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3 **School characteristics and children's mental health: A linked survey-administrative**
4 **data study**

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1 **Abstract**

2 Mental health difficulties are childhood-onset with lifelong health, social and economic
3 consequences. Children spend a large amount of time in schools, making schools an
4 important context for mental health prevention and support. We examine how school
5 composition and school climate, controlling for individual child-level characteristics, are
6 associated with children’s mental health difficulties (emotional and behavioural difficulties).
7 Data from 23,215 children from 648 primary schools in England were analysed to examine
8 the associations of school composition (size, gender, socioeconomic and ethnicity) and
9 school climate with mental health (emotional symptoms, behavioural symptoms and above
10 clinical cut-off scores) adjusting for individual child socio-demographic characteristics. We
11 find that between 3% and 4.5% of the variation in children’s mental health outcomes could be
12 attributed to schools. Of this, small proportions were explained by school composition (1.4 to
13 3.8%) and larger proportions were explained by school climate (29.5 to 48.8%). Lower
14 school socio-economic status was associated with higher behavioural symptoms (coef=.02
15 [95%CI: .01-.04]) and slightly raised odds of high mental health difficulties (OR = 1.05, 95%
16 CI: 1.01,1.09). More positive school climate was associated with lower emotional (coef=-.09
17 [95%CI:-.11,-.08]) and behavioural (coef=-.13 [95% CI:-.15,-.11]) symptoms and lower odds
18 of mental health difficulties (OR = 0.78, 95%CI:0.74,0.81). Some associations between
19 school factors and mental health were moderated by child sex and SES. School composition
20 factors were weakly associated with children’s mental health, whereas school climate
21 explained a larger amount of between-school variation and appears a good target for
22 universal prevention of mental health difficulties in children.

23 **Keywords:** mental health, community, prevention, young people, school, education, children
24

25

1 **Introduction**

2 Recent prevalence estimates from 2017 indicate that 1 in 8 children has a diagnosable
3 mental health disorder in the UK(NHS Digital, 2018), with many more children experiencing
4 high levels of mental health difficulties(Deighton et al., 2019). For many individuals, mental
5 health difficulties are first experienced in childhood(Kessler et al., 2005), and have long-term
6 negative consequences on a range of social and health outcomes later in life(Clayborne et al.,
7 2019). Child mental health difficulties, especially emotional symptoms, are increasing (Fink
8 et al., 2015; Patalay and Gage, 2019) and there is some evidence that mental health
9 difficulties are manifesting earlier in primary school-aged children when compared to
10 previous generations(Kovacs and Gatsonis, 1994). This highlights the large public health
11 challenge of child mental health difficulties resulting in increased focus by governments
12 nationally and internationally on prevention efforts specifically in young people (European
13 Union, 2013; Green Paper, 2017; Rampazzo et al., 2017).

14

15 Schools, given their near universal access to children and the large proportion of time
16 children spend there, have been highlighted as a key context in which early mental health
17 intervention, screening and prevention efforts might be fruitfully concentrated (European
18 Union, 2013; Green Paper, 2017). However, compared to the vast body of evidence regarding
19 the contribution of the family context on children’s mental health, there is comparatively little
20 investigating the role of school context on children’s mental health. This is a critical omission
21 to the population health literature as both the characteristics of the school itself and
22 socialising within this complex environment likely influences the development of mental
23 health difficulties(Paulus et al., 2016). Even less is known about whether school-level
24 characteristics provide differing levels of risk to different children based on socio-
25 demographic characteristics and needs, that is, what is the interplay between school-level and
26 individual child-level characteristics in understanding child mental health?

27

28 In the few studies that have examined the role of schools in the development of
29 mental health problems, socio-demographic composition such as school size, staff-student
30 ratio, gender balance and deprivation have been the main focus, and together they present an
31 inconsistent picture of the role of these factors for child mental health (Gutman and Feinstein,
32 2008; Saab and Klinger, 2010; Vaz et al., 2014). For example, some research has concluded
33 that school composition is not associated with mental health(Gutman and Feinstein, 2008;
34 Vaz et al., 2014), others have reported that the proportion of disadvantaged children in school
35 is related to mental health outcomes(Gutman and Feinstein, 2008; Saab and Klinger, 2010),
36 while others have shown that school resources (e.g., student-staff ratio) are not associated
37 with mental health outcomes(Gutman and Feinstein, 2008). It is important to highlight that
38 regardless of the influence of these compositional factors for child mental health, they are
39 essentially non-malleable. Nonetheless, understanding the role of these factors may help in
40 the identification of those schools more likely to have students with poor mental health and
41 therefore inform the allocation of additional support.

42

1 Conversely, malleable school-level factors, such as school climate(Cohen et al., 2009)
2 are more amenable to intervention. School climate reveals the degree to which children feel a
3 sense of belonging to, have positive perceptions of and feel safe in their school. According to
4 the National School Climate Council (2007) school climate reflects a school's "*norms, goals,*
5 *values, interpersonal relationships, teaching and learning practices, and organizational*
6 *structures*. Improving school climate has been suggested as a fruitful avenue to promote
7 learning, healthy peer relationships, school connectedness, and reduce school dropouts
8 (Centers for Disease Control and Prevention, 2009; Thapa et al., 2013; United Nations
9 Childrens Fund, 2009). Research also indicates feelings of liking and connection to school is
10 a protective factor in the development of mental health difficulties(Patalay and Fitzsimons,
11 2018; Somersalo et al., 2002; Thumann et al., 2016). Hence focusing on school climate is
12 potentially beneficial to children's mental health, in addition to other learning and school
13 retention benefits(Centers for Disease Control and Prevention, 2009; Cohen et al., 2009;
14 Thapa et al., 2013; United Nations Childrens Fund, 2009).

15
16 One likely factor explaining the limited large-scale empirical studies on contextual
17 school factors and child mental health is the lack of appropriately powered datasets with
18 survey data on mental health combined with administrative data comprising both child- and
19 school-level characteristics. In the current study, we use a large English primary school
20 mental health survey dataset that has been linked with both the National Pupil Database
21 (NPD, providing individual child-level sociodemographic information) and a national schools
22 database (providing data on the composition of schools) to investigate, (i) the association
23 between school-level factors (both composition and climate) and children's mental health
24 difficulties, controlling for child-level characteristics, and (ii) the potentially moderating role
25 of child-level characteristics for the association between school-level predictors of children's
26 mental health difficulties.

27 28 **Method**

29 **Design**

30 Secondary analysis of cross-sectional survey data from a large-scale school mental
31 health survey in England linked to both student and school administrative records was
32 undertaken.

33 **Participants**

34 *Children.* A total of 23,215 participants (49.27% female, $n = 11439$) were included in
35 the current study ($M_{\text{age}} = 9.06$ years, $SD = .56$). In each school, children in Year 4 or 5 were
36 invited to participate, with consent from their parents/guardians. A total of 64.3% of
37 participants were in Year 4, ($n = 14929$) and 35.7% in Year 5 ($n = 8286$). Participant school
38 records ethnicity comprised White (75.05%), Asian (11.79%), Black (6.57%), mixed (4.48%)
39 and other (2.11%). Socioeconomic status was measured by the child's eligibility for free
40 school meals (23.5%, $n = 5455$).

41 *Schools.* Students from 648 state-maintained primary schools, selected by their local
42 authority, were included in the current analysis(Wolpert et al., 2011). An average of 35.83
43 students per school ($SD = 18.66$, range 1- 110) were included. School characteristics are
44 presented in Table 1.

1 From a sample of 24,565 participants, 221 cases (0.9%) were excluded from the
2 analysis due to missing child-level demographic information. An additional 835 cases (3.6%)
3 were excluded due to missing school composition information. Given the low levels (<5%) of
4 overall missing data and the nature of the missing data we used all available data for analysis
5 ($n = 23,215$), representing a response rate of 84% from 27,653 students eligible to take part.
6

7 **Procedure**

8 Survey data were collected as part of 1) the baseline of a randomised control trial, and
9 2) ongoing longitudinal study in the 2009-10 school year (Wolpert et al., 2011). Parents of
10 eligible students were sent study information sheets and opt-out consent forms before data
11 collection. Teachers read a standardised information sheet to children including information
12 on the study aims, confidentiality and the participants' right to withdraw. Children accessed
13 the online survey in a classroom with school computers using a password. If they agreed to
14 participate in the study they proceeded to complete the survey. Ethical approval was granted
15 by UCL research ethics committee. Child socio-demographic characteristics were obtained
16 by linking these survey data to the NPD. School composition information was obtained by
17 linking these survey data to the EduBase national school database which contains information
18 on school characteristics based on the school census. The data used in this study can be
19 requested from the data holding institution by researchers.
20

20 **Measures**

21 ***Mental health.*** Emotional and behavioural difficulties are the most common
22 childhood mental health problems (Ford et al., 2003). In this study mental health difficulties
23 were measured using the 10-item emotional difficulties and 6-item behavioural difficulties
24 scales of the Me and My Feelings self-report questionnaire (see supplementary file for full
25 measure) (Deighton et al., 2013). Internal reliability estimates were good (emotional
26 Cronbach's alpha = 0.73 and behavioural Cronbach's alpha = 0.78). The measure has strong
27 psychometric properties, and established clinical thresholds (Deighton et al., 2013; Patalay et
28 al., 2014). Children above the clinical cut-off for either emotional (≥ 12) or behavioural
29 (≥ 7) difficulties are referred to as having 'high mental health difficulties'.
30

31 ***Child-level factors.*** Sex, socioeconomic status (SES) as measured by eligibility for
32 free school meals (FSM), ethnicity (White, Black, Asian, mixed, other/unclassified), special
33 educational needs (SEN) status, and age were controlled for in all analysis.

34 ***School composition.*** School composition information is presented in Table 1.
35 Headcount (i.e., number of children in the school) ranged between 29 to 1,212, with an
36 average school size of 304 children. School gender composition was based on the proportion
37 of girls, so for instance, if a school value is 40 this indicates that 40% of the students in the
38 school are female and 60% male. The school deprivation measure was based on the
39 proportion of students eligible for FSM, with higher numbers indicating more students from
40 disadvantaged socio-economic backgrounds. School ethnicity was derived by aggregating the
41 proportion of ethnic minority students in each school to create a school-level indicator that
42 represents the proportion of ethnic minority students, where a higher number indicates a
43 greater proportion of ethnic minority students.

44 ***School climate.*** Children completed a seven item questionnaire on perceptions of
their school climate (see supplementary file for full measure) (Fink et al., 2018). Scores were

1 aggregated at the school-level by calculating the average school climate from responses
2 within a school to create a single school-level score, with a range between 0 to 14 (higher
3 score indicates a more positive school climate). Internal reliability of the measure was good,
4 Cronbach's alpha=0.75.

5 **Analysis**

6 Continuous mental health outcome variables (emotional and behavioural symptoms)
7 were standardised to ensure comparability of regression coefficients and effect sizes.
8 Continuous school demographic variables were centred for the interaction analyses and the
9 school climate variable was also standardised to aid interpretation. A multilevel modelling
10 approach was used to account for children nested within schools, with linear multilevel
11 regression for continuous emotional and behavioural symptom outcome scores and logistic
12 multilevel regression for the dichotomous high mental health difficulties variable. We first
13 estimate the proportion of variance in mental health difficulties accounted for by schools then
14 and the associations of school-level characteristics with outcomes, controlling for child-level
15 characteristics. Finally, we estimate interactions between school composition and climate and
16 cross-level interactions between child- and school-level characteristics to examine whether
17 child characteristics moderate the association between school characteristics and outcomes.
18 Incremental model fit is assessed using a log-likelihood test and estimate the intra-class
19 coefficient (ICC) at each stage to estimate amount of school-level variance explained by
20 school composition and climate.

21 **Results**

22 Table 1 presents the descriptive statistics for emotional and behavioural symptoms
23 and school-level composition and climate variables. Analysis comparing these data with
24 national characteristics of primary schools students indicate that study schools have a similar
25 proportion of children eligible for FSM(18.73% vs. 18.5% nationally) and ethnic minority
26 students(22.67% vs. 21.5% nationally) and a larger headcount(304 vs. 241
27 nationally)(Department for Education, 2010).

28
29
30 Initial multilevel models estimate that approximately 3.1%(95%CI:2.5 - 3.9) of the
31 variance in emotional symptoms, 4.4%(95%CI:3.7 - 5.3) of the variance in behavioural
32 symptoms and 4.3%(95%CI:3.2 - 5.6) of the variance in children with high mental health
33 difficulties is accounted for by schools before any school-level variables are accounted for.
34 The percentage of school-level variation in outcomes accounted for by school composition
35 factors was small(1.4% for emotional symptoms, 3.8% for behavioural symptoms and 1.9%
36 for high mental health difficulties), while the percentage of school-level variation explained
37 by school climate after accounting for composition was substantially higher(29.5% for
38 emotional, 47.8% for behavioural symptoms, and 48.8% for high difficulties).

39
40 Including school-level predictors in the models, while controlling for child-level
41 characteristics (Table 2), indicated that school composition was not associated with mean
42 levels of emotional symptoms. School SES was associated with behavioural symptoms and
43 high levels of mental health difficulties, such that students in schools with higher proportions
44 of disadvantaged students had on average more behavioural symptoms and were more likely

1 to have high (i.e., above clinical cut-off) levels of mental health difficulties. A more positive
2 school climate was associated with lower levels of emotional and behavioural symptoms, and
3 lower likelihood of having high levels of mental health difficulties(OR = 0.78, 95%CI:0.75-
4 0.81). There were no interactions between school composition and school climate in
5 predicting any of the mental health outcomes in this study.

6
7 For emotional symptoms an interaction between child SES and school SES was
8 observed(see Figure 1a), such that disadvantaged children in a school with lower levels of
9 disadvantage were more likely to have emotional symptoms, while non-disadvantaged
10 children's emotional symptoms were not associated with school SES. For instance, in a
11 school with 10% disadvantaged students, average symptoms for children eligible for FSM
12 was 0.16 SD above the mean and for other children it was -0.01 SD below the mean; however
13 in schools with 40% and above disadvantaged students mean scores were not different by
14 FSM eligibility. The association between school climate and emotional symptoms was
15 moderated by sex (Figure 2a), such that while both boys and girls were more likely to have
16 emotional symptoms if they were in a school with poor school climate, this effect was larger
17 for girls compared to boys.

18
19 For behavioural symptoms, an interaction between child- and school-level SES
20 (Figure 1b) was also observed. Unlike the interaction noted above for emotional symptoms,
21 for behavioural symptoms high SES children in a school with higher levels of disadvantage
22 were more likely to have behavioural symptoms, while for disadvantaged children
23 behavioural symptoms were unrelated to school-SES. In terms of school climate and sex,
24 both girls and boys were more likely to have behavioural symptoms if they were in schools
25 with poor school climate, but this effect was larger for boys compared to girls(Figure 2b).

26
27 Interactions between child- and school-level characteristics were also observed for
28 those children with high mental health difficulties. Child sex moderated the association
29 between school sex composition and high levels of difficulties, such that girls in schools with
30 greater proportions of female students had lower odds of having high difficulties compared to
31 girls in schools with fewer females. While socio-economically disadvantaged children were
32 more likely to experience high difficulties, the magnitude of this effect was less pronounced
33 in children in more disadvantaged schools. Finally, there was a school climate and sex
34 interaction whereby the protective effects of school climate were larger for boys compared to
35 girls.

36 **Discussion**

37 Children's mental health is a public health issue frequently in the spotlight due to its
38 lasting impact on development and increasing prevalence (Patalay and Gage, 2019). Given
39 the growing focus on schools as an important context for mental health prevention and
40 intervention efforts, understanding the extent to which schools influence children's mental
41 health is crucial. The current analyses investigate the associations between children's mental
42 health and school composition and climate. We use large-scale survey data of children's

1 mental health from over 600 schools, linked to student and school national databases to
2 investigate the school-level variation in mental health, how much of this is explained by
3 school composition and climate and whether the association of school-level factors are
4 moderated by child-level socio-demographic factors.

5
6 Schools accounted for 3-5% of the variation in children's mental health, of which
7 only a small amount was explained by school compositional factors(1.4 to 3.8%). School size
8 was associated with slightly raised odds of high mental health difficulties, however, the effect
9 size was small(odds ratio of 1.03 for an additional 100 students). School deprivation
10 predicted behavioural symptoms and rates of high mental health difficulties, supporting
11 previous research showing schools with higher levels of disadvantaged children have an
12 increased likelihood of students with behavioural difficulties regardless of a child's
13 individual socio-economic position(Kellam et al., 1998). This may be due to the fact that
14 schools with higher proportions of disadvantaged students may have characteristics that
15 increase risks for poor student behaviour, including higher teacher turnover and less effective
16 management (Smithers and Robinson, 2004).

17
18 Conversely, school climate was associated with all three mental health outcomes.
19 More positive school climate was associated with a tenth of a standard deviation lower
20 emotional and behavioural symptoms and children at these schools were almost 25% less
21 likely to experience high levels of difficulties. This supports existing literature studying the
22 impact of the quality of the school environment for children's mental health(Somersalo et al.,
23 2002). It is worth noting that in primary school settings, when schools are often smaller than
24 secondary schools in England, the school level variation observed regarding school climate
25 might in reality reflect classroom level climate where some classes have teachers that create
26 more positive climates than others. More detailed studies that are able to differentiate school-
27 and class-level factors will shed light on the relevance of classroom level factors within the
28 school context.

29
30 One-third to one-half of school-level variation in child mental health was explained
31 by school climate, highlighting the importance of school climate as a target for intervention.
32 Analyses examining moderation by child-level characteristics suggest that the association of
33 school climate with mental health difficulties is moderated by child sex, with poorer school
34 climate specifically associated with greater levels of behavioural symptoms for boys and
35 emotional symptoms for girls. This gendered pattern highlights that school climate potentially
36 moderates the difficulties children are more likely to experience; for example, our finding
37 show that in schools with poorer school climate the expected gender gap in emotional
38 symptoms (i.e., higher prevalence in girls) becomes wider with girls experiencing
39 increasingly greater emotional problems as school climate decreases.

40
41 We also found interactions between school-level and child-level socio-economic
42 status, such that a disadvantaged child in a relatively non-disadvantaged school had higher
43 levels of emotional symptoms while, comparatively, socio-economically non-disadvantaged
44 children had similar rates of difficulties irrespective of their school's SES level. This suggests

1 that the higher SES of a school magnifies the likelihood of emotional symptoms for
2 disadvantaged children. The inequality between a disadvantaged child in a non-disadvantaged
3 school may prompt negative social comparisons which have been shown to be associated
4 with poorer mental health outcomes(Mishra and Carleton, 2015; Patalay and Fitzsimons,
5 2016). Individual by school-level disadvantage effects on mental health were also seen in the
6 context of behavioural symptoms. However, in contrast to emotional symptoms, the
7 moderation was observed in non-disadvantaged students showing greater behavioural
8 symptoms in more disadvantaged schools. The effect size for the moderation of child by
9 school SES was larger for behavioural symptoms compared to emotional symptoms.

10
11 Strengths of the current study include a large sample of schools, child mental health
12 data linked to national child and school databases and the inclusion of different domains of
13 child mental health. Nonetheless, some limitations deserve note. First, schools included in the
14 study were slightly larger in terms of headcount compared to the national average, and only
15 state-maintained schools were included in the dataset. However, given the included schools
16 being similar to national figures on proportions of disadvantaged and ethnic minority
17 students, it is likely that these findings are generalisable to primary schools nationally. In
18 addition, given the study is based in England, the findings might not generalise to different
19 cultural contexts with different school systems or different structural challenges such as
20 segregation.

21
22 Second, school climate was aggregated from student responses regarding their school,
23 potentially leading to higher estimates of the school-level variation in children's mental
24 health scores explained by this variable, as children's mental health might influence their
25 ratings of the school climate. Although our measure of school climate captures key
26 components of school climate including safety, positive adult-student relationship and
27 morale; some aspects included in the broader conceptualisation of school climate(Cohen et
28 al., 2009), such as the structural elements of the school like space, building materials and
29 aesthetics were not assessed. Future research exploring the role of these physical environment
30 aspects of school climate on child mental health is needed. In addition, the use of cross-
31 sectional data precludes us from examining whether student mental health difficulties are
32 responsible for poor school climate, longitudinal datasets of this nature will permit further
33 understanding of this association in shaping school climate. There are also other factors
34 related to family and neighbourhood socio-economic and climate characteristics that we were
35 not able to include in the study that might be important to consider.

36
37 Currently, the majority of school-based mental health interventions are expensive to
38 deliver with specific copyrights and associated training or manuals and, importantly, have
39 limited evidence for their efficacy(Adi et al., 2007). In contrast, a focus on improving school
40 climate might provide an accessible and actionable target that is also low cost to help
41 promote students mental health; and there is some evidence for the efficacy of school climate
42 based interventions(Bradshaw et al., 2008) and school practices such as mental health
43 support, socio-emotional learning provision and non-punitive disciplinary strategies might be
44 important strategies to improve school-climate. Future research should investigate the

1 influence of malleable, contextual school factors other than school climate (such as policies,
2 leadership, teacher quality) in association with child- and school-level demographics in
3 influencing child mental health outcomes. Schools are increasingly facing an expanding remit
4 that includes supporting the rising mental health difficulties faced by their students(European
5 Union, 2013; Green Paper, 2017). Constraints on school budgets and squeezed timetables
6 further compounds the issue and reduce scope for the delivery of mental health focused
7 interventions within schools. Tackling school climate is an attractive focus for improvement
8 as, not only does it not necessarily place demands on curriculum time, it is within the scope
9 of schools' remit and has potential benefits for other outcomes such as school engagement
10 and academic outcomes alongside mental health difficulties.

11
12

13 **Contributors statement:** PP, EN and EF conceptualised and planned the study. PP and EN analysed
14 the data. JD and PP were part of the group that collected the data. All authors contributed to drafting
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22

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28

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Table 1

Descriptive statistics of mental health outcomes (n=23215) and school composition and climate (n = 648) showing means (with 95% CI) and ranges.

	Mean (or %)	95% confidence intervals of the mean or %	Range	(10th and 90th percentile)
<i>Mental health outcomes, children (n = 23215)</i>				
Emotional symptoms score	6.78	6.73, 6.82	0 – 16	2, 11
Behavioural symptoms score	3.18	3.15, 3.21	0 – 12	0, 7
% above clinical threshold	16.84	16.4, 17.3	NA	NA
<i>Schools (n = 648)</i>				
School headcount	304	293.5, 314.5	29 – 1212	160, 471
School gender (proportion female)	48.45	48.1, 48.8	0 – 60	44.3, 52.9
School deprivation (proportion FSM eligible)	18.73	17.7, 19.7	0 – 87.5	3.9, 37.4
School ethnicity (proportion ethnic minority)	22.67	20.5, 24.8	0 – 100	0, 74
School climate	11.77	11.7, 11.8	7.03-13.82	10.76, 12.77

Table 2.

Regression coefficients (with 95% CIs) from 1) model with school predictors controlling for child level socio-demographic characteristics, 2) model 1 plus interactions between school composition and corresponding child factor, 3) model 1 plus interactions between child socio-demographic characteristics and school climate

	Emotional symptoms	Behavioural symptoms	High mental health difficulties
	Coef (95% CI)	Coef (95% CI)	Odds ratio (95% CI)
<i>From model with child level controls and school level predictors</i>			
School headcount (per 100 children)	0.0 (-0.01,0.02)	-0.01 (-0.02,0.01)	1.03 (1.00,1.06)
School gender (% female, 10%)	-0.02 (-0.07,0.02)	0.04 (-0.01,0.09)	1.04 (0.92,1.17)
School deprivation (% fsm eligible, 10%)	-0.02 (-0.03,0.00)	0.02 (0.01,0.04)	1.05 (1.01,1.09)
School ethnicity (% ethnic minority, 10%)	0.0 (-0.01,0.00)	0.0 (-0.01,0.01)	0.99 (0.97,1.01)
School climate (1 SD)	-0.09 (-0.11,-0.08)	-0.13 (-0.15,-0.11)	0.78 (0.74,0.81)
<i>From model adding interactions between child characteristics and corresponding school level factor</i>			
School gender % x child sex (female)	-0.06 (-0.13,0.02)	-0.07 (-0.14,0)	0.77 (0.62,0.96)
School ethnicity% x child ethnicity (BME)	-0.01 (-0.02,0.01)	0.01 (0,0.02)	1.02 (0.98,1.06)
School deprivation % x child deprivation (FSM)	-0.03 (-0.06,-0.01)	-0.05 (-0.07,-0.02)	0.90 (0.84,0.96)
<i>From model adding interactions between child characteristics and school climate</i>			
School climate x child sex (female)	-0.05 (-0.08, -0.01)	0.10 (0.07,0.13)	1.13 (1.02,1.24)
School climate x child age	-0.04 (-0.07,0)	0.02 (-0.01,0.06)	1.03 (0.93,1.13)
School climate x child ethnicity (BME)	0.04 (-0.01,0.08)	0.02 (-0.02,0.07)	1.09 (0.96,1.23)
School climate x child deprivation (FSM)	0.02 (-0.02,0.06)	-0.03 (-0.07,0.01)	1.03 (0.93,1.15)
School climate x child special needs (SEN)	-0.04 (-0.08,0)	-0.04 (-0.07,0.00)	0.98 (0.89,1.08)

Note: BME = black, minority ethnic, FSM = free school meals, SEN = special educational needs. All models controlling for child sex, age, ethnicity, socio-economic status and special education needs status

Figure 1

Figures 1a and 1b showing interactions between child SES (FSM eligibility) and school level deprivation in predicting emotional (1a) and behavioural symptoms (1b)

Figure 2

Figures 2a and 2b showing interactions between child sex and school level school climate in predicting emotional (2a) and behavioural symptoms (2b)