

#BeeWell

Evidence Briefing 3

Relationships

Prepared by the #BeeWell Research Team

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The following individuals (members of the #BeeWell team and colleagues in the Manchester Institute of Education) contributed directly to this report (in alphabetical order): Louise Black, Megan Cutts, Amy Hibbert, Neil Humphrey, Devi Khanna, Jose Marquez, Kim Petersen, Pamela Qualter, Francesca Speakman, and Emma Thornton.

Executive Summary

Introduction

#BeeWell is a programme that aims to make the wellbeing of young people everybody's business. A key component of this is an annual survey of the domains and drivers of wellbeing among young people across Greater Manchester (GM; survey available [here](#)). The data generated by #BeeWell is informing work in different parts of the GM system (e.g. integrated health, care, education and voluntary, community and social enterprise infrastructure), to provide new and improved ways to support young people, creating the best conditions for them to thrive in every community, regardless of their background.

Relationships and young people's wellbeing

The nature and quality of our relationships with other people are an important driver of wellbeing throughout the lifespan, but are particularly prominent during adolescence. Following discussion and consultation with the #BeeWell Research Advisory Group, conversations with our Youth Steering Group, and other groups/fora through which we engage with our different audiences, this evidence briefing focuses on two aspects of the relationships data generated in the first annual wave of our survey: bullying (Study 1) and loneliness (Study 2).

What did we do?

We surveyed approximately 38,000 young people from more than 160 secondary schools across all 10 LAs in GM, without whose efforts in Autumn 2021 these studies would not have been possible. Survey responses were linked to demographic data about these young people, provided by LAs and/or schools. The data were analysed using robust statistical methods that enabled us to report the following:

Study 1 (bullying): we examined how many young people are bullied, who is more likely to be bullied, and the extent to which bullying impacts young people's mental health.

Study 2 (loneliness): we examined how much differences between neighbourhoods, relationships with other people (peers, parents/carers, school staff), and experiences of discrimination (on the basis of, for example, gender) are associated with young people's reports of loneliness.

What did we find?

In Study 1, we found that approximately 16% of young people (about 1 in 6) are bullied. We also found that young people who identify as LGBTQ+, females, those with special educational needs, younger students, and those from socio-economically disadvantaged backgrounds experienced significantly greater odds of being bullied than their peers. Young people from most ethnic minority groups experienced significantly reduced odds of being bullied than their White peers. Finally, we found that approximately 19% (about 1 in 5) of

the cases of significant mental health difficulties among young people can be attributed to their exposure to bullying.

In Study 2, we found just over 1% of the variation in young people's loneliness can be explained by differences between the neighbourhoods in which they live. Furthermore, we found that friendships and social support, relationships with parents/carers, and relationships with school staff were each negatively associated to young people's reports of loneliness (that is, the better the relationships, the less lonely young people feel). As might be expected, the strongest negative association was between friendships and social support and loneliness. We also found that different experiences of discrimination (based on race/ethnicity, gender, sexual orientation, disability, or religion/faith) were positively associated with loneliness (that is, young people who reported experiences of discrimination were lonelier than those who did not).

What next?

A key implication of Study 1 is that preventing/reducing bullying could have a significant impact on the burden of mental health difficulties among young people.

A key implication of Study 2 is that promoting positive peer relationships and social support, and addressing discriminatory attitudes (particularly in relation to gender and sexual orientation) in schools and communities could be effective approaches to tackling loneliness among young people.

Introduction

About the #BeeWell Programme

#BeeWell is a programme that aims to make the wellbeing of young people everybody's business. A central component of this is the #BeeWell survey (available [here](#)), which is being completed annually by pupils in secondary schools across Greater Manchester (GM). The research design includes a longitudinal element (tracking pupils from Year 8 to Year 10) and a cross-sectional element (annual survey of pupils in Year 10). The survey focuses on domains of wellbeing (e.g. life satisfaction, optimism) and drivers of wellbeing (e.g. physical activity, bullying). We link these data to information on pupil characteristics (e.g. ethnicity) shared by Local Authorities (LAs) and/or schools. In the first annual wave of data collection (Autumn 2021), responses to the #BeeWell survey were received from approximately 38,000 young people from more than 160 secondary schools across all 10 LAs in GM. The results of the survey are helping us to better understand the development and drivers of young people's wellbeing. The data generated is informing work in different parts of the GM system (e.g. integrated health, care, education and voluntary, community and social enterprise infrastructure). The aim is to provide new and improved ways to support young people, creating the best conditions for them to thrive in every community, regardless of their background.

Social relationships in adolescence

The nature and quality of our relationships with other people are an important driver of wellbeing throughout the lifespan, but are particularly prominent during adolescence, a period of heightened sensitivity to social influence [1].

Study 1: Bullying is social aggression aimed toward an individual (or group), with the intention to cause harm, that is repeated over time and involves an imbalance of power that favours the perpetrator(s). A distinction is often made between 'traditional' (i.e. that carried out face to face, such as hitting, calling names, or leaving the victim out of games; often dichotomised into 'physical' and 'relational' bullying) and 'cyber' (i.e. that carried out via digital media, such as posting negative online content about the victim) bullying. In Study 1, we examined how many young people are bullied, who is more likely to be bullied, and the extent to which bullying impacts young people's mental health.

Study 2: Loneliness occurs when a person thinks their interpersonal relationships are insufficient in some way. It is a subjective experience, accompanied by painful or negative feelings and a perceived lack of connectedness to peers during adolescence. In Study 2, we examined how much differences between neighbourhoods, relationships with other people (peers, parents/carers, school staff), and experiences of discrimination (on the basis of, for example, gender) are associated with young people's reports of loneliness.

The #BeeWell sample

In Autumn 2021, we surveyed young people in secondary schools across GM. We linked the survey data to information on pupil characteristics (e.g. ethnicity) shared by LAs or schools. The main #BeeWell sample comprises 37,978 young people across 165 schools¹. We were able to compare some characteristics of our sample (specifically, sex, age, ethnicity, special educational needs, and language) to those of the population of young people aged 11-16 in GM, using government statistics. We found that there were very few differences, and where these did exist, they were negligible. This gives us confidence that our sample findings can be applied to the population of young people aged 11-16 in GM. For more information, see Appendix 1 of our first evidence briefing, available [here](#).

A note on the word ‘significant’

In the reports of Studies 1 and 2 that follow, we use the term significant/ly to denote statistical significance. In our statistical models, we get ‘p’ values to accompany each observed effect (for example, the odds-ratio for being bullied if you have SEN compared to those with no SEN). The p value tells us how frequently, if we ran our study again many times, we would get data as extreme (or more extreme) than the data we have, if there is no actual difference in the population. It is expressed as a percentage (e.g. 0.08 = 8%). If the p value is small enough (normally less than 5% from a very large number of hypothetical results – hence ‘ $p < .05$ ’), the finding is considered to be ‘statistically significant’. This means that the result is therefore considered unlikely to be the result of random noise. That said, very large samples such as that used here lead to increased test sensitivity. This means that some statistically significant results can emerge where the actual magnitude of a given effect is not meaningful. As a result, our emphasis is on the *size* of the effects observed.

¹ This is not the total number of schools and young people who took part in the first annual #BeeWell survey; rather, it is the total who completed the standard version of our survey, which includes the measures used in this briefing.

Study 1: Bullying

What did we do?

This study uses data on 35,825 adolescents aged 12-15 attending 147 secondary schools in the #BeeWell sample². Information on their characteristics is available in Table 1. Information about the two key measures we used (bullying and mental health difficulties) is available in Table 2.

Table 1. Characteristics of the sample used in Study 1.

Characteristic	Source	Categories	Notes
Gender and sexual orientation	LA/Survey	Cishet males (38.47%) Cishet females (32.07%) LGBTQ+ (29.45%)	'Cishet' refers to young people who report being heterosexual, and whose sex and gender identity are the same (e.g. those born male who identify as male) 'LGBTQ+' included those who identified as sexual minorities (e.g. gay, lesbian, bi/pansexual), gender diverse (e.g. non-binary, and/or self-reported gender is incongruent with sex assigned at birth, such as those born male who identify as female), or who indicated that they <i>describe themselves in another way</i> or <i>prefer not to say</i> on either the sexual orientation or gender identity survey items.
Special educational needs (SEN)	LA	No SEN (85.7%) SEN Support (12.28%) Education, Health and Care Plan (2.02%)	'SEN support' refers to young people who have been identified as having SEN and are supported by their school using a graduated approach that follows a four-stage cycle of Assess, Plan, Do, Review. 'Education, Health and Care Plan' involves a needs assessment, following which a plan that identifies the educational, health and care (EHC) needs of a given young person is drawn up. This plan outlines the additional support that will be put in place to meet those needs. EHC plans involve more support than is available through SEN Support, and typically therefore involve allocation of additional budgetary resource.
Ethnicity	LA	White (67.25%) Asian (18.46%) Black (5.18%) Chinese (0.85%) Mixed (5.92%)	

² The sample was reduced for this study for two reasons. First, we needed responses on the bullying and/or mental health difficulties measures (i.e., no respondents with data completely missing for both measures). Second, as we clustered data by school in our analyses, any schools with N<5 respondents were removed, in line with guidance on multi-level modelling.

		Any Other Ethnic Group (2.34%)	
Year Group	LA	Year 10 (53.56%) Year 8 (46.44%)	
Socio-economic disadvantage	LA/publicly available data	Quintile 1 (most deprived) (42.64%) Quintile 2 (19.61%) Quintile 3 (12.01%) Quintile 4 (13.57%) Quintile 5 (least deprived, 12.17%)	Socio-economic disadvantage was measured using publicly available data on Index of Multiple Deprivation (IMD) scores by neighbourhood, which we linked to our data via young people's residential postcodes. IMD is a measure of relative deprivation formed from data on seven domains (income, employment, health deprivation and disability, education, skills and training, crime, barriers to housing and services, and living environment). IMD data can be grouped into quintiles, from the most (Q1) to the least (Q5) deprived.

Table 2. Measures used in Study 1.

Domain	Measure	N of items	Sample item	Response format	Scoring notes
Bullying	Items adapted from Understanding Society and Health Behaviours in School-Aged Children surveys	3	How often do you get cyber-bullied? By this we mean someone sending mean text or online messages about you, creating a website making fun of you, posting pictures that make you look bad online, or sharing them with others.	Not bullied at all; Not much (1-3 times in the last 6 months); Quite a lot (more than 4 times in the last 6 months); and, A lot (a few times every week)	Young people who responded <i>quite a lot</i> or <i>a lot</i> on at least one of the three questions asked were classified as 'bullied'; all others were classified as 'not bullied'
Internalising mental health difficulties ³	Me and My Feelings (M&MF) emotional problems subscale	10	"I worry a lot"	Never; sometimes; always	Young people's scores on this measure were divided into those that were in the 'low' (scoring as expected for their age) range and those that were in the 'slightly elevated/high' range (scores indicating a greater level of difficulties that would warrant additional support)

First, we calculated the proportion of young people that were bullied in any way (that is, they responded *quite a lot* or *a lot* on at least one of the three questions). We also considered each bullying item (physical, relational, cyber) separately.

Second, we ran a multi-level logistic regression analysis, using our sample characteristics (Table 1) as predictor variables. Logistic regression enables us to estimate the strength of association between a 'binary' outcome (e.g. bullied vs not bullied) and a set of explanatory variables (e.g. SEN, ethnicity). These are expressed as odds ratios (e.g. 'the odds of young people with characteristic X being bullied are 3.5 times greater than young people with characteristic Y').

We used multi-level regression because our data are 'nested' (i.e. young people within schools) and it is important to account for the similarities between young people from the same school in our analysis. Failing to do so can lead to incorrect inferences.

Third, we calculated the population attributable fraction (PAF). The PAF tells us what proportion of slightly elevated/high internalising symptoms cases can be attributed to bullying exposure among young people. The PAF formula is $(O-E)/O$, where O is the

³ The #BeeWell negative affect measure captures the frequency with which young people report experiencing feelings like sadness and worry. These are often referred to as 'internalising mental health difficulties'.

Observed number of cases and E is the Expected number of cases under no exposure. We also ran a multi-level logistic regression as above, but this time with bullying exposure as the main explanatory variable (controlling for the range of characteristics outlined in Table 1). This gave us another way of examining the strength of association between bullying and mental health difficulties (i.e. the odds ratio).

As with any project of this kind, some of our data were missing. Handling missing data is important because it can lead to biased analyses. Accordingly, we used a technique called multiple imputation in which missing data are replaced by multiple sets of plausible values. This enabled us to make use of the full sample in our analyses.

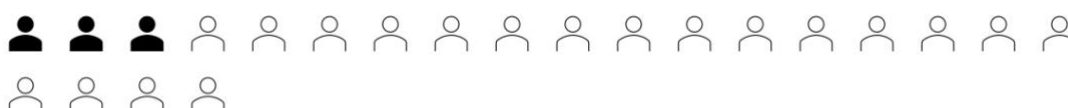
For further technical detail regarding our analyses, please refer to the pre-print for a paper we have written about this study, available [here](#).

What did we find?

How many young people are bullied?

15.56% of young people reported being bullied in at least one of the ways (physical, relational, cyber) that we examined in the #BeeWell survey. In an average secondary school class of 22 pupils [2], this equates to between 3 and 4 young people (see Figure 1). Relational bullying (e.g. being called names, getting left out of games) was the most common form of bullying (12.03%), followed by physical (e.g. getting hit, pushed around; 6.31%), and finally, cyber (e.g. sending mean text or online messages; 4.57%). Note that these figures do not total 15.56% because some young people are exposed to more than one type of bullying (known as ‘polyaggression’).

Figure 1. The number of young people being bullied in a typical secondary school class.



Which young people are more likely to be bullied?

Figure 2 visualises the strength of association between different characteristics of young people and being bullied. In brief, we found that:

- The odds of cishet females and LGBTQ+ young people being bullied were significantly greater than cishet males;
- The odds of young people in receipt of SEN Support or with EHC Plans being bullied were significantly greater than those with no SEN;
- The odds of young people from most ethnic minority groups being bullied were significantly lower than White young people (except for those from Any Other Ethnic Group);

- The odds of young people in Year 8 being bullied were significantly greater than those in Year 10;
- The odds of most young people living in more socio-economically deprived neighbourhoods being bullied were significantly greater than those living in the least deprived neighbourhoods (except for those in IMD Quintile 4).

Figure 2. Inequalities in exposure to bullying among different groups of young people.

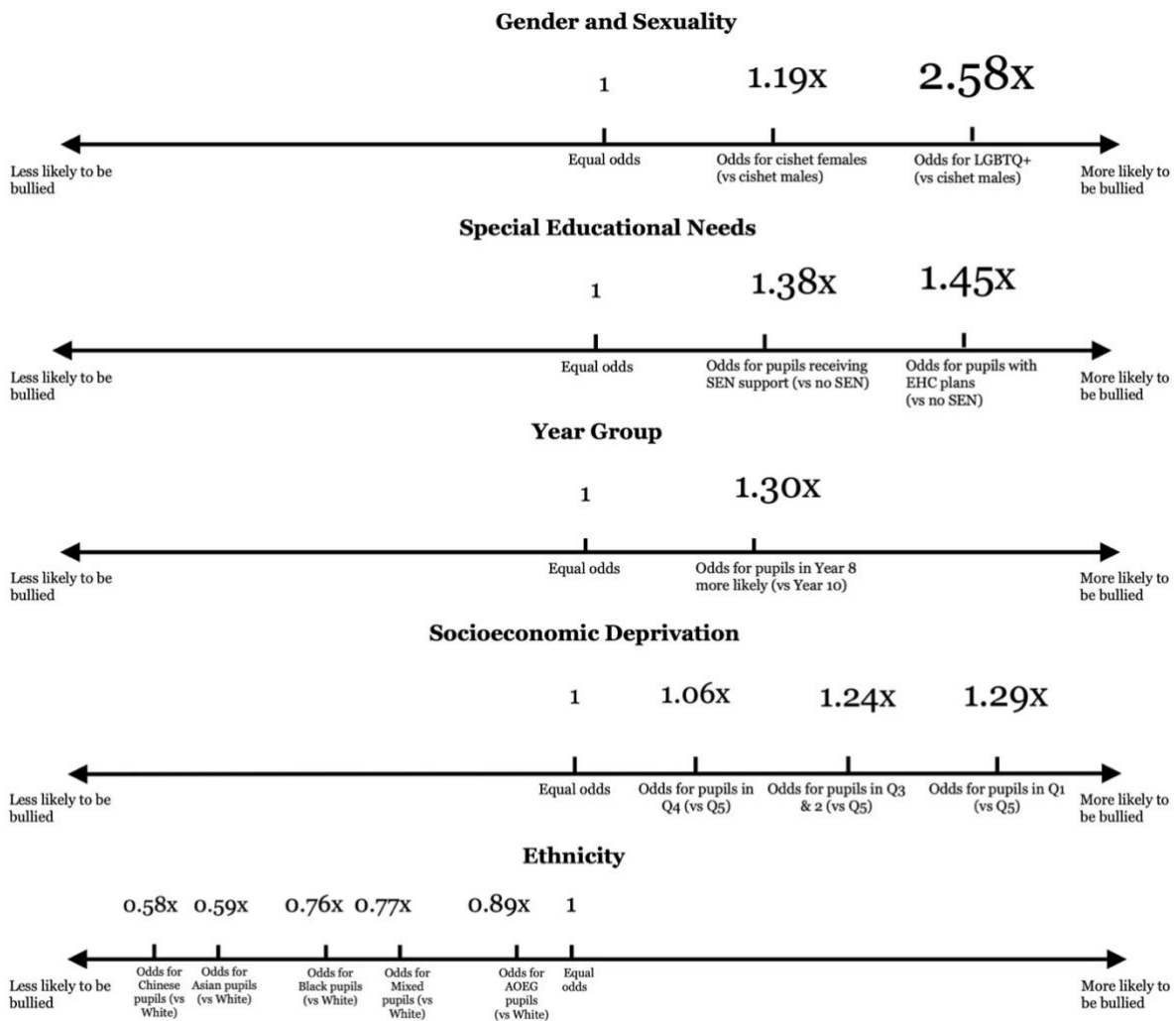


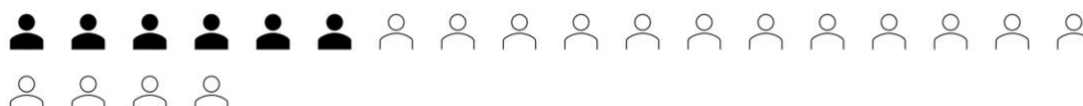
Figure notes:

- Text size for odds-ratio increases or decreases relative to 1 (equal odds) to emphasize size of effect.
- Odds ratios under 1 (decreased odds) can be more challenging to interpret. An alternative way to think about these is to subtract from 1. So, for example, for Chinese pupils (vs White), the odds ratio is 0.58. $1 - 0.58 = 0.42$, meaning that Chinese pupils have a 42% reduction in odds of being bullied compared to White pupils.

To what extent does bullying impact young people's mental health?

27.21% of young people had scores on our mental health difficulties measure (the Me and My Feelings emotional difficulties subscale) that were in the slightly elevated/high range. In an average secondary school class of 22 pupils [2], this equates to approximately 6 young people (see Figure 3).

Figure 3. The number of young people with slightly elevated/high levels of internalising mental health difficulties in a typical secondary school class.



Our PAF calculation indicates that 18.8% of these cases can be attributed to being bullied. In other words, our analysis indicated that by tackling bullying, we could prevent nearly 1 in 5 cases of internalising mental health difficulties among young people.

It may be helpful to think about what the above means in the city-region context more broadly. Office for National Statistics data indicates that there are 210,858 young people aged 11-16 in GM [3]. Our analysis indicates that 57,374 (27.21%) of these experience slightly elevated/high levels of internalising mental health difficulties. The PAF calculation noted above means that 10,786 (18.8%) of these cases could be avoided through effective prevention of bullying.

Finally, our logistic regression analysis indicated that, after controlling for a range of young people's characteristics (e.g. ethnicity, socio-economic disadvantage), the odds of those exposed to bullying experiencing slightly elevated/high levels of internalising mental health difficulties were significantly greater (3.92x) than those not exposed to bullying.

Study 2: Loneliness

What did we do?

This study uses data from 36,141 adolescents aged 12-15 across 1,590 neighbourhoods in the #BeeWell sample⁴. Neighbourhoods were defined using Lower Super Output Areas (LSOAs) linked to young people's residential postcodes. LSOAs are geographic units of approximately 650 households (c. 1,500 residents).

Information on the Study 2 sample characteristics is available in Table 3. Information on the measures were used is available in Table 4.

⁴ The sample was reduced for this study in line with guidance on multi-level modelling. Accordingly, any neighbourhoods with $N < 5$ respondents were removed.

Table 3. Characteristics of the sample used in Study 2.

Characteristic	Source	Categories⁵	Notes
Gender	Survey	Male (40.41%) Female (39.18%) Gender diverse (7.14%) Prefer not to say (5.34%) Missing (7.92%)	Gender diverse = young people who reported their gender as non-binary or who describe themselves in another way.
Sex	LA	Male (50.64%) Female (49.36%)	
Sexual orientation	Survey	Heterosexual (67.36%) Minority sexual orientation (14.09%) Prefer not to say (9.12%) Missing (9.43%)	Minority sexual orientation = young people who reported being lesbian, gay, bi/pansexual, or who describe themselves in another way.
Ethnicity	LA	White (64.34%) Asian (18.24%) Black (5.41%) Other (10.76%) Missing (1.25%)	
Year Group	LA	Year 10 (53.86%) Year 8 (46.14%)	
Familial socio-economic disadvantage	LA	Yes (25.46%) No (73%) Missing (1.54%)	Young people recorded as known to be eligible for Free School Meals (FSM) in any of the termly school censuses in the previous six years.

⁵ The sample characteristics reported and their categories in Study 2 vary slightly from those in Study 1 in line with decisions made by the different analytic teams of the two studies.

Table 4. Measures used in Study 2.

Domain	Measure	N of items	Sample item	Response format	Scoring notes
Loneliness	Office for National Statistics loneliness item	1	How often do you feel lonely?	Often or always; Some of the time; Occasionally; Hardly ever; Never	Possible scores range from 0 to 4, with higher scores indicating higher frequency of feeling lonely
Friendships and social support	Child and Youth Resilience Measure	4	I feel supported by my friends	Not at all; A little; Somewhat; Quite a bit; A lot	Possible scores range from 4 to 20, with higher scores indicating higher levels of perceived friendships and social support.
Relationships with parents/carers	Student Resilience Survey	4	At home there is an adult who listens to me when I have something to say	1 = Never to 5 = Always	Possible scores range from 4 to 20, with higher scores indicating higher levels of perceived support from parents/carers
Relationships with school staff	Student Resilience Survey	4	At school there is an adult who believes that I will be a success	1 = Never to 5 = Always	Possible scores range from 4 to 20, with higher scores indicating higher levels of perceived support from school staff
Discrimination	Adapted from Determinants of Adolescent Social Wellbeing and Health Study & Harvard Measuring Discrimination Resource	5	How often do people make you feel bad because of your race, skin colour or where you were born?	Often or always; Some of the time; Occasionally; Hardly ever; Never	Separate items probing race/ethnicity, gender, sexual orientation, disability, and religion/faith. For each item we classified responses as not discriminated against (Never) versus discriminated against (all other response options)

We ran a multi-level regression analysis, using our sample characteristics (Table 3) and measures (Table 4) as predictors of loneliness. Multi-level regression enables us to estimate the strength of association between an outcome (e.g. loneliness) and a set of explanatory variables (e.g. friendships and social support). We used multi-level regression because our data are ‘nested’ (i.e. young people within neighbourhoods) and it is important to account for the similarities between young people from the same neighbourhood in our analysis. Failing to do so can lead to incorrect inferences.

For further technical detail regarding our analyses, please refer to Appendix 1.

How much are differences between neighbourhoods associated with young people's reports of loneliness?

Our analysis revealed that a small but significant amount (1.18%) of the variation in young people's reports of loneliness was attributable to differences between the neighbourhoods in which they live.

How much are relationships with other people (peers, parents/carers, school staff), and experiences of discrimination (on the basis of, for example, gender) associated with young people's reports of loneliness?

Figure 4 below visualises the strength of association between different relationships (peers, parents/carers, school staff) and experiences of discrimination (race/ethnicity, gender, sexual orientation, disability, religion/faith) among young people and their reports of loneliness. In brief, we found that:

- Relationships with school staff were significantly negatively associated with loneliness (that is, the better the relationships with school staff, the lower the loneliness)
- Relationships with parents/carers were significantly negatively associated with loneliness (that is, the better the relationships with parents/carers, the lower the loneliness)
- Friendships and social support were significantly negatively associated with loneliness (that is, the better the friendships and social support, the lower the loneliness)
- Young people who had experienced discrimination based on race/ethnicity reported significantly higher levels of loneliness than those who had not
- Young people who had experienced discrimination based on gender reported significantly higher levels of loneliness than those who had not
- Young people who had experienced discrimination based on sexual orientation reported significantly higher levels of loneliness than those who had not
- Young people who had experienced discrimination based on disability reported significantly higher levels of loneliness than those who had not
- Young people who had experienced discrimination based on religion/faith reported significantly higher levels of loneliness than those who had not

Figure 4. Co-efficient plot depicting the strength of association between different relationships and experiences of discrimination among young people and their reports of loneliness.

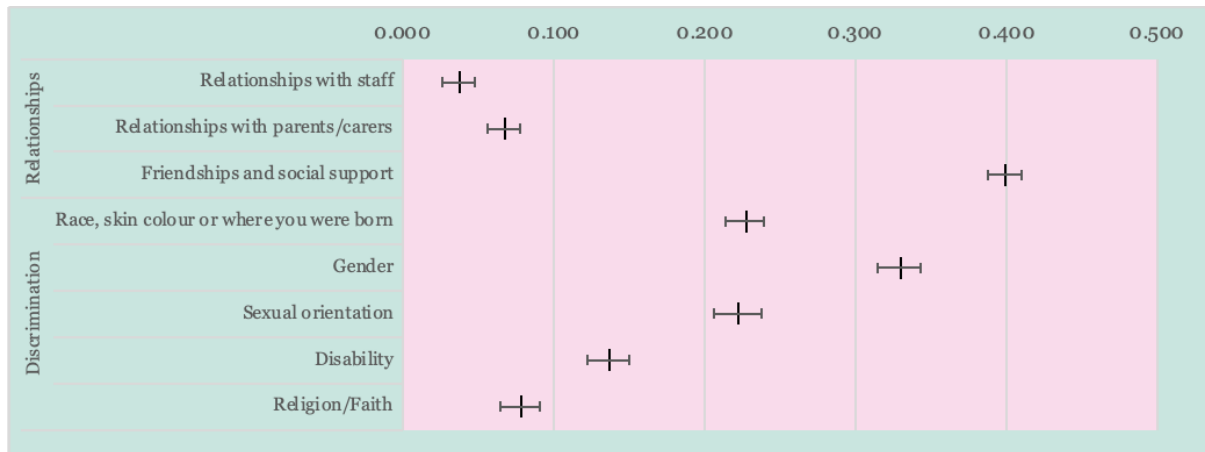


Figure notes:

1. The values depicted are absolute (i.e. the '+' or '-' sign has been removed) for ease of visual comparison.
2. For the 3 relationships measures, the effect indicates the increase (in standard deviations, SD) in loneliness associated with a decrease of 1 SD in the score for a given measure, after controlling for data clustering (young people nested within neighbourhoods) other variables in the model, and socio-demographic characteristics (age, ethnicity, gender, sexual orientation, and free school meal eligibility). So for example, a 1 SD reduction in friendships and social support is associated with a 0.399 SD increase in loneliness. This equates to about half a point on the five-point loneliness scale.
3. For the 5 discrimination items, the effect indicates the increase (in SD) in loneliness associated with being ever discriminated against (versus not), after controlling for data clustering (young people nested within neighbourhoods) other variables in the model, and socio-demographic characteristics (age, ethnicity, gender, sexual orientation, and free school meal eligibility). So, for example, being discriminated against based on sexual orientation is associated with a 0.22 SD increase in loneliness. This equates to about a quarter of a point on the five-point loneliness scale.
4. The plot also depicts 95% confidence intervals (CIs) around each co-efficient value. CIs represent a range around a measurement estimate that depict where the actual population value is likely to reside. So for example, the upper and lower CIs for the friendships and social support co-efficient are 0.410 and 0.388, respectively.

In terms of the strength of associations, the following patterns are noteworthy:

- Among the 3 types of relationships assessed, friendships and social support were much more strongly associated with loneliness than relationships with parents/carers or school staff. Indeed, the effect size (co-efficient) for friendships and social support was more than 20x larger than for relationships with school staff, and nearly 8x larger than for relationships with parents/carers.
- Among the 5 types of discrimination assessed, that based on gender was more strongly associated with loneliness than those based on other factors such as disability.

Conclusion

It is possible to summarise our findings as follows:

- Study 1 (bullying): Nearly 16% of young people are bullied; the most common form of bullying experienced is relational bullying. We found clear evidence of inequalities in bullying exposure among certain socio-demographic subgroups (e.g. those who identify as LGBTQ+, those with SEN). Our analyses demonstrated a significant association between bullying exposure and experiencing slightly elevated/high levels of internalising mental health difficulties.
- Study 2 (loneliness): Just over 1% of the variation in young people's reports of loneliness is attributable to differences between the neighbourhoods in which they live. Our analyses demonstrated that positive relationships with other people (school staff, parents/carers, and in particular, peers) were associated with lower levels of loneliness. Young people who report having been discriminated against (on the basis of their religion/faith, disability, race/ethnicity, sexual orientation, or in particular, gender) report significantly higher levels of loneliness than those who have not.

We can have confidence in these findings due to the use of a very large sample whose composition mirrors the population of young people aged 11-16 in GM very well, and the implementation of robust analysis procedures (e.g. use of multilevel regression to account for data nesting, and multiple imputation to take account of missing data).

The key implications of these findings are as follows:

- Our PAF estimate indicated that nearly 1 in 5 cases of slightly elevated/high levels of internalising mental health difficulties were attributable to bullying. The adoption of evidence-based approaches to bullying prevention could therefore have a significant impact on the burden of these kinds of difficulties among young people. For schools, effective anti-bullying practices are an essential component of a whole-school approach to mental health promotion. Online resources, such as the Early Intervention Foundation guidebook (available [here](#)) can be useful in identifying those approaches that have a strong evidence base.
- Promoting positive peer relationships and social support, in addition to addressing discriminatory attitudes (particularly in relation to gender and sexual orientation), could be effective approaches to tackling loneliness among young people. An obvious vehicle for such work is through the personal, social, health and economic education curriculum (including relationships and sex education and health education), but there are also opportunities to engage in work to address discrimination and promote peer and social support in the communities in which young people live through local social cohesion initiatives.

References

1. Foulkes, L. and S.-J. Blakemore. (2016). Is there heightened sensitivity to social reward in adolescence? *Current Opinion in Neurobiology*, 40, 81-85.
2. HM Government (2022). *Schools, pupils and their characteristics (academic year 2021/22)*. Accessed at: <https://explore-education-statistics.service.gov.uk/find-statistics/school-pupils-and-their-characteristics> (January 2023).
3. Office for National Statistics (2023). *Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland*. Accessed at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates> (January 2023).

Appendix 1

All analyses were conducted using Stata 15.

The estimates reported in Figure 4 are the effects in multi-level models with neighbourhoods (LSOAs) at level 2, and young people at level 1. Two multilevel models were estimated, both of which had loneliness as the dependent variable. Model 1 included as independent variables the 3 relationship measures (relationships with staff, relationships with parents/carers, and friendships and social support) together with 5 covariates intended to control for young people's characteristics (year group, ethnicity, gender, sexual orientation, and free school meal eligibility). Model 2 included as independent variables the 5 discrimination measures (ever discriminated due to race, skin colour or where you were born, gender, sexual orientation, disability, and religion/faith) together with the same 5 covariates noted above. Thus, estimates for relationships were obtained from Model 1 and estimates for discrimination from Model 2. Loneliness and the relationship variables were transformed into z-scores (mean=0, S.D.=1) to facilitate comparisons across different types of relationships.

Missing data were handled via multiple imputation. The following variables had missingness at the indicated levels: loneliness (9.01%), ethnicity (1.25%), gender identity (7.86%), sexual orientation (9.39%), and free school meals eligibility (1.90%), relationships with staff (10.41%), relationships with parents/carers (9.76%), friendships and social support (10.55%), ever discriminated due to race, skin colour or where you were born (9.66%), gender (10.04%), sexual orientation (10.55%), disability (10.47%), and religion/faith (10.25%). To impute these data, we used a multivariate normal regression approach, which employs an iterative Markov chain Monte Carlo method to impute missing values. We performed 20 imputations of the data set.

No weights were applied, since our sample was extremely close in composition to the GM population of young people aged 11-16 for available demographic variables. We compared the sample that completed surveys in 2021 (the dataset used in Study 2) to published GM-level statistics via the government's education statistics tool (available [here](#)).