Ethnic variations in mental health among 10–15-year-olds living in England and Wales: The impact of neighbourhood characteristics and parental behaviour

Abstract

Several studies indicate that young people from certain ethnic minority groups in Britain have significant mental health advantages over their White majority counterparts, but the reasons for these differences have not been adequately explored. This work analyses the impact of neighbourhood characteristics, measured by socioeconomic deprivation; crime; living conditions; ethnic density and parenting behaviour on the mental health of young people. To determine the impact of these factors on mental health among young people, geocoded data from waves 1, 3 and 5 of the UK Household Longitudinal Study (*UKHLS*) are merged with small area statistics from the 2011 census, and multilevel linear regression models are fitted to the sample of 5,513 (7,302 observations) 10–15-year-olds of varying ethnicity residing in England and Wales. We find that mental health is generally poorer for White British youths, even after accounting for individual/family-level predictors, neighbourhood characteristics and parental behaviour than it is for minority youths. In keeping with results from studies of adult populations, neighbourhoods with high levels of deprivation are associated with poorer mental health. However, some aspects of parenting behaviour appear to have a more significant impact on the mental health of young people from ethnic minority backgrounds than on White British youths. Further research into factors that influence inter-ethnic disparities in mental health among young people is warranted, given that clear differences remain after the models in this study are fully adjusted.

Keywords: Children/adolescents; Ethnic density; Socioeconomic deprivation; Mental health; Neighbourhood

Introduction

It has been estimated that 20 percent of children and adolescents around the world suffer from some kind of mental disorder (WHO, 2016). The British Child and Adolescent Mental Health Survey 2004 found that one in ten children aged 5–15 had a diagnosable mental disorder (Green et al. 2005). Moreover, studies from the UK have found that some ethnic minority youths report better mental health and have lower prevalence of mental disorders than their White/White British counterparts (Goodman, Patel, and Leon 2010, 2008; Astell-Burt et al. 2012; Harding et al. 2015; Maynard, Harding, and Minnis 2007; Fagg et al. 2006; Green et al. 2005; Meltzer et al. 2000). The opposite relationship is seen among adults, with both an elevated risk (Breslau et al. 2005) and a higher prevalence (Rees et al. 2016; McManus et al. 2016) of mental health disorders in the Black, Asian and ethnic minority (BAME) population. For instance, first-time contact rates for psychotic disorder were three to five times higher for Blacks compared to other ethnic groups (Rees et al., 2016). The causes of this variation are understudied and inadequately explained by existing research on the topic. This work addresses this gap in the literature by providing empirical evidence on the impact of neighbourhood characteristics and parental behaviour on potential ethnic differences in the mental health of children/adolescents aged 10 –15 residing in England and Wales.

Previous research and theory

Neighbourhood characteristics and youth outcomes

A young person's development is significantly shaped by their neighbourhood and family, including forms of parenting and the parent-child relationship. For this reason, the neighbourhood and family are not only relevant but crucial starting points for understanding the factors that may affect young people's mental health during their formative years. The existing scholarship has shown that a person's neighbourhood accounts for 5 to 10 percent of the variance in a range of outcomes related to young people (Roosa et al. 2003). Likewise,

several studies have highlighted the potential role of parenting as a mediator and/or moderator of the effects of the neighbourhood (O'Connor and Scott 2007; Katz et al. 2007; Phoenix and Husain 2007). Following the work of Faris and Dunham (1939), the intricately linked factors of neighbourhood ethnic composition and socioeconomic deprivation have been associated with mental health among adults, with the magnitude and nature of the association varying between minority ethnic groups. Similarly, social disorganisation, is a construct that is known to be correlated with the level of crime, general living conditions and socioeconomic deprivation within British neighbourhoods (Markowitz et al. 2001), and has been shown to affect the social and health outcomes of young people (Kawachi, Kennedy, and Wilkinson 1999; Edwards and Bromfield 2010; Leventhal and Brooks-Gunn 2000). It is also now well established that ethnic minorities are over-represented in neighborhoods characterised by these factors, and a common finding is that health inequalities are explained by reduced area-level socioeconomic conditions (Bécares et al. 2011; Bécares, Nazroo, et al. 2012; Jonsson and Demireva 2018).

It has been suggested that minority group members are protected from adversities by ethnic density, defined as the percentage of the population in the respondent's area of residence that share the respondent's ethnicity, after adjusting for area-level socioeconomic deprivation (Faris and Dunham 1939; Pickett and Wilkinson 2008; Bhugra and Arya 2005; Das-Munshi et al. 2010; Bécares, Nazroo, et al. 2012; Aneshensel 2009). In line with this suggestion, there are several studies that used adult samples to examine ethnically dense neighbourhoods and shown that these residents do indeed enjoy better mental health, at least in the short term (Bécares, Nazroo, et al. 2012; Bécares, Nazroo, and Stafford 2009; Halpern and Nazroo 2000b).

However, there is little evidence supporting the ethnic density hypothesis as it relates to young people, and studies of this issue have yielded mixed results. Some researchers observed

beneficial effects of ethnic density on some indicators of mental health such as depressive symptoms, psychological distress, behavioural and cognitive problems (Gieling, Vollebergh, and van Dorsselaer 2010; Wickrama and Bryant 2003). But, at least one study indicated that this effect may be negative when the group is too large (Fagg et al. 2006), while another study recorded a generally negative effect (Abada, Hou, and Ram 2007), and others have found no effect of ethnic density on young people's mental health (Xue et al. 2005; Astell-Burt et al. 2012).

Opponents of the ethnic density hypothesis have argued that ethnic disparities in health are mainly caused by the residential concentration of ethnic minorities in poor socioeconomic circumstances (Williams and Collins 2001; Roland G. Fryer, Pager, and Spenkuch 2013; Wilson 1987). This school of thought suggests that living in 'racially segregated' neighbourhood environments determines access to health-related services and the quality of those services. This is because ethnic concentration correlates strongly with neighbourhood socioeconomic deprivation and adverse neighbourhood conditions such as actual and perceived rates of crime, the number of single parent households, lack of employment opportunities, as well as access to, and the use of social services such as healthcare (Roland G. Fryer, Pager, and Spenkuch 2013; Wilson 1987); all these factors have been shown to be associated with poor health both among adults and young people (Williams and Collins 2001; Leventhal and Brooks-Gunn 2000; Mair et al. 2010).

The link between neighbourhoods, parental behaviour and youth outcomes

Parenting behaviour is defined in terms of the parent-child interaction and relationship. According to Baumrind (1970, 1966), factors that distinguish different types of parenting behaviours are: (a) warmth and nurturing; (b) maturity demands; (c) control of the child's behaviour; and (d) communication between parent and child (that is, the extent to which the child's opinion is sought and listened to). There is evidence to support the theory that

parenting behaviours influence youth outcomes, but there is also sufficient data indicating that this influence does not act in a vacuum. While parenting behaviour is an important consideration, it is not only influential but is, in and of itself, influenced by wider environmental factors such as the neighbourhood.

The theoretical models informing this work generally suggest that neighbourhood effects on parental characteristics and parenting styles are strongest in socioeconomically disadvantaged neighbourhoods. Conger, Conger, and Martin (2010) developed a family stress model to explain the mediating effects of parental behaviour on youth outcomes. This model suggested that common stressors affecting people living in deprived situations may undermine the parent-child relationship and, thus, weaken or eliminate the associated positive effects on the child's mental well-being. This is because parents themselves might experience high levels of distress, leading them to adopt behaviours that are frequently related to negative youth outcomes. Jencks and Mayer (1990) proposed four models to explain how neighbourhood factors might affect parenting: the epidemic/contagion, collective socialisation, competition, and relative deprivation theory models. The competition and relative deprivation explanations state that residing in affluent neighbourhoods may adversely affect young people from more socioeconomically disadvantaged families. Conversely, the contagion and collective socialisation explanations state that neighbourhoods with residents of diverse economic backgrounds are more likely to be healthy and have few behavioural problems.

These theoretical frameworks have been used in several studies, particularly from the USA. For the most part, these frameworks implicated parental behaviour (and certain parenting styles) as an influential factor in explaining the healthy development of young people (Maynard and Harding 2010; Lee et al. 2014; Ceballo and McLoyd 2002; Leventhal and Brooks-Gunn 2000; Baumrind 1966, 1971; Conger, Conger, and Martin 2010; Jencks and

Mayer 1990). These studies confirmed that the neighbourhood environment is associated with parental behaviour, and that parental behaviour, in turn, influences youth outcomes. Studies have also highlighted socioeconomic deprivation, crime and disorder, and a lack of resources or social support as factors that may undermine effective parenting strategies (Ceballo and McLoyd 2002; Leventhal and Brooks-Gunn 2000; Byrnes and Miller 2012; Wilson 1996; Burton and Jarrett 2000; Furstenberg 1999).

Neighbourhoods with high levels of disorder and crime might disrupt both adult and youth behaviours and thereby influence the style of parenting that is adopted. In such areas, parents may adopt a more harsh/controlling parenting style to regulate the interactions of the child/adolescent with their environment (Furstenberg 1999; Burton and Jarrett 2000; Sampson, Morenoff, and Earls 1999). An alternative explanation (Sampson, Morenoff, and Earls 1999) for the adoption of a harsher, more controlling parenting style and ineffective parenting strategies that lack warmth and communication, is that parents residing in areas of high deprivation, and generally poor living conditions, become overwhelmed by these conditions. In these cases, parents may lack the energy to engage warmly with their children, (Byrnes and Miller 2012). The reverse might also be true; that is, parents with effective parenting strategies might be less likely to reside in more problematic neighbourhoods.

Research gaps

Notwithstanding the wealth of literature in this area, relatively few studies have focused on the role of ethnicity and/or other potentially relevant factors such as socioeconomic, language, cultural, and religious beliefs and practices on parenting. This has meant that subsequent mental health outcomes related to these factors have remained understudied. Furthermore, among the studies that have explored ethnicity, few have examined “White ethnic groups” or acknowledged that even within this categorisation there are minority and majority groups. For instance, previous studies have shown that health reporting varies among individuals self-

identifying as White Irish, Welsh and Gypsy/Irish travellers (ONS 2013; Cemlyn 2009; Becares 2015). These studies have also shown that there are important distinctions between White ethnic groups with respect to health-related measures, such as labour market participation, general socioeconomic conditions, education, and area of residency (ONS 2013; Cemlyn 2009). In addition, the 2011 UK census showed that the proportion of White UK residents born in other European Union (EU) member states has increased over time. If the parenting style of this population differs from that of the White British population, this demographic change could affect the validity of previous parenting studies that simply categorise migrating families from the EU as 'White. The consequences of these potential differences in parenting styles for youth outcomes deserves greater attention. We therefore sought to determine whether there were significant mental health differences between White British youth and youths from Welsh and other White backgrounds.

Further, most research on parenting and its relationship to neighbourhood has been done in the United States (US), and whilst these are interesting and provide relevant insights, they might not be completely applicable in discussions relating to youth outcomes in Britain. Whilst, there are also certain historic similarities between the US and the UK, there are also many differences between the two countries in terms of neighbourhood ethnic, social, economic and cultural make-up. Thus, additional studies from the British context maybe particularly important for increasing our understanding of how the relationship between parenting and neighbourhoods might promote or mitigate the mental health of young people.

As they are less mobile than adults, young people are more likely to spend a greater proportion of their time in and around their area of residence, so their neighbourhood context may significantly affect outcomes relating to their health and well-being (Allison et al. 1999). Therefore, to understand properly the mechanisms that contribute to ethnic disparities in young people's mental health, it is necessary to use an integrated approach that accounts for

differences between neighbourhoods in which young people reside. Disentangling the factors influencing the mental health of young people may also reveal pertinent risk factors and important areas of focus for future interventions, as well as inform policy and treatment. As many mental health difficulties among adults begin early in life (Kessler et al. 2005; De Girolamo et al. 2012), early treatment or risk-reducing interventions targeting youths could reduce the individual and societal costs associated with long-term and undiagnosed mental health difficulties (Davies et al. 2013; Health 2011).

Research aim

As demonstrated above, the literature indicates that (i) children's mental health outcomes are sensitive to neighbourhood characteristics and vary with ethnicity (Leventhal and Brooks-Gunn 2000; Xue et al. 2005; Edwards and Bromfield 2010; Zhang et al. 2017; Astell-Burt et al. 2012); (ii) parental behaviour influences youth outcomes such as social competency, high risk health behaviours, aggressive behaviour, delinquency, and various measures of mental health (O'Connor and Scott 2007); and (iii) parental behaviour both influences, and is influenced by, neighbourhood characteristics (Ceballo and McLoyd 2002; Leventhal and Brooks-Gunn 2000; Byrnes and Miller 2012; Wilson 1996; Burton and Jarrett 2000; Furstenberg 1999; Sampson, Morenoff, and Earls 1999).

However, previous research on neighbourhood effects and ethnic disparities in mental health may have been hampered by the use of small samples and regional data restricted to specific geographic areas. Data sets including large representative samples of young people in the age group considered in this paper are rare (Fagg et al. 2006; Astell-Burt et al. 2012; Harding et al. 2015; Maynard and Harding 2010; Maynard, Harding, and Minnis 2007). To overcome this issue, this study draws on a rich national data source, the UK Household Longitudinal Study (*UKHLS*), which was linked to aggregated geocoded data from the 2011 UK census. Using the large resultant data set, we investigate the impact of neighbourhood

characteristics and parenting behaviour on mental health difficulties among White British youths, Welsh, other Whites (including Scottish and Northern Irish participants residing in England) and BAME youths aged 10–15 residing in England and Wales. The specific research questions examined are:

- To what extent can ethnic variations in mental health among youths be attributed to individual and family characteristics?
- Are ethnic variations in mental health mediated by parental behaviour and neighbourhood characteristics (including ethnic composition, socioeconomic deprivation, the living environment, and levels of crime and disorder)?

Material and methods

Survey

Data for this analysis were drawn from multiple sources. Individual-level data were taken from waves 1, 3, and 5 of *Understanding Society*, the *UKHLS* (University of Essex – Institute for Social and Economic Research 2015), while neighbourhood-level data were based on geocoded administrative data collected in the 2011 UK census (ONS 2017).

Individual data: The *UKHLS* is an annual longitudinal household panel survey that started in 2009, with a nationally representative and stratified cluster sample of around 40,000 households living in the United Kingdom. Within households where adults were interviewed, oral consent was obtained from parents and/or guardians for household members aged 10–15 to complete a self-reported questionnaire. The sample for this study therefore consisted of children of adult panel members, for whom parental consent to participate was granted, and who responded to the questionnaire (Knies 2017).

Neighbourhood data: Neighbourhood data were derived from geocoded, census-defined small area statistics at the so-called middle super output area (MSOA) level. MSOAs have a

minimum residential size of 5,000 individuals and 3,000 households, with an average population size of 7,500. The use of MSOAs made it possible to link aggregated area-level variables taken from the 2011 census to the *UKHLS*. This was the lowest level of aggregation permissible for this study given issues of identification.

The use of the *UKHLS* as a secondary data source and its linkage to administrative data were approved by the University of Essex Ethics Committee.

Sample

We investigated the sources of missing values to determine whether the data should be modelled by imputation or handled by listwise deletion. This analysis revealed three major sources of non-response. Notably, several items included in the Townsend deprivation index had missing values for some neighbourhoods. Consequently, there were 211 MSOAs for which this index could not be calculated, this affected 7% of the original sample. In addition, approximately 15% of children did not disclose their ethnicity. Finally, information on length of residence (used as a control variable in this work) was unavailable for children drawn from a sample related to the British Household Panel Survey (BHPS). The BHPS was incorporated into the UKHLS during wave 2, so its respondents became part of our samples for waves 3 and 5. Length of residence data was unavailable for these sample members because the UKHLS only collected this information from participants if they had not previously been interviewed, and BHPS participants were considered to have previously been interviewed. This affected 9.5% of the sample. As the cases with missing values did not differ greatly from the original sample, listwise deletion was not expected to introduce appreciable bias, and was therefore used in preference to imputation. Table SA1 of the supplementary appendix shows the mean values of the main variables used in the analysis for the complete and excluded cases and the proportion of the full sample affected by missing values.

After listwise deletion of variables with missing information, attrition, and the inclusion of new survey participants, the final sample used in this analysis consisted of 5,513 (7,302 observations) 10–15-year-olds of varying ethnicity residing in England and Wales. Attrition may have occurred due to non-response or a lack of contact with a family that participated in an earlier wave. The sample also changed when young people aged 15 or younger became ineligible for the youth survey at age 16, when younger children became eligible for inclusion upon reaching the age of 10 and thus entered the youth panel, and when children of an appropriate age joined households participating in the survey. Table 1 below shows the sample size for each wave before and after listwise deletion, along with the proportion of new and retained participants for each wave.

Table 1. Sample sizes across data waves

Wave	Sample	Sample after listwise deletion	New participants	Participants from previous wave
1 (2009 – 2011)	4366	3366	3366 (100 %)	
3 (2011– 2013)	3711	2138	1093 (51.1%)	1045 (48.9%)
5 (2013 – 2015)	3113	1798	854 (47.5%)	944 (52.5%)

Source: Understanding Society (2015), *Waves 1, 3 and 5, linked with data from the 2011 UK Census.*

Dependent variable

The dependent variable, *mental health difficulties*, was measured using the responses provided in waves 1, 3 and 5 of the self-reported version of the Strengths and Difficulties Questionnaire (SDQ). A copy of this questionnaire is given in appendix SA2. This widely-used and cross-nationally validated screening instrument includes 25 items and five subscales that are suggested to capture four areas of potential difficulty (emotional symptoms, conduct problems, hyperactivity-inattention, peer relationship problems) and one area of strength

(prosocial behaviour) (Goodman 1997; Goodman, Meltzer, and Bailey 1998). Responses are based on a three-point scale, ranging from 1 [Not true] to 3 [Certainly true]. A total difficulties score (TDS) ranging from 0 to 40, representing increasing mental health difficulties, is derived by summing the scores on the first four of these subscales. According to Goodman (1997), the absence of prosocial behaviour cannot be equated with the presence of mental health difficulties.

Individual and family predictors

The key explanatory variable, *self-identified ethnicity*, was measured using the responses to an item asking respondents to select the option most appropriate to themselves from a list of 18 ethnic identities defined in the UK census. These remained unchanged throughout the study period. Due to small subsample sizes, we collapsed responses regarding ethnicity into four ethnic categories: White British, Welsh, other Whites (including Scottish and Northern Irish participants residing in England), and BAMEs. The consequences of combining ethnicities into larger groups in this way are addressed in the Discussion.

Parental behaviour was measured by a series of questions regarding the frequency of certain activities/behaviours undertaken between parents and their children. These were the frequency of time spent doing leisure activities, eating dinner together, talking about important matters, giving praise, cuddling the child, involving the child in setting rules, shouting at the child, and spanking or slapping the child. The correlations between the items ranged from $r = 0.11$ to $r = 0.38$ (between cuddling and praising). The weak correlation between the items implied that there was no underlying latent factor that could be termed parenting behaviour, so the average parental behaviour for each item was examined separately in the model, with the exception of quarrelling, which correlated too strongly with shouting ($r = 0.53$) and was thus omitted from the analysis. This decision did not affect the results. In alternative models with shouting replaced by quarrelling, the effect of quarrelling was

335 marginally but smaller than that of shouting, and differences between ethnicities in its effect
336 were less pronounced but had the same direction.

337 Prior studies have highlighted the importance of accounting for the individual-level and
338 family-level predictors used in this study when assessing neighbourhood variation in young
339 persons' mental health (Fagg et al. 2006; Meltzer et al. 2000). The individual variables used
340 in this study were youth's age and gender. The models also included socioeconomic and
341 demographic characteristics of the parents that may predispose families to live in particular
342 neighbourhoods and/or influence the parent-child relationship. These were: lone parent
343 household, household income (log), parents' age, indicators of whether one or both parents
344 were born abroad, at least one parent in the household working, length of residency in the
345 neighbourhood (entered as a categorical variable), parents' highest level of education, and
346 parents' physical and mental health as measured by the 12-item Short Form Health Survey
347 (SF-12, SA3). All parental variables were averaged between the two parents with the
348 exception of education, for which the result for the parent with the highest level of
349 educational attainment was used. If a child resided in a single parent household, the
350 information for that parent was used. Across all three waves, 92% of the information on single
351 parent households came from households headed by a single mother.

352

353 ***Neighbourhood predictors***

354 Neighbourhood own group *ethnic density* was defined as the percentage of individuals living
355 in the respondent's MSOA that belonged to his/her ethnic group (Halpern and Nazroo 2000a;
356 Pickett and Wilkinson 2008). Furthermore, in keeping with previous work on the effects of
357 neighbourhood characteristics on children and adolescents, several measures (socioeconomic
358 status, crime and disorder, and indicators of the indoor and outdoor living environment) found
359 to influence the health and well-being of young people were included in the models

(Leventhal and Brooks-Gunn 2000; Astell-Burt et al. 2012; Wilson 1996, 1987). The first of these measures was *Neighbourhood living environment,* which is an indicator of the indoor and outdoor quality of the local environment. This measure was created by combining four indicators (an assessment of social and private housing in poor condition, the proportion of houses without central heating, air quality, and numbers of road traffic accidents involving injury to pedestrians and cyclists). This domain was coded so that higher scores indicated higher levels of deprivation, i.e. a higher probability that the neighbourhood contains, for example, a relatively high proportion of houses without central heating (McLennan et al. 2011; Noble et al. 2000). In addition, the *Crime Domain* of the indices of deprivation was used as a proxy for the risk of personal and material victimisation at the small area level. This domain consists of the recorded crime rate for four major types of crime (burglary, theft, criminal damage and violence). This was also coded so that higher scores indicated higher levels of crime (McLennan et al. 2011; Noble et al. 2007; Noble et al. 2000). Finally, the *Townsend Material Deprivation Index*, which was used to further adjust the models for area-level deprivation. This is a measure of socioeconomic disadvantage consisting of four aggregate-level variables gathered in the census: the percentage of households without access to a car or van, the percentage of households with more than one person per room (overcrowding), the percentage of households not owner-occupied (tenure), and the percentage of unemployed economically active residents, excluding students (Townsend, Phillimore, and Beattie 1988). The Pearson correlation matrix, mean (SD), and range of the items measuring parental behaviours and neighbourhood characteristics are given in Tables SA4 and SA5 respectively.

Finally, wave (i.e. the year of data collection) was included as a variable in every model to control for, and assess changes in, outcomes over the studied calendar period.

Statistical analysis

Three-level multilevel linear regression models capturing the nested relationship between the neighbourhood (level 3), individual (level 2) and the three waves of data collection (level 1), were fitted using the lme4 package of the R programming language. The models have the form:

$$y_{ijk} = \beta_0 + \beta_1 X_{1ijk} + \beta_2 X_{2jk} + \beta_3 X_{3k} + v_k + u_{jk} + e_{ijk} \qquad (1)$$

where person-waves *ijk* are nested in persons *jk*, which in turn are nested in neighbourhoods *k*. v_k and u_{jk} are neighbourhood and person random intercepts, which (like the person-wave error term e_{ijk}) are normally distributed with mean 0 and standard deviations σ_v^2, σ_u^2, and σ_e^2, respectively. Multilevel models of this sort make it possible to partition and explain variation in mental health over time, across individuals and at the neighbourhood level. Moreover, by using a multilevel model, we can account for the fact that the *UKHLS* sampled young people from the same MSOAs, and thus control for the similarities in these neighbourhoods while increasing the precision of the estimates. Modelling was carried out sequentially using a series of nested models. The initial models were pooled in which the factors impacting the mental health of all ethnic groups were examined simultaneously. This was followed by separate sequential analyses for each of the studied ethnic groups using the following five models of young people's mental health.

Model 1. A three-level model with individual-level predictor variables for young people in the fixed part of the model. This model was adjusted for gender, age and wave, and was used to identify potential differences in the reporting of mental health among BAMEs, Welsh, or other Whites relative to White British youths.

Model 2. Identical to Model 1 except that the fixed part includes all family-level predictors as well as all individual predictors. This model assesses whether and the extent to which family-level predictors explain the difference in mental health among BAMEs, Welsh, or other Whites relative to White British youths.

412 Model 3. Identical to Model 2 except that its fixed part also includes parental behaviour. As
413 such, this model estimates the extent to which parental behaviour explains differences in
414 mental health among the studied groups.
415 Model 4. Identical to Model 2 but in addition to the individual and family–level predictors,
416 this model considers the fixed effect of neighbourhood-level ethnic density and
417 socioeconomic deprivation. As such this model estimates the extent to which these effects
418 explain area-level variation in the mental health of youths from various ethnic groups.
419 Model 5. Identical to Model 2 except that its fixed part includes the effect of neighbourhood-
420 level crime and the living environment. This model thus estimates the extent to which
421 neighbourhood-level ethnic density, crime, and the living environment explain area-level
422 variation in the mental health of youths from various ethnic groups.
423 Beyond the models described above, additional interaction models were tested to evaluate
424 ethnic differences in parental behaviour, to determine whether there was any relationship
425 between neighbourhood ethnic density and parental behaviour, and to see if neighbourhood
426 deprivation had any effect on this relationship.
427 Sensitivity analyses were carried out to investigate possible cross-level effects because 3%
428 (160) of young people had moved between waves and were therefore cross-classified between
429 different MSOAs. The cross-classified models yielded results that did not differ in any
430 significant or substantive way from those obtained with the hierarchical models, so we
431 rejected the cross-classified models in favour of the more parsimonious three-level models
432 described above.
433
434 **Results**
435 ***Sample description***
436 A breakdown of the total sample across all three waves indicated that (as expected) White
437 British youths formed the largest group (67% of the study sample), followed by BAMEs

438 (27%). Youths categorised as Welsh and other Whites accounted for 3% and 2% of the total
439 sample, respectively. Table 2 shows the estimated individual and neighbourhood
440 characteristics for each ethnic group. There are clear differences between ethnic groups with
441 respect to several factors that we expect to be associated with mental health, including the
442 proportion of single parent households, parental physical and mental health, parents' highest
443 level of education, and length of residence in the neighbourhood.

444 Variation was also observed in parental behaviour: parents of White British and other
445 White ethnicities, on average, spent more leisure time with their children and ate dinner with
446 their children more frequently. Compared to BAME parents, parents from other ethnic groups
447 were less likely to spank/slap their children but exhibited similar behaviour with respect to
448 shouting, involving their children in rule setting, and cuddling or praising their children.
449 There was also appreciable inter-ethnic variation with respect to neighbourhood
450 characteristics, with clear gradients in various neighbourhood characteristics among the ethnic
451 groups. Compared to BAME youths, White British youths were less likely to reside in areas
452 with high levels of crime or economic and/or environmental deprivation.

453

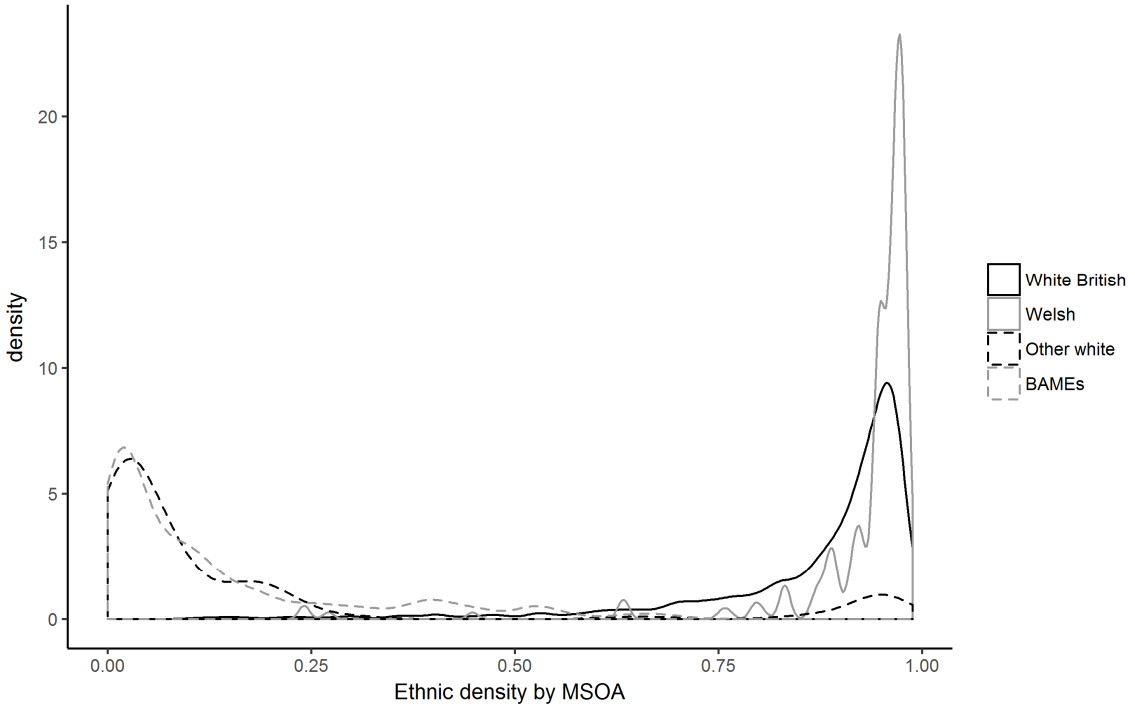

Fig. 1 Proportion of young people aged 10–15 from similar ethnic groups across neighbourhoods (Kernel-Density plot).
Source: Understanding Society (2015), *Waves 1, 3 and 5, linked with data from the 2011 Census.*

Figure 1 shows the distribution of the proportion of co-ethnic young people across different neighbourhoods. It is readily apparent that the proportion of co-ethnic residents is widely distributed for White British, but not for Welsh and all other ethnic groups. However, the Welsh sample was too small for these effects to dominate in a pooled model. BAMEs and other Whites are more likely to reside in diverse neighbourhoods with lower proportions of own-group members at the neighbourhood-level.

Results for individual/family characteristics

Separate inspection of the coefficients for the covariates in the fixed part of the model examining the individual and family characteristics associated with young people's mental health (Table SA6) revealed that having at least one parent in employment, and living in a single parent household are all likely to result in poor mental health. In contrast, older parents, whether having at least one parent born outside of the UK, residing in an area for ten years or more, having a parent without mental health issues, and having a parent with higher education

were associated with better mental health among young people. Interestingly, these analyses revealed no significant differences in mental health by youth age or gender, and there were no significant changes in mental health over time.

Results from models examining mental health difficulties for the total sample

Table 3 shows the results obtained for the pooled model which used the complete sample (n = 5,513). The negative coefficients for the ethnic minority groups indicate that they have better mental health than White British youths, in keeping with previous findings. The changes in the coefficients of Model 1 reflect the effects of parental/familial characteristics and parental behaviour or neighbourhood characteristics. These changes indicate that, relative to young people identifying themselves as White British, all other ethnic groups report fewer total difficulties (i.e. better mental health). There is, however, some variation by ethnicity. For example, these differences are significant for BAMEs and other Whites, but small and non-significant for young people with a Welsh background.

These findings for BAMEs persist across every tested model, with some indication that family characteristics is strongly associated with mental health (Model 2). When the models are adjusted for parental behaviour (Model 3), the relationship between mental health among BAMEs compared to White British youths remains strong. This suggests that parenting behaviour does not explain and, if anything, increases the gap in mental health between BAMEs and White British youths. This is illustrated by the fact that the coefficients of Model 3 are greater than those of Model 2 and remained highly significant. For the categories of other Whites and Welsh, there is a negligible decline in mental health, which remained non-significant. However, specific aspects of parental behaviour (Appendix SA6, Model 3) was related to the better mental health of youths from these groups. In particular, the frequency of leisure time spent with other Whites and Welsh predicted better mental health, while worse

497 mental health was found among these groups if their parents reported discussing important
498 matters, shouted, or slapped them.

Table 2 Description of individual-level and MSOA-level variables used in the models to examine the relationship between mental health, ethnicity, parental behaviour and neighbourhood characteristics.

	(White British, n = 4, 918)			*(Welsh, n = 224)*			*(other Whites, n = 174)*			*(BAMEs, n = 1,986)*		
	Mean/ Freq	*SD/ Percent*	*range*	*Mean/ Freq*	*SD/ Percent*	*range*	*Mean/ Freq*	*SD/ Percent*	*range*	*Mean/ Freq*	*SD/ Percent*	*range*
Individual level												
Youth a girl	2458	50.0%	0/1	120	53.6%	0/1	81	46.6%	0/1	1003	50.5%	0/1
Youth age	12.53	1.69	10/15	12.83	1.56	10/15	12.57	1.77	10/15	12.55	1.71	10/15
Wave												
1	2227	45.3%	0/1	99	44.2%	0/1	71	40.8%	0/1	969	48.8%	0/1
3	1460	29.7%	0/1	79	35.3%	0/1	52	29.9%	0/1	547	27.5%	0/1
5	1231	25.0%	0/1	46	20.5%	0/1	51	29.3%	0/1	470	23.7%	0/1
Household income (log)	8.00	0.53	4.93/9.9	7.82	0.52	6.5/9.14	7.93	0.55	6.17/9.66	7.88	0.56	4.97/9.9
At least one parent works	4211	85.6%	0/1	177	79.0%	0/1	140	80.5%	0/1	1478	74.4%	0/1
Single parent	1232	25.1%	0/1	79	35.3%	0/1	60	34.5%	0/1	566	28.5%	0/1
Parent's mental health	48.63	8.87	5.69/69.73	48.58	9.45	8.9/67.36	49.03	9.73	9.03/65.09	48.19	9.83	3.04/70.96
Parent's physical health	52.22	8.28	11.14/70.49	50.82	9.79	14.21/68.18	52.95	7.13	24.01/68.54	49.67	9.16	12.4/68.77
Parent's age	42.65	6.10	25/75	41.74	6.52	27/71	41.95	6.20	27/60	41.99	5.86	21/73
Parent's education												
Degree	1489	30.3%	0/1	58	25.9%	0/1	82	47.1%	0/1	692	34.8%	0/1
Other higher degree	860	17.5%	0/1	41	18.3%	0/1	20	11.5%	0/1	252	12.7%	0/1
A-levels or similar	1037	21.1%	0/1	47	21.0%	0/1	21	12.1%	0/1	352	17.7%	0/1
GCSE or similar	1067	21.7%	0/1	60	26.8%	0/1	15	8.6%	0/1	320	16.1%	0/1
Other qualification	277	5.6%	0/1	6	2.7%	0/1	24	13.8%	0/1	147	7.4%	0/1
No qualification	188	3.8%	0/1	12	5.4%	0/1	12	6.9%	0/1	223	11.2%	0/1
Parent's birthplace												
Both parents UK born	4134	84.1%	0/1	189	84.4%	0/1	49	28.2%	0/1	461	23.2%	0/1
One parent non-UK born	717	14.6%	0/1	33	14.7%	0/1	63	36.2%	0/1	707	35.6%	0/1
Both parents non-UK born	67	1.4%	0/1	2	0.9%	0/1	62	35.6%	0/1	818	41.2%	0/1
Length of residence												
1 year or less	166	3.4%	0/1	8	3.6%	0/1	12	6.9%	0/1	106	5.3%	0/1
2–3 years	371	7.5%	0/1	11	4.9%	0/1	34	19.5%	0/1	173	8.7%	0/1

4–10 years	2101	42.7%	0/1	87	38.8%	0/1	80	46.0%	0/1	904	45.5%	0/1
10 years or longer	2280	46.4%	0/1	118	52.7%	0/1	48	27.6%	0/1	803	40.4%	0/1
Parental behaviour												
Leisure time	3.50	1.18	1/6	3.35	1.31	1/6	3.57	1.28	1/6	3.18	1.25	1/6
Eat dinner	3.38	0.79	1/4	3.20	0.97	1/4	3.43	0.74	1/4	3.50	0.77	1/4
Talk about important matters	3.31	0.77	1/4	3.35	0.78	1/4	3.42	0.74	1/4	3.39	0.77	1/4
Praise	3.76	0.41	1/4	3.71	0.45	2/4	3.68	0.51	1/4	3.69	0.47	1/4
Cuddle	3.71	0.53	1/4	3.60	0.67	1/4	3.78	0.40	2/4	3.67	0.58	1/4
Involve youth in rule setting	2.50	0.86	1/4	2.34	0.94	1/4	2.55	0.89	1/4	2.57	0.93	1/4
Shouting	2.99	0.71	1/4	2.90	0.73	1/4	2.89	0.65	1/4	2.89	0.78	1/4
Spanking or slapping	1.25	0.50	1/4	1.18	0.44	1/3	1.24	0.45	1/3	1.40	0.63	1/4
Neighbourhood level												
Ethnic density	0.87	0.15	0.09/0.99	0.93	0.10	0.24/0.99	0.16	0.28	0/0.97	0.13	0.16	0/0.77
Deprivation												
Q1-least deprived	1135	23.1%	0/1	26	11.6%	0/1	19	10.9%	0/1	98	4.9%	0/1
Q2	1105	22.5%	0/1	70	31.2%	0/1	28	16.1%	0/1	121	6.1%	0/1
Q3	1143	23.2%	0/1	49	21.9%	0/1	36	20.7%	0/1	162	8.2%	0/1
Q4	884	18.0%	0/1	61	27.2%	0/1	36	20.7%	0/1	286	14.4%	0/1
Q5-most deprived	651	13.2%	0/1	18	8.0%	0/1	55	31.6%	0/1	1319	66.4%	0/1
Crime												
Q1-least deprived	1169	23.8%	0/1	52	23.2%	0/1	35	20.1%	0/1	51	2.6%	0/1
Q2	1103	22.4%	0/1	48	21.4%	0/1	32	18.4%	0/1	137	6.9%	0/1
Q3	967	19.7%	0/1	51	22.8%	0/1	27	15.5%	0/1	294	14.8%	0/1
Q4	922	18.7%	0/1	30	13.4%	0/1	36	20.7%	0/1	686	34.5%	0/1
Q5-most deprived	757	15.4%	0/1	43	19.2%	0/1	44	25.3%	0/1	818	41.2%	0/1
Living environment												
Q1-least deprived	1289	26.2%	0/1	37	16.5%	0/1	34	19.5%	0/1	110	5.5%	0/1
Q2	1091	22.2%	0/1	63	28.1%	0/1	23	13.2%	0/1	156	7.9%	0/1
Q3	1024	20.8%	0/1	32	14.3%	0/1	39	22.4%	0/1	252	12.7%	0/1
Q4	913	18.6%	0/1	50	22.3%	0/1	41	23.6%	0/1	509	25.6%	0/1
Q5-most deprived	601	12.2%	0/1	42	18.8%	0/1	37	21.3%	0/1	959	48.3%	0/1

Note: Deprivation refers to Townsend Deprivation Index, Q1–Q5 refers to neighbourhood quintiles. Education variables categorised: A- level or similar includes Welsh baccalaureate; international baccalaureate; higher grade/advanced higher; certificate of sixth year studies. GCSE/O-level or similar includes CSE; standard/ordinary (o) grade / lower

499

Table 3 Ethnicity related coefficients [ab] derived from multilevel linear regression of mental health with respect to ethnicity, individual/family characteristics, parental behaviour and neighbourhood characteristics among young people.

	Ethnicity (comparison group: White British)					
	Other Whites	Welsh	BAMEs	Neighbourhood variance	Individual variance	Variance of Time
	Coeff (SE)	*Coeff (SE)*	*Coeff (SE)*			
Model 1 (Individual characteristics)	-0.93* (0.44)	-0.53 (0.41)	-1.13*** (0.17)	1.81	3.77	3.73
Model 2 (+ family/parental characteristics)	-0.56 (0.45)	-0.57 (0.41)	-0.75*** (0.21)	1.66	3.65	3.74
Model 3 (+ parental behaviour)	-0.57 (0.45)	-0.56 (0.41)	-0.83*** (0.21)	1.53	3.56	3.77
Model 4 (mode1 2 + deprivation and ethnic density)	-0.71 (0.55)	-0.61(0.41)	-0.97* (0.40)	1.65	3.65	3.74
Model 5 (model 2+ crime and living environment)[c]	-0.77 (0.55)	-0.54 (0.41)	-1.01* (0.40)	1.66	3.65	3.74

*Notes: *p<0.05;** p<0.01;*** p<0.001. Models are sequentially adjusted.*

[a] Individual/parental characteristics included: sex, age, parents' age, single parent household, parents' highest educational qualification, parents' mental health, parents' physical health, nativity, household income (log), length of neighbourhood residency and waves.
[b] For complete set of results, see Appendix SA3.
[c] The effect of crime and the living environment alongside ethnic density was assessed in this model without deprivation because of the strong correlation between these variables.
Source: *Understanding Society (2015),* Waves 1, 3 and 5, linked with MSOA-level data from Census 2011.

To further investigate the impact of neighbourhood characteristics and parental behaviour, separate models examining the mental health of young people from each ethnic group were analysed. The results, which are shown in Figure 2, indicate a strong and significant association between deprivation and the mental health of White British youths, and only weakly significant relationship for Welsh youths. However, deprivation was not related to the mental health of young people from any other ethnic group.

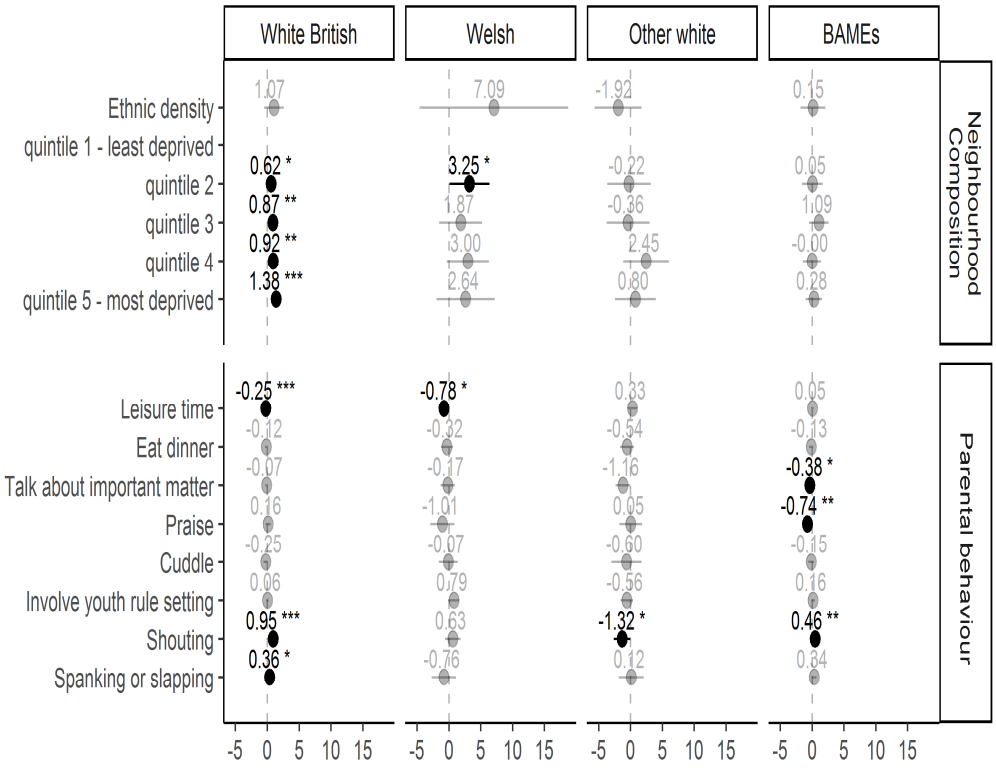

Figure 2. Coefficients from models examining the association between ethnic density, socioeconomic deprivation and parenting behaviour on the mental health of young people aged 10–15. Models were analysed for each ethnic group separately. More negative coefficients correspond to lower total difficulties scores (i.e. better mental health). *Notes: *p<0.05;** p<0.01;*** p<0.001*

The effect of parenting varied by ethnicity. The mental health of Welsh and White British youths increased significantly with the frequency of social interaction with their parents (i.e. the amount of leisure time spent together). Shouting and spanking appeared to have the most negative impact on the mental health of White British youths. Although shouting was also associated with poor mental health for BAMEs, it appeared to be associated with better

mental health for other Whites. Discussing important matters with parents and receiving praise were associated with better mental health among BAME young people, whereas the parental behaviour with the most significant impact on mental health among Welsh youths seemed to be leisure time spent with parents.

The results presented in Figure 2 show differences between White British youths and those from Welsh and other White backgrounds**.** The initial pooled models included the assumption that the factors impacting mental health in these groups were identical. However, the results of the separate analyses indicated that young people self-identifying as White British generally fare worse than other Whites and Welsh youths when parental behaviour and socioeconomic deprivation are considered.

We also fitted additional interaction models (not shown here) that confirmed the existence of significant inter-ethnic differences in parenting behaviour. However, models fitted to determine whether neighbourhood ethnic density enhanced the effect of certain parental behaviours on young people's mental health were not supported, and neither were models fitted to determine the effect of the level of deprivation. The results for these models are available from the authors upon request.

Results for the other subscales

Differences in the results for each of the four subscales included in the total difficulties score (TDS) are responsible for the observed variation in the mental health of young people (see results given in SA7.1–A7.4). An examination of the subscales indicated that relative to White British youths, all other ethnic groups had lower levels of mean emotional symptoms, hyperactivity-inattention and peer relationship problems. Specifically, BAMEs had lower mean scores on all three subscales described above, Welsh youths on average reported having good peer relationships, and other Whites reported lower mean scores on the hyperactivity-inattention subscale relative to White British youths. There were no detectable differences in

543 the association between conduct problems among White British youths and all other ethnic
544 groups.
545
546 **Discussion**
547 The findings reported here support the results of prior research on inter-ethnic disparities in
548 mental health among young people at the individual and neighbourhood levels. Specifically,
549 earlier studies showed that a relatively small but significant proportion of the variation in
550 mental health as measured by SDQ is associated with socioeconomic deprivation (Harding et
551 al. 2015; Fagg et al. 2006), while other work has found that parenting behaviour might be a
552 contributing factor (Maynard and Harding 2010).
553 The neighbourhood characteristics considered in this work were more weakly related to
554 the mental health of BAMEs than to that of White British youths. In fact, our data provide no
555 indication that these factors strongly influence the mental health of young people from any
556 ethnic group, including those of Welsh and other White ethnicities. These results were
557 somewhat surprising because the descriptive statistics indicate that neighbourhood
558 characteristics vary greatly with ethnicity. The fact that inter-ethnic disparities in mental
559 health were not fully explained by the neighbourhood characteristic included in the models
560 may indicate that the relationship between neighbourhood characteristics and mental health
561 outcomes among young people is based on a complex set of interactions that was captured by
562 the models and the data.
563 Fagg et al. (2006) speculated that the neighbourhoods included in their study might have
564 lacked variation, and that this limited heterogeneity may have contributed to the finding that
565 socioeconomic disadvantages were not related to psychological distress among young people.
566 However, the data used in this work were drawn from a national sample with the necessary
567 heterogeneity in measures of neighbourhood characteristics. Given this fact, how do we
568 explain the observed ethnic differences? We suggest that our results may be due to the age of

569 the participants in our sample. It may be that the influence of friends and parents, together
570 with family circumstances, are more important than neighbourhood characteristics in
571 determining whether young people have mental health difficulties. Earlier studies also
572 suggested that younger people may lack the mobility and social autonomy necessary for the
573 types of interactions with the neighbourhood that might affect mental health (De Clercq et al.
574 2012).

575 Our results also indicate that while deprivation by itself seemingly has little effect on the
576 mental health of young BAMEs, it is an important driver of the effects witnessed for White
577 British youths. For instance, the stratified models in which the mental health of each ethnic
578 group was examined separately indicated that mental health difficulties were more common
579 among White British youths residing in deprived neighbourhoods, and it is these effects that
580 usually increase the gap between the mental health of White British youths and BAMEs. A
581 similar result has been found among adult populations, where the detrimental association
582 between deprivation at the neighbourhood-level and health perceptions was greater in
583 magnitude and stronger for White British people than ethnic minority group members
584 (Bécares, Nazroo, et al. 2012; Jonsson and Demireva 2018).

585 One might also argue, since deprivation is strongly associated with minority
586 neighbourhoods, that White British youths residing in these areas might be affected
587 negatively by being 'outsiders', which could lead to discrimination that could, in turn, worsen
588 mental health. Moreover, as minorities in deprived neighbourhoods, White British youths may
589 lack the social support and networks to cope with their life situation, which could adversely
590 affect their mental health. It may be that deprivation does not affect the mental health of
591 young people from minority ethnic groups because they are protected from the adverse effects
592 of residing in a deprived neighbourhood by stronger social support and services tailored to
593 their specific ethnic groups (Bécares, Nazroo, et al. 2012; Bécares, Shaw, et al. 2012).

The internal heterogeneity of the BAME group could also possibly explain its non-significant relationship between deprivation and mental health. Combining large ethnic categories into single large groups can be problematic because it may conceal significant differences (Aspinall 1998; Bhopal 1997; Bhopal 2002). Prior studies have reported mental health advantages for Black Africans (Maynard, Harding, and Minnis 2007), Indians (Green et al. 2005; Meltzer et al. 2000), and Bangladeshis (Stansfeld et al. 2004) relative to White British youths, but no such advantage was observed for Black Caribbean youths (Green et al. 2005). Unfortunately, in our data set, the sub-samples of the BAME group corresponding to individual BAME ethnicities were too small to permit meaningful analyses of neighbourhood characteristics' effects on specific subgroups, which may have masked some interesting effects. The heterogeneity of the BAME category may also explain the weak association between mental health and residence in ethnically dense neighbourhood environments.

The findings of this study also indicate that parental behaviour may have an important influence on the mental health of young people, especially BAMEs, for whom parenting style seemed to produce small but incremental improvements in mental health when the models were adjusted for individual and parental characteristics. Parental behaviour, however, must be balanced between supportive and authoritative styles of parenting. For instance, the frequency of spending leisure time with parents and discussing matters deemed important appear to be associated with better mental health, whereas shouting and spanking predict poor mental health. These findings are supported by previous research suggesting that the parent-child relationship protects young people from the adverse effects of the wider society (Maynard and Harding 2010; Xue et al. 2005) such as deprivation (Fagg et al. 2006). In particular, studies from the US have shown that there may also be a protective component to authoritative parenting behaviours, and the resulting parent-child relationship. Specifically, families living in deprived areas may adopt more authoritative parenting styles that restrict

their children's interactions with other residents (Sampson, Morenoff, and Earls 1999; Furstenberg 1999; Lee et al. 2014) and from perceived ills that might negatively impact their well-being.

In summary, it appears that while neighbourhood characteristics have some influence on the mental health of young people, our findings generally support previous research indicating that most of the variability in young persons' mental health is due to individual-level variation. There was also some indication that parental behaviour accounted for some of the variation in mental health among young people. The question of why minority group members are more resilient to deprivation than majority group members remains unanswered, and further studies are required to explain this differences.

Strengths and limitations

Some limitations of the data used in this work, and of neighbourhood studies in general, should be borne in mind when interpreting the results of this study. One limitation is that the neighbourhoods boundaries considered in this work were defined using administrative measures that may not fully reflect the experiences of young people living in their area of residence. On the other hand, neighbourhood boundaries were defined on the basis of Middle Super Output Areas (MSOAs); as stated above, an MSOA is an aggregated census measure containing 3,000 households with an average population size of 7,500. Given the small geographic area captured by this measure, this level of aggregation might reasonably be expected to correlate quite closely with conversational definitions of neighbourhoods.

In addition, studies seeking to disentangle area-level variance have an acknowledged weakness stemming from the difficulty of separating compositional and contextual effects. We sought to overcome this by employing multilevel models that can simultaneously model variance at the individual and neighbourhood-levels, which should increase the precision of the estimates (Lupton 2003; Van Ham et al. 2012; Pickett and Pearl 2001).

Another limitation of the data analysis in this work relates to the listwise deletion of some study participants. An acknowledged effect of this is data loss, which may have some implications for the statistical power of any given analysis. A related issue is that listwise deletion may lead to bias because increases in the mean squared error term may be similar to that expected from omitted variables (King et al. 2002). For instance, young people who do not respond to questions regarding their ethnicity are likely to be from minority backgrounds. Similarly, non-response to questions regarding parents' mental and physical health may be more likely if those parents are unwell, biasing the data towards a healthier sample. The alternative to listwise deletion is multiple imputation. However, this method also requires researchers to make the ignorability assumption (Allison 2002). A question that remains unresolved in the literature is how imputation affects the quality and reliability of results when the conditions/assumptions under which it is carried out do not hold (Allison 2002; Mittag 2013).

Conclusions and study implications

This study has provided compelling evidence of a pressing need for additional work to explain the variation in mental health among young people by ethnicity. Such studies are necessary because of the disturbingly high prevalence of young people who suffer from mental health difficulties and the fact that childhood/adolescence is the stage where most mental disorders (which are often first detected later in life) have their origins. Greater knowledge of these issues would contribute to both policy-making and academia. Moreover, a better understanding of the complex mechanisms that contribute to inter-ethnic disparities in mental health could lead to significant improvements in the delivery of more targeted and effective interventions for detecting and treating mental ill-health. Future studies may also improve our understanding of the differential trajectories of mental health among ethnic

minority groups, and thereby facilitate earlier diagnosis and treatment of individuals who are later diagnosed with more severe mental disorders.

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