

Schmid, K., Al Ramiah, A. and Hewstone, M. 2014. Neighborhood Ethnic Diversity and Trust: The Role of Intergroup Contact and Perceived Threat. *Psychological Science* 25(3) 665–674.

Simpson, L. and Finney, N. (2010). 'Parallel lives and ghettoes in Britain: Facts or Myths?' *Geography* 95(3): 124-131.

Sturgis, P., Brunton-Smith, I., Read, S. & Allum, N. (2011). Does ethnic diversity erode trust?: Putnam's 'hunkering-down' thesis reconsidered. British Journal of Political Science 41(1):57–82.

Tajfel, H. (1981). 'Social identity and intergroup behaviour'. Soc. Sci. Inf. 13 (2): 65-93.

Thijs, J., and Verkuyten, M. 2014. School Ethnic Diversity and Students' Interethnic Relations. *British Journal of Educational Psychology* 84(1): 1–21.

Tables & Figures

TABLES

Table 1: Ethnic composition of schools in England and in sample

	CILS4EU sample			National Sample		
	Asian British	Black British	White British	Asian British	Black British	White British
Mean	15.9	8.0	67.9	8.0	4.5	78.2
SD	20.3	12.6	28.5	15.4	9.9	26.0
Percentiles						
p5	0.2	0	12.3	0	0	13.7
p10	0.4	0.1	22.4	0	0	32.3
p25	1.5	0.7	45.7	0.6	0	73.6
p50	7.6	2.7	78.3	2	0.7	89.5
p75	23.3	8.5	91.5	7.3	3.5	95.1
p90	45.0	21.4	96.9	21.9	13.8	97.5
p95	58.7	42.4	97.8	40.2	25.4	98.4

Source: NPD, columns 1-3; NPD matched to CILS4EU, columns 4-6

Table 2: Homophily among ethnic groups in the UK, positive to own/ other groups, composition of friendships, and pro minority / majority attitudes

	…*among* White British	…*among* Asian British	…*among* Black British
Positive feelings *for* (on scale of 1-100):			
White British	**88.4 (17.2)**	72.6 (25.1)	75.6 (25.0)
Asian British	69.7 (28.4)	**83.7 (20.3)**	68.8 (28.0)
Black British	76.2 (24.7)	70.8 (26.6)	**84.2 (19.5)**
N	2,302	648	369
Friendship composition (%)….			
None or very few			
White British friends	**0.5**	13.5	9.7
Asian British friends	45.6	**2.8**	19.7
Black British friends	28.4	28.2	**4.6**
A few			
White British friends	2.6	37.4	26.9
Asian British friends	41.0	10.0	42.1
Black British friends	51.1	44.3	17.0
About half			
White British friends	6.6	18.5	21.5
Asian British friends	6.8	14.1	16.8
Black British friends	9.3	12.8	13.0
A lot			
White British	39.7	23.6	29.8
Asian British	5.4	35.0	17.0
Black British	9.3	12.1	39.2
All or almost all			
White British friends	**50.7**	7.1	12.0
Asian British friends	1.2	**38.1**	3.5
Black British friends	1.9	2.7	**26.2**
N	1,984	611	349
Attitudes (mean (SD) on scale of 1-5, higher is stronger agreement)			
Pro minority	3.4 (0.8)	**3.7** (0.8)	**3.7** (0.8)
Pro majority	**3.5** (0.8)	3.3 (0.7)	3.2 (0.8)
N	1,990	626	350

Source: CILS4EU, UK Sample, Wave 1. Notes: Figures emboldened indicate homophily

Table 3: OLS regression of association between school composition and net positive attitudes to other groups by ethnic group, individual level with controls

	Views by White British for Asian British	Views by White British for Black British	Views by Asian British for White British	Views by Black British for White British
School % White British			13.16***	10.36*
			(3.17)	(5.41)
School % Asian British	-2.87			
	(8.15)			
School % Black British		17.35**		
		(8.20)		
Personal Characteristics	Yes	Yes	Yes	Yes
R^2	0.06	0.03	0.06	0.03
Obs	1743	1747	510	285

Source: CILS4EU, UK Sample, Wave 1 & NPD. Notes: Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

Table 4: OLS regression of association of school composition with composite outgroup orientation by ethnic group, individual level with controls

	White British orientation towards Asian British		White British orientation towards Black British		Asian British orientation towards White British		Black British orientation towards White British	
	High orientation	Low orientation	High orientation	Low orientation	High orientation	Low orientation	High orientation	Low orientation
School % Asian British Pupils	0.43*** (0.09)	-0.54*** (0.10)						
School % Black British Pupils			0.91*** (0.15)	-0.80*** (0.14)				
School % White British Pupils					0.58*** (0.09)	-0.19** (0.08)	0.59*** (0.09)	-0.18** (0.08)
Personal Chars	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.04	0.05	0.03	0.03	0.12	0.03	0.12	0.03
Observations	1917	1917	1917	1917	532	532	305	305

Source: CILS4EU, UK Sample, Wave 1 & NPD. Notes: Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.

* p<0.10, ** p<0.05, *** p<0.01

Table 5: OLS regression of association of ethnic composition of school and local authority with net warmth towards other ethnic groups, by ethnic group, individual level with controls

	White British warmth for Asian British	White British warmth for Black British	Asian British warmth for White British	Black British warmth for White British
SCH Lo|LA Hi	-9.10**	-2.65	5.57	-0.11
	(3.61)	(2.15)	(3.61)	(6.60)
SCH Hi|LA Lo	-3.78	-1.11	5.08**	12.25**
	(3.86)	(1.95)	(2.33)	(5.09)
SCH Hi| LA Hi	-1.03	1.73	8.82*	9.43*
	(2.08)	(1.36)	(5.03)	(4.89)
Personal Characteristics	Yes	Yes	Yes	Yes
TEST: SCH Lo|LA Hi v. SCH Hi| LA Hi	0.04	0.04	0.59	0.23
R^2	0.07	0.04	0.05	0.05
N	1743	1747	510	285

Source: CILS4EU, UK Sample, Wave 1 & NPD. Notes: Test: SCH Low and LA High = SCH High and LA High. Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.

* p<0.10, ** p<0.05, *** p<0.01

Table 6: OLS regression of association of ethnic composition of school and local authority with composite orientation towards other ethnic groups, by ethnic group, individual level with controls

	White British composite orientation towards Asian British		White British composite orientation towards Black British		Asian British composite orientation towards White British		Black British composite orientation towards White British	
	High orientation	Low orientation	High orientation	Low orientation	High orientation	Low orientation	High orientation	Low orientation
SCH Lo|LA Hi	0.02	-0.00	0.02	-0.05	0.22***	-0.03	0.18*	-0.17***
	(0.05)	(0.06)	(0.04)	(0.04)	(0.05)	(0.05)	(0.10)	(0.06)
SCH Hi|LA Lo	0.03	-0.10**	0.12***	-0.12***	0.25**	-0.03	0.36***	-0.09
	(0.03)	(0.04)	(0.04)	(0.04)	(0.10)	(0.06)	(0.08)	(0.08)
SCH Hi| LA Hi	0.09***	-0.13***	0.12***	-0.12***	0.38***	-0.11	0.39***	-0.09
	(0.03)	(0.04)	(0.03)	(0.03)	(0.09)	(0.08)	(0.08)	(0.06)
Personal Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TEST: SCH Lo|LA Hi v. SCH Hi| LA Hi	0.24	0.05	0.04	0.08	0.09	0.38	0.06	0.27
R^2	0.04	0.05	0.03	0.03	0.08	0.02	0.11	0.03
N	1827	1827	1827	1827	532	532	305	305

Source: CILS4EU, UK Sample, Wave 1. Notes: Test: SCH Low and LA High = SCH High and LA High. Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

Table 7: Class and school variation in composition

	Net Warmth of White British for Black British	Net Warmth of White British for Asian British	Net Warmth of Asian British for White British	Net Warmth of Black British for White British
Panel A: No school fixed effects, class- and school-variation				
Fraction Black	15.446**			
British pupils	(7.28)			
Fraction Asian		-4.408		
British pupils		(6.25)		
Fraction White			14.796***	14.292***
British pupils			(4.21)	(5.35)
Personal Chars	Yes	Yes	Yes	Yes
Observations	1747	1743	510	285
Panel B: School fixed effects included, only class-variation				
Fraction Black	23.928			
British pupils	(17.58)			
Fraction Asian		-5.244		
British pupils		(16.86)		
Fraction White			16.380	-12.526
British pupils			(14.52)	(16.81)
Personal Chars	Yes	Yes	Yes	Yes
Observations	1747	1743	510	285

Source: CILS4EU, UK Sample, Wave 1 & NPD. Notes: Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

Table 8: Splitting the estimation by school academic quality

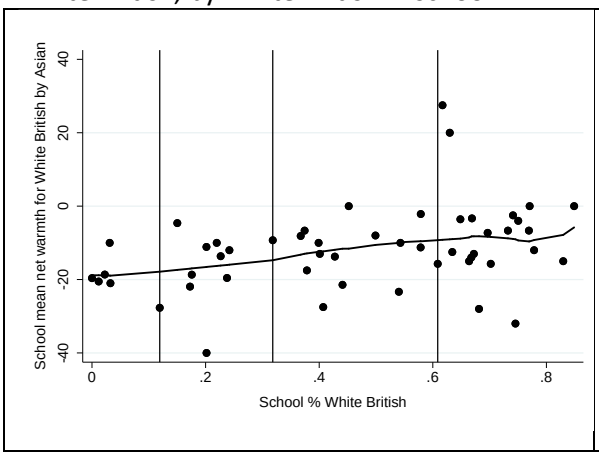
	Net Warmth of White British for Black British	Net Warmth of White British for Asian British	Net Warmth of Asian British for White British	Net Warmth of Black British for White British
Panel A: All schools, replicating Table 3				
Fraction Black pupils	17.348**			
	(8.197)			
Fraction Asian pupils		-2.865		
		(8.149)		
Fraction White pupils			13.158***	10.363*
			(3.174)	(5.414)
Personal Chars	Yes	Yes	Yes	Yes
Observations	1747	1743	510	285
Panel B: Only schools in the top half of local academic quality ranking				
Fraction Black pupils	17.686*			
	(8.851)			
Fraction Asian pupils		-1.267		
		(14.143)		
Fraction White pupils			12.114*	3.274
			(6.658)	(9.250)
Personal Chars	Yes	Yes	Yes	Yes
Observations	949	945	238	134

Source: CILS4EU, UK Sample, Wave 1 & NPD. Notes: Standard errors in parentheses. Standard errors clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

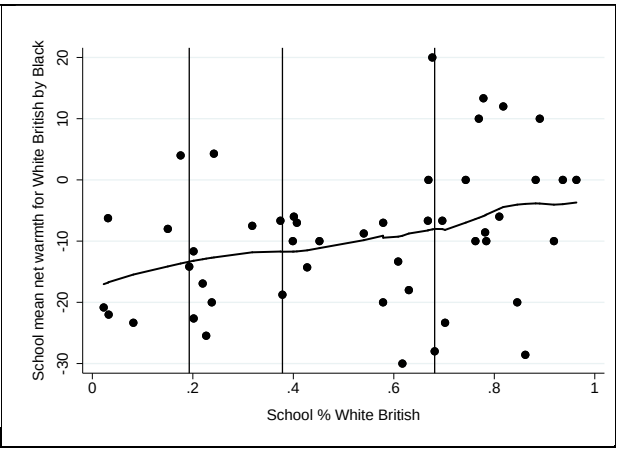
FIGURES

Figure 1: LOWESS of net warmth towards outgroup by ethnic composition of school, by ethnic group, school level

Mean Asian British warmth orientation to White British, by White British in school



Mean Black British warmth to White British, by White British in school



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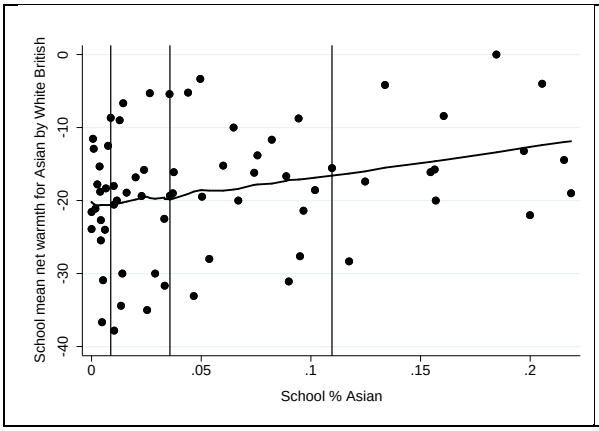

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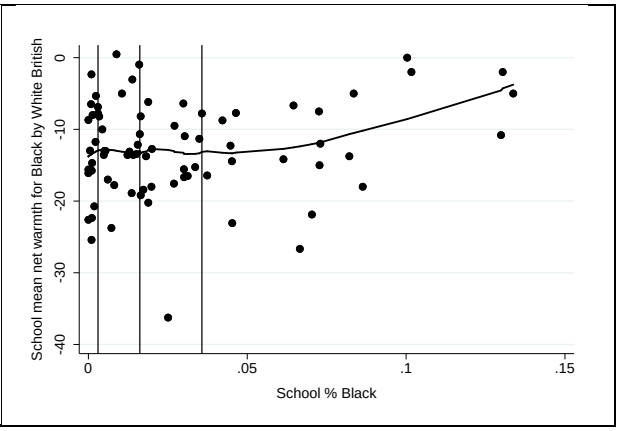
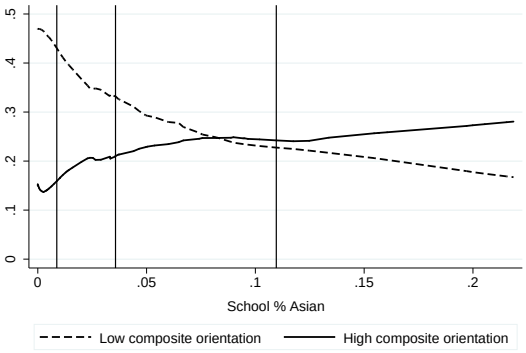
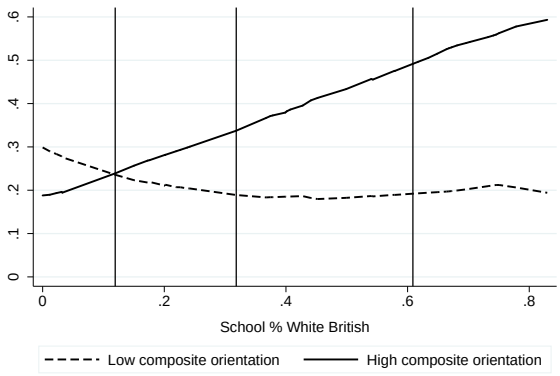
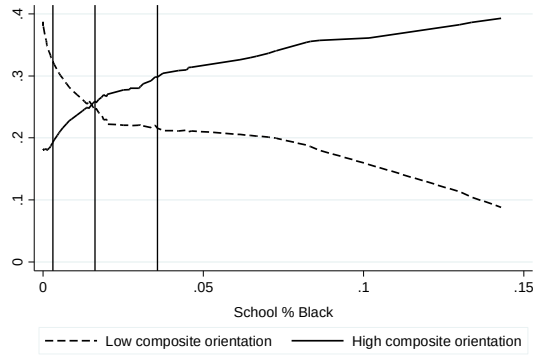
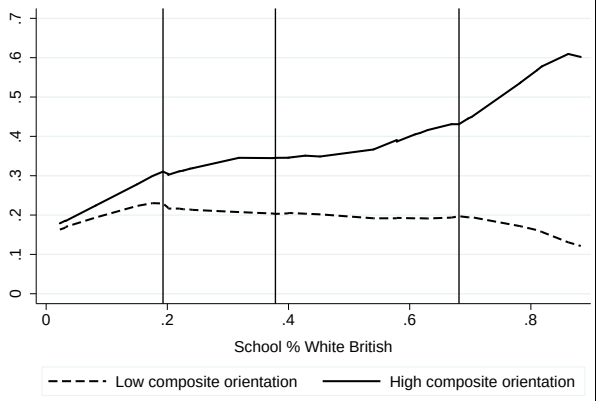


Source: CILS4EU, UK Sample, Wave 1 & NPD. Note: vertical lines at lower and upper quartiles and median of school composition. X-axis range is up to 90th percentile of national distribution

Figure 2: LOWESS of composite orientation towards outgroup by ethnic composition of school, by ethnic group, school level

Mean White British low and high composite orientation to Asian British, by Asian British in school	Mean Asian British low and high composite orientation to White British, by White British in school
	
Mean White British low and high composite orientation to Black British, by Black British in school	**Mean Black British low and high composite orientation to White British, by White British in school**
	

Source: CILS4EU, UK Sample, Wave 1 & NPD. Note: Vertical lines at lower and upper quartile and median. X-axis range is up to 90th percentile of national distribution

Appendix Tables and Figures

Appendix Tables

Table A1: Pattern of support for four attitudes adjusting for personal characteristics, by ethnic group

Ethnic group (ref. =White British)	Support for statement (1) Pro-traditional	Support for statement (2) Pro-adaptation	Support for statement (3) Pro-openness	Support for statement (4) Pro-multiculturalism
Asian British	-0.112**	-0.310***	0.358***	0.424***
	(0.050)	(0.064)	(0.046)	(0.052)
Black British	-0.213***	-0.376***	0.412***	0.341***
	(0.055)	(0.070)	(0.060)	(0.054)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.022	0.040	0.081	0.051
Observations	2622	2611	2605	2606

Standard errors in parentheses
SEs clustered at school level
* p<0.10, ** p<0.05, *** p<0.01

Table A2: Location of schools in CILS4EU Sample (N=65 LAs out of 150)

London		**Other Urban**		**Rural**	
Camden	1	Birmingham	2	Buckinghamshire	5
Greenwich	1	Dudley	1	Milton Keynes	1
Islington	1	Sandwell	2	Derby	1
Lambeth	1	Walsall	1	Dorset	1
Southwark	1	St. Helens	1	Hampshire	2
Wandsworth	1	Wirral	1	Wiltshire	1
Barnet	1	Bolton	1	Reading	1
Brent	1	Manchester	2	Slough	1
Bromley	2	Oldham	1	Peterborough	1
Croydon	3	Rochdale	1	Devon	1
Ealing	1	Salford	1	Kent	2
Harrow	1	Trafford	2	Medway	1
Hillingdon	1	Doncaster	3	Lancashire	2
Hounslow	1	Bradford	1	Nottinghamshire	1
Merton	2	Kirklees	1	Nottingham	2
Newham	1	Leeds	2	Shropshire	1
Sutton	1	North Tyneside	1	Telford & Wrekin	1
Waltham F't	1	Bristol, City of	1	Cumbria	1
		York	1	Gloucestershire	1
		Bedford	2	Hertfordshire	3
				Lincolnshire	2
				Norfolk	2
				Northamptonshire	3
				Oxfordshire	1
				Suffolk	4
				Surrey	3
				Warwickshire	1

Table A3: Descriptive statistics of child characteristics in analysis sample , percent / mean (SD)

	White British	Asian British	Black British
Boy	52.1	54.7	41.6
Books in the home:	2.4 (1.2)	2.1 (1.1)	2.3 (1.1)
mean (SD) of scale from 1 (0-25) to 5 (500+)			
Parental education			
Primary or less	19.5	22.4	15.1
Lower secondary	51.3	56.2	66.9
Upper secondary	14.0	11.3	6.6
University	15.2	10.2	11.5
English self-concept:	2.9 (0.8)	3.0 (0.8)	3.0 (0.8)
mean (SD) from 1 (not at all well) to 4 (very well)			
Maths self-concept:	2.8 (0.9)	3.0 (0.8)	2.8 (0.9)
mean (SD) from 1 (not at all well) to 4 (very well)			
N	1827	532	305

Notes: The N is that of the sample with valid values on all variables.

Table A4: Homophily: positive feelings for broad ethnic group (on scale of 0-100) and friends from broad ethnic group (mean score from 1 (all or almost all) to 5 (none or very few), by disaggregated ethnic groups

By group	*For* group	Positive feelings group	N	Friends with group (mean)	N
UK majority	Asian British	69.6	1830	4.48	1793
	Black British	76.3	1832	4.25	1792
	White British	88.8	1860	1.43	1868
Irish	Asian British	72.4	113	4.24	114
	Black British	78.8	113	4.07	114
	White British	91.6	115	1.71	115
EU15 (ex I & UK)	Asian British	70.4	148	3.99	147
	Black British	74.4	151	3.96	147
	White British	82.8	153	1.79	151
Other Europe (broadly defined)	Asian British	66.7	105	4.15	104
	Black British	73.4	108	3.91	103
	White British	83.5	110	2.19	106
Other white origin	Asian British	73.9	64	4.22	62
	Black British	81.3	65	4.31	62
	White British	85.8	64	1.67	63
Indian	Asian British	86.7	319	2.55	311
	Black British	77.3	316	3.88	306
	White British	78.9	318	2.75	307
Pakistani	Asian British	79.3	291	2.08	291
	Black British	61.0	284	3.94	281
	White British	63.5	287	3.18	288
Bangladeshi	Asian British	87.8	38	2.26	36
	Black British	80.4	38	3.38	36
	White British	78.7	38	2.72	39
Chinese	Asian British	77.3	59	2.29	58
	Black British	62.9	58	4.26	60
	White British	67.6	59	2.97	60
Other Asian	Asian British	85.0	47	2.56	48
	Black British	79.6	48	3.65	48
	White British	82.9	47	2.79	48
African (ex N. African)	Asian British	72.5	197	3.69	191
	Black British	85.9	201	2.86	193
	White British	74.6	199	2.51	195
Caribbean	Asian British	64.7	167	3.96	166
	Black British	82.2	168	2.93	171
	White British	76.7	167	2.32	170
MENA	Asian British	73.5	52	3.61	51
	Black British	77.5	52	3.40	50
	White British	78.7	51	1.96	50
Other (inc. not known)	Asian British	76.2	385	4.01	372
	Black British	79.3	385	3.90	372
	White British	85.3	385	1.80	384
Total	Asian British	71.7	3815	4.12	3744

	Black British	76.3	3819	4.09	3735
	White British	85.6	3853	1.72	3844

Table A5: Positive Feelings and Composite Orientation: OLS regression result, school level

School composition	White British school mean warmth for Asian British	White British school mean warmth for Black British	Asian British school mean warmth for White British	Black British school mean warmth for White British
School % White			15.780**	13.595**
			(5.973)	(5.757)
School % Asian	8.067			
	(6.522)			
School % Black		33.457***		
		(7.339)		
R^2	0.017	0.191	0.125	0.108
Obs	90	90	51	48

SEs in parentheses

Table A6: Alternative specifications for the association between share of Asian pupils in school and White British warmth towards Asian British.

	School level	Individual level
School % Asian British pupils (linear specification)	7.028	-2.865
	(7.033)	(8.149)
R^2	0.011	0.057
School % Asian British pupils (dummies, ref=0-2%)		
2-5%	2.170	0.830
	(3.465)	(3.109)
5-10%	2.248	1.136
	(3.628)	(3.064)
10-20%	5.740	4.185**
	(3.726)	(1.741)
20-30%	7.649**	0.452
	(3.628)	(3.493)
30%+	2.809	-3.343
	(3.726)	(4.885)
R^2	0.061	0.060
School % Asian British pupils with quadratic term	43.882**	17.607
	(18.073)	(20.295)
Asian British squared	-69.240**	-57.515
	(32.678)	(53.055)
R^2	0.065	0.063
Personal Chars	No	Yes
Observations	90	1743

Standard errors in parentheses. SEs clustered at school level in individual regressions. * p<0.10, ** p<0.05, *** p<0.01

Table A7: Positive feelings, between Black British and Asian British, individual level

	Feelings for Asians from Blacks	Feelings for Blacks from Asians
	Individual level	
School % Asian British	13.251 (10.688)	
School % Black British		14.450 (11.128)
Personal Chars	Yes	Yes
R^2	0.047	0.035
Observations	281	508

Table A8: Robustness check on results including school-group means for poverty and ability measures

Table A8a: Warmth of feelings towards outgroups by school ethnic composition, controlling for poverty and ability school-group means

	By White British for Asian British	By White British for Black British	By Asian British for White British	By Black British for White British
School % Asian British	1.789			
	(8.411)			
School % Black British		19.969**		
		(7.769)		
School % White British			11.166***	12.649**
			(3.796)	(6.109)
School-ethnic group means:				
FSM	-26.775*	-22.479**	-8.041	10.706
	(14.459)	(9.750)	(10.600)	(8.986)
Attainment age 11	-0.143	-0.164	-0.014	-0.434*
	(0.161)	(0.148)	(0.142)	(0.231)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.061	0.038	0.056	0.060
Observations	1743	1747	505	271

Standard errors in parentheses SEs clustered at school level in individual regressions * p<0.10, ** p<0.05, *** p<0.01

Table A8b: High composite orientation towards outgroups by school ethnic composition, controlling for poverty and ability school-group means

	Hi, White British for Asian British	Hi, Asian British for White British	Hi, White British for Black British	Hi, Black British for White British
School % Asian British	0.425***			
	(0.095)			
School % White British		0.550***		0.625***
		(0.109)		(0.102)
School % Black British			0.904***	
			(0.184)	
School-ethnic group means:				
FSM	-0.149	-0.031	-0.122	0.430***
	(0.189)	(0.212)	(0.186)	(0.155)
Attainment age 11	-0.002	0.001	-0.004	-0.002
	(0.002)	(0.003)	(0.003)	(0.003)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.045	0.111	0.034	0.122
Observations	1827	527	1827	290

Standard errors in parentheses. SEs clustered at school level. * p<0.10, ** p<0.05, *** p<0.01

Table A8c: Low composite orientation towards outgroups by school ethnic composition, controlling for poverty and ability school-group means

	Lo, White British for Asian British	Lo, Asian British for White British	Lo, White British for Black British	Lo, Black British for White British
School % Asian	-0.563***			
	(0.125)			
School % White British		-0.199**		-0.164*
		(0.085)		(0.087)
School % Black			-0.891***	
			(0.183)	
School-ethnic group means:				
FSM	0.120	-0.091	-0.009	0.051
	(0.270)	(0.130)	(0.177)	(0.142)
Attainment age 11	-0.000	0.000	0.000	0.004
	(0.003)	(0.002)	(0.002)	(0.003)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.053	0.030	0.026	0.029
Observations	1827	527	1827	290

Standard errors in parentheses. SEs clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

Table A9: Relationship between friendship composition and positive feelings for group

	Asian British friends on White positive feelings for Asian British	White British friends on Asian British positive feelings for White British	Black British friends on White British positive feelings for Black British	White British friends on Black British positive feelings for White British
Share of friends from outgroup (ref=none or almost none				
A few friends from group	9.350***	4.938	7.252***	4.321
	(1.610)	(4.476)	(1.359)	(3.997)
About half friends from group	15.029***	10.693**	11.927***	11.140**
	(2.183)	(4.162)	(1.565)	(4.654)
A lot of friends from group	12.166***	17.397***	9.442***	12.100***
	(2.826)	(4.141)	(2.087)	(4.264)
All or almost all friends from group	20.415**	20.219***	14.927***	22.760***
	(7.906)	(5.195)	(4.474)	(5.837)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.094	0.103	0.065	0.077
Observations	1684	501	1686	279

Standard errors in parentheses. SEs clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

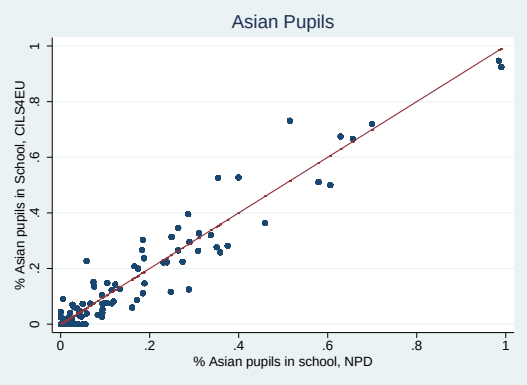
Table A10: Association between Ofsted ranking on ""The effectiveness with which the school promotes equality of opportunity and tackles discrimination" and intergroup attitudes

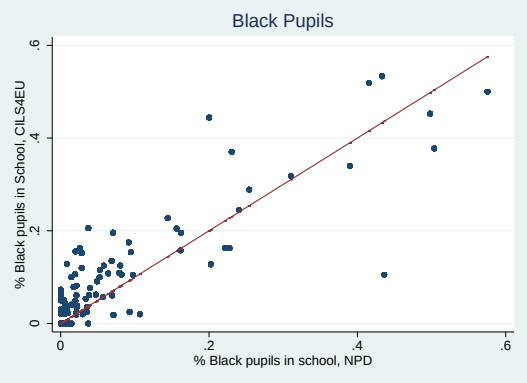
	White British warmth for Asian British	White British warmth for Black British	Asian British warmth for White British	Black British warmth for White British
OFTSED ranking of school's "equality and anti-discrimination" policy (ref.= "Good")				
"Outstanding"	3.862*	1.970	-0.061	0.705
	(2.044)	(1.549)	(2.030)	(3.886)
"Requires improvement"	4.278	2.410	-2.133	4.098
	(2.795)	(1.725)	(2.978)	(4.113)
School % Asian British	-2.997			
	(7.946)			
School % Black British		16.580**		
		(7.778)		
School % White British			13.305***	11.725**
			(3.248)	(5.430)
Personal Chars	Yes	Yes	Yes	Yes
R^2	0.067	0.040	0.057	0.041
Observations	1710	1713	503	284

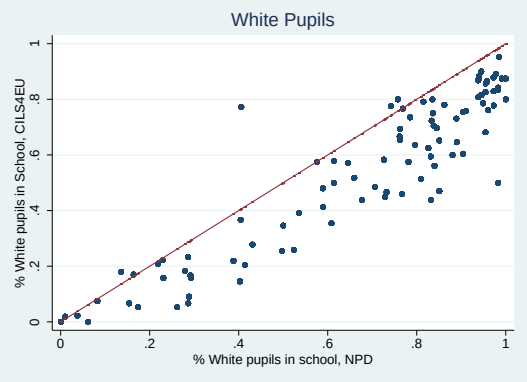
Standard errors in parentheses. SEs clustered at school level. Personal characteristics comprise: sex, number of books in the home, parental education, self-concept in English, self-concept in maths.
* p<0.10, ** p<0.05, *** p<0.01

Appendix Figures

Figure A1: Ethnic composition of Schools: CILS4EU sample and NPD 2010 compared

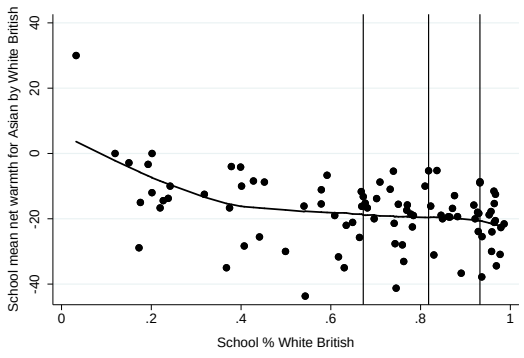
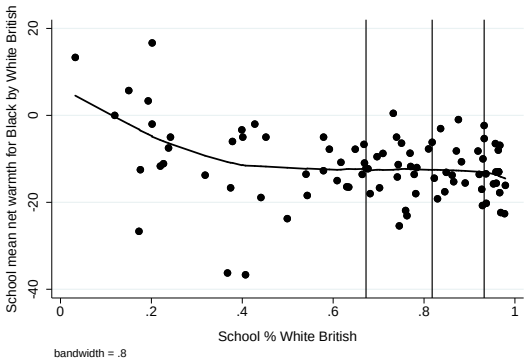






Note: An observation is a school. Source: CILS4EU and NPD

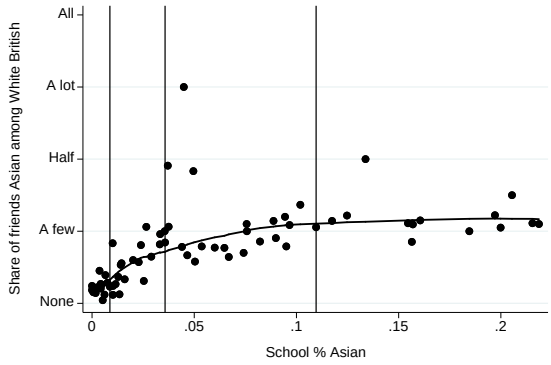
Figure A2: LOWESS of White British warmth for Asian British and Black British on share of White British in school

School mean white British warmth for Asian British by School Share White British	School mean white British warmth for Black British by School Share White British
	

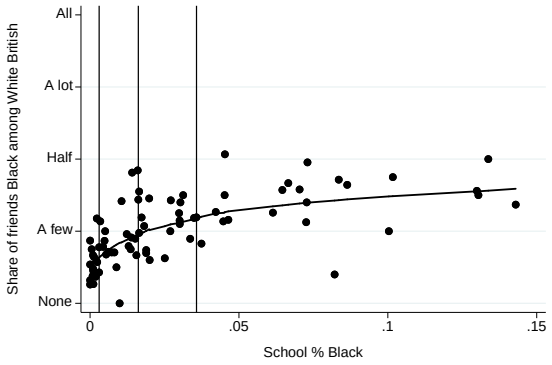
Note: Vertical lines at lower and upper quartile and median. X-axis range is up to 90th percentile of national distribution

Figure A3: LOWESS of Share of Friends from other ethnic groups, by Ethnic Composition of School

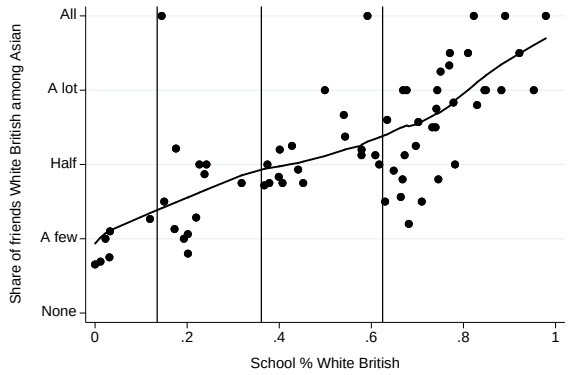
White British with share of friends who are Asian British by % Asian British in school



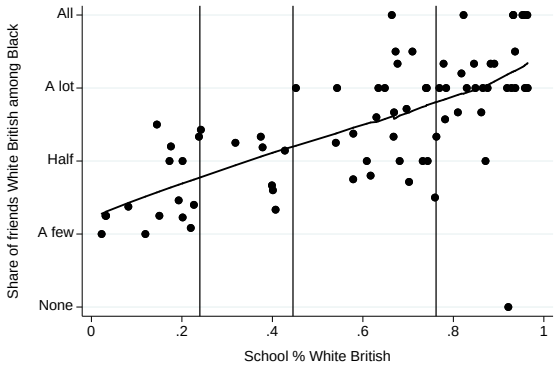
White British with share of friends who are Black British by % Black British in school



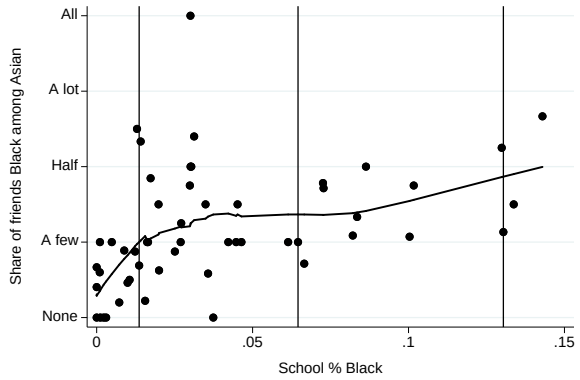
Asian British share of friends who are White British by % White British in school



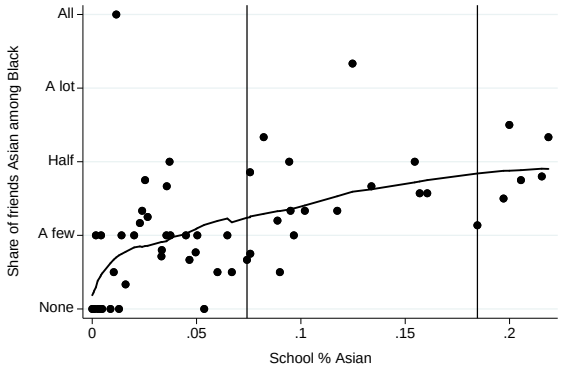
Black British share of friends who are White British by % White British in school



Asian British with share of friends who are Black British by % Black British in school



Black British share of friends who are Asian British by % Asian British in school



Source: CILS4EU, UK Sample, Wave 1 & NPD. Note: Vertical lines at lower and upper quartile and median. X-axis range is up to 90th percentile of national distribution