The presence of mental disorders in children are associated with a range of factors relating to a child’s demographics, family life and socioeconomic circumstances. This topic report explores the rates of mental disorder by each of these factors individually and uses regression analysis to identify which factors remain associated with mental disorders when other factors are accounted for. Variations by age group and mental disorder type are examined.

**Socioeconomic factors**
- Income related: occupational classification of parent, receipt of welfare benefits, equivalised household income
- Location related: region, neighbourhood deprivation, household tenure, accommodation type

**Family-related factors**
- Family functioning, parental mental health, qualification status of parent, marital status of parent, family type

**Demographic factors**
- Sex, ethnic group
Main findings

Primary school children (5 to 10 year olds)

After controlling for other factors, the presence of any mental disorder in a primary school aged child was associated with:

- Demographic factors: sex, ethnic group.
- Family context: family functioning, parental mental health, qualification status of the parent, marital status of the parent, family type.
- Socioeconomic context: receipt of welfare benefits, region, household tenure.

In unadjusted analysis, the presence of any mental disorder in primary school aged children was also associated with the occupational classification of the parent and equivalised household income. These were no longer significant once other factors were controlled for.

The factors associated with emotional disorders after controlling for all factors were similar to those for any mental disorder, except no association was found with sex, marital status of the parent, family type or region.

The factors associated with behavioural disorders after controlling for all factors were also similar to those for any mental disorder, however no association was found with marital status of the parent.

Secondary school children (11 to 16 year olds)

After controlling for all factors, the presence of any mental disorder in secondary school aged children was associated with:

- Demographics: ethnic group.
- Family context: family functioning, parental mental health, marital status of the parent.
- Socioeconomic context: occupational classification of the parent, receipt of welfare benefits, household income.

In unadjusted analysis, any mental disorder in secondary school aged children was also associated with region and household tenure. However, these were no longer associated after controlling for all factors.

The factors associated with emotional disorders after controlling for all factors were similar to those for any mental disorder. However, sex and household tenure were found to be associated, while marital status of the parent and household income were not.

The factors associated with behavioural disorders after controlling for other factors were similar to those for any mental disorder. However, sex, region and household tenure were found to be associated, while marital status of the parent was not.
Preschool children (2 to 4 year olds)

Experimental Statistics

After controlling for all factors, the presence of any mental disorder in preschool aged children was associated with:

- Demographics: sex, ethnic group.
- Family context: family functioning, parental mental health.
- Socioeconomic context: receipt of welfare benefits, region.

In unadjusted analysis, the presence of any mental disorder in preschool children was associated with marital status of the parent, family type, occupational status of the parent, household income and household tenure. After controlling for all factors, they were no longer associated.
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This report may be of interest to people working with children and young people in mental health, social care or educational settings, as well as to policy officials, commissioners of health and care services, and parents, young people and the general public.
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**Introduction**

Analysis presented in other topic reports in this survey series provided an insight into which groups of children were more likely to have certain mental disorders. However, relationships between characteristics (factors) and the development of mental disorders are complex. More than one factor may be associated with a child having a disorder, and these factors may also be associated with each other.

This topic report aims to identify which factors remain associated with mental disorders in 2 to 16 year olds when other factors are held constant. For example, children living with a lone parent tend to be more likely to have a mental disorder than children living with married parents. Regression analysis allows us to test whether that is still the case once other factors, like household income, are accounted for.

**What is covered in this report**

This report examines how the presence of mental disorders in children aged 2 to 16 years old differ by a range of factors, and identifies which factors remain associated with mental disorders when other factors are controlled for (referred to as adjusted analysis in this report).

This report examines how these factors are associated with:

Any mental disorder in 2 to 4 year olds, 5 to 10 year olds and 11 to 16 year olds. Separate adjusted analyses were run for each age group because the factors associated with mental disorder may vary by age.

Emotional disorders and behavioural disorders for school aged children (5 to 10 and 11 to 16 year olds). Separate adjusted analyses were run for any mental disorder, emotional disorders and behavioural disorders because the factors associated may vary according to the type of disorder a child may have.

**Demographic, family and socioeconomic factors**

Children aged 2 to 16 were analysed in groups depending on their age: 2 to 4, 5 to 10 and 11 to 16. Fourteen factors were investigated separately for each age group, including demographic characteristics of the child (such as their ethnic group or sex), their family (such as marital status of parents) and their socioeconomic context (such as equivalised household income and the parental receipt of welfare benefits). These factors were chosen as they featured in the analysis of the 2004 (Green et al., 2005) and 2017 series of the survey.

Figure 1 illustrates the factors included in this report. Although some factors may overlap in terms of outcomes (for example, households with the highest income are also less likely to be in receipt of welfare benefits), they have been included to gain a broad picture of the factors associated with the mental health of children. We have tested for the possible effect that each factor would likely have on every other factor studied in this report by looking at the Variance Inflation Factors (VIFs) and have only
looked at factors which avoid misleading interpretations. See the Methods section for more information on multicollinearity.

The outcomes of our adjusted analyses were based on controlling for all factors at the same time. A combination of different factors may change the associations in the adjusted analysis (for example, excluding household income may change the factors associated with the presence of mental disorders). The findings throughout this report may also be explained through associations with factors not included in our analysis. The reasons behind these associations have not been explored as part of our analysis and the results of the analyses in this report must be understood in light of these potential limitations.

**Figure 1: Factors tested for association with mental disorders in children, 2017**

**Socioeconomic factors**

- Income related: occupational classification of parent, receipt of welfare benefits, equivalised household income
- Location related: region, neighbourhood deprivation, household tenure, accommodation type

**Family-related factors**

- Family functioning, parental mental health, qualification status of parent, marital status of parent, family type

**Demographic factors**

- **Sex:** Boys were compared with girls.
- **Ethnic group:** Children of White (White British or White other) backgrounds were compared with children of Black and Minority Ethnic backgrounds.
Family-related factors

- **Family functioning**: Children of families with ‘healthy’ family functioning were compared with children of ‘unhealthy’ functioning families (identified using the General Functioning Scale of the McMaster Family Activity Device - FAD).

- **Parental mental health**: Children of a parent with ‘good’ mental health were compared with children of a parent with ‘poor’ mental health (identified using the GHQ-12 screening questionnaire).

- **Qualification status of the parent**: Children of a parent with ‘any qualifications’ were compared with children whose parent reported having ‘no qualifications’.

- **Marital status of the parent**: Children living in households with a ‘married’ parent were compared with children of a ‘cohabiting’ parent and those of a ‘lone parent’ (either single or previously married).

- **Family type**: Children living in families without ‘stepchildren / stepsiblings’ in the household were compared with children living in families with ‘stepchildren / stepsiblings’ in the household.

Socioeconomic factors

These factors can be understood in terms of two groups: income-related factors that influence a child’s circumstances and factors related to where a child lives. These distinctions have been used throughout this report to aid interpretation but have not been used to separate factors in the logistic regression models.

**Income related:**

- **Occupational classification of the parent**: Children of a parent in ‘managerial and professional occupations’ were compared with children of a parent in ‘Intermediate’ and ‘routine and manual’ occupations.

- **Equivalised household income**: Children of parents with different levels of household income were compared. Income included things such as earnings from employment, and receipt of benefits.

- **Receipt of welfare benefits**: Children of a parent in receipt of ‘low-income and/or disability-related benefits’ were compared with children of a parent not in receipt of these benefits.

**Location related:**

- **Region**: Children living in London were compared with children living in the ‘South of England’, ‘North of England’ and ‘Midlands and East of England’.

- **Neighbourhood deprivation**: Children living in the least deprived areas in England were compared with children living in other areas of England with higher levels of deprivation. Deprivation was presented in quintiles.
• **Household tenure:** Children living in ‘owner occupied’ accommodation were compared with children living in ‘privately rented’ or ‘socially rented’ accommodation.

• **Accommodation type:** Children living in a ‘house or bungalow’ were compared with children living in a ‘flat or maisonette / other’ accommodation.
Information about the Mental Health of Children and Young People survey

Major surveys of the mental health of children and young people in England were carried out in 1999 (Meltzer et al., 2000), 2004 (Green et al., 2005), and 2017. The latest survey was funded by the Department of Health and Social Care, commissioned by NHS Digital, and carried out by the National Centre for Social Research (NatCen), the Office of National Statistics (ONS) and Youthinmind.

In each of the three surveys, the Development and Well-Being Assessment (DAWBA) was administered to a stratified probability sample of children and young people and their parents and teachers (Goodman et al., 2000). The 2017 survey was the first in the series to go up to age 19, and to include 2 to 4 year olds.

Cases were reviewed by clinically-trained raters. While many surveys use brief tools to screen for nonspecific psychiatric distress or dissatisfaction and then carry out in depth assessment on a sub-sample if at all, this series applied rigorous, detailed and consistent methods to assess with all participating children for a range of different types of disorder according to International Classification of Disease (ICD-10) diagnostic criteria (WHO, 1992).

As well as a Summary Report, a series of other topic reports are available focusing on:

- Trends and characteristics
- Emotional disorders
- Behavioural disorders
- Hyperactivity disorders
- Autism spectrum, eating and other less common disorders
- Multiple conditions and wellbeing
- Professional services, informal support and education
- Behaviours, lifestyles and identities
- Preschool children

Further information about the survey and methods can be found in the Survey Design and Methods Report. All reports and associated tables are available at: https://digital.nhs.uk/pubs/mhcypsurvey17.
Terminology

The term ‘mental disorder’ is generally used in this report. This is because the survey did not screen for general mental health ‘problems’ or ‘issues’ but applied the diagnostic criteria for specific disorders set out in the tenth International Classification of Disease (ICD-10) (WHO, 1992). More information can be found in the Definitions section of this report.

In this report we use the term adjusted analysis. This refers to the results of a logistic regression to analyse the factors associated with the presence of a mental disorder in children when all factors are controlled for at the same time. A backwards regression analysis was conducted, removing factors one at a time until an optimal model was identified (see the Methods section for further information). Regression is a method used to determine the strength of associations between multiple independent variables (i.e. the factors) and a binary dependent (outcome) variable (i.e. the presence of a mental disorder). Unadjusted analysis refers to the prevalence rates of mental disorders in children.

We use odds ratios (OR) as a numeric measure of association between the presence of a mental disorder and any given factor. This enables us to determine the likelihood of a mental disorder occurring for different factors relative to the reference category for that factor, while controlling for other factors at the same time (following the application of a logistic regression model). A factor category with an odds ratio less than 1.00 indicates that a mental disorder is less likely to occur than in the reference category. A factor category with an odds ratio greater than 1.00 indicates that a mental disorder is more likely to occur than in the reference category.

Confidence intervals represent the range for which a value is likely to fall within, had the whole population participated in this survey rather than a sample. This range was calculated based on 95% confidence, indicating that 19 out of 20 confidence intervals produced from a repeated sample would contain the population value. The confidence intervals presented in this report surround the odds ratios given for each factor. If the confidence interval of the odds ratio does not include 1.00, then there is a significant difference between the odds ratio of a particular category of that factor and the reference category. If the confidence interval includes 1.00, then it is possible that the true odds ratios are 1.00 and therefore no increase or decrease in odds can be attributed to the factor (relative to the reference category for the factor).

Three factors in this report (qualification status, marital status and occupational classification) were asked of the household representative person (HRP). In many cases, the parent or guardian of the child was interviewed and therefore classed as the HRP. However, in some instances, the HRP may not have been the parent or guardian of the child, but some other member of the household (for example, a grandparent). For simplicity, consistent use of the term ‘parent’ has been reported throughout for these factors.
Interpreting results in this report

This report presents results in the form of **odds ratios**. The odds ratio can be interpreted as the increased or decreased likelihood of a disorder being present for any particular factor, relative to the reference category for that factor. This allows us to consider how different elements of a child’s identity and circumstances are associated with mental disorders. These odds ratios are accompanied by prevalence rates of mental disorders, which show the percentage of children who experience a mental disorder for a given factor (which is referred to as the unadjusted analysis throughout the report).

Factors have been discussed in this report if:

- They had an overall association with a mental disorder, indicated by a p-value of less than 0.05 (statistically significant at 95% confidence level), and
- At least one category for a factor differed significantly from the reference category.

There were some instances when a factor had an association with a mental disorder, however it has not been reported on due to no significant difference between categories within a given factor and the reference category. This association could be explained by significant differences between other categories within a factor. A series of tables have been published alongside this topic report to show which factors had an association with mental disorders, and the corresponding odds between groups.

Prevalence rates and odds ratios are presented with confidence intervals. All figures referenced in this report can be found in the Figures section and the accompanying tables can be found at: [https://digital.nhs.uk/pubs/mhcypsurvey17](https://digital.nhs.uk/pubs/mhcypsurvey17). To aid interpretation of odds ratios and confidence intervals in this report, a worked example is presented below.

**Worked example**

*In the preschool children topic report, 6.8% of boys and 4.2% of girls had a mental disorder in 2017.*

While this suggests girls are less likely than boys to have a mental disorder, it is useful to control for other elements of a child’s identity to confirm whether this is the case. We did this by comparing the odds ratio of girls having a mental disorder to boys (who will be treated as our reference category).

Controlling for all factors in our adjusted analysis produced an odds ratio of 0.56 for girls (OR 0.56, CI: 0.35 - 0.90). This suggests that girls were less likely to have a mental disorder when compared to boys. In this report, we use the term “decreased odds” to explain this. It could also be interpreted as the odds of a girl having a mental disorder are around half the odds of a boy having a mental disorder.

If there is no difference between the reference category and other categories for a given factor (i.e. boys and girls in this example), the confidence interval will cross one. As this odds ratio has a confidence interval of 0.35 – 0.90, we can be confident that if we repeated this survey 100 times, we would find that girls were less likely than boys...
to have a mental disorder in the majority of instances (95 times out of 100), meaning this finding is statistically significant.

Factors found to be associated with a mental disorder and those that have at least one category with odds ratios that differ significantly from the reference category have been presented in a chart. All charts are presented in the Figures section of this report.

In this example, the results can be interpreted as follows:

This shows girls are less likely than boys to have a mental disorder.

The confidence interval (shown by this line) does not cross 1. This means that if we repeated this survey multiple times, we would find girls were less likely than boys to have a mental disorder (95% of the time).
Primary school children: factors associated with mental disorders

This section explores the demographic, family and socioeconomic factors associated with the presence of any mental disorder, emotional disorders and behavioural disorders in 5 to 10 year olds (primary school aged children). The results discussed in this section can be found in the Figures section and accompanying tables.

While this section is able to show the associations between factors and the presence of mental disorders in primary school aged children, it is not able to show whether the factors were the cause or result of the mental disorder.

Demographics

Sex

In unadjusted analysis, boys of primary school age were more likely to have any mental disorder (12.2%) than girls of the same age (6.6%). Emotional disorders were equally likely in boys and girls, but behavioural disorders were more common in boys (6.7%) than girls (3.2%). After controlling for other factors:

- Girls remained less likely than boys to have any mental disorder (OR 0.48, CI: 0.37 - 0.62), with the odds of boys having a mental disorder being just over twice the odds of girls in this age range. (Figure 2; Table 1a)

- No association was found between sex and the presence of emotional disorders. (Table 1b)

- Girls remained less likely than boys to have a behavioural disorder (OR 0.46, CI: 0.33 - 0.63). (Figure 3; Table 1c)

Ethnic group

In unadjusted analysis, children of a White ethnic background were more likely to have a mental disorder (11.2%) than children identifying as Black or Minority Ethnic (4.2%). This was also found for emotional disorders and behavioural disorders. After controlling for other factors, we found:

- Decreased odds of Black or Minority Ethnic children having any mental disorder compared to children of White background (OR 0.32, CI: 0.20 - 0.50). (Figure 2; Table 1a)

- The odds of a child from Black and Minority Ethnic backgrounds having an emotional disorder were not significantly different to those of White children. (Table 1b)

- Decreased odds of having a behavioural disorder (OR 0.23, CI: 0.12 - 0.48) were observed for children from Black or Minority Ethnic groups compared to children identifying as White. (Figure 3; Table 1c)
Family characteristics

Family functioning

In unadjusted analysis, children living in families with healthy functioning (7.6%) had lower rates of mental disorders compared to children from families of unhealthy functioning (19.0%). This pattern of association was also observed for emotional and behavioural disorders. After controlling for other factors, we found:

- Increased odds of having any mental disorder in children from families with unhealthy functioning (OR, 1.89, CI: 1.36 - 2.62) compared to children from healthy functioning families. (Figure 4; Table 1a)

- No difference in the odds of emotional disorders in children living in unhealthy functioning families compared to children living in healthy functioning families. (Table 1b)

- Increased odds of behavioural disorders in children living in unhealthy functioning families (OR 2.12, CI: 1.43 - 3.13) compared to children living in healthy functioning families. (Figure 6; Table 1c)

Parental mental health

In unadjusted analysis, the presence of any mental disorder was higher in children whose parent had poor mental health (23.4%) than in children whose parent had good mental health (7.0%). This was also the case for emotional and behavioural disorders. This pattern of association remained when controlling for other factors, where:

- Increased odds of any mental disorder in children whose parent had poor mental health (OR 2.59, CI: 1.94 - 3.45) were found compared to children whose parent was considered to have good mental health. (Figure 4; Table 1a)

- Increased odds of emotional disorders in children living with a parent with poor mental health (OR 3.38, CI: 2.30 - 4.98) than in children living with a parent with good mental health. (Figure 5; Table 1b)

- Increased odds of behavioural disorders were found for children whose parent had poor mental health (OR 2.35, CI: 1.58 - 3.49) compared to children whose parent showed evidence of good mental health. (Figure 6; Table 1c)
Qualification status of the parent

In unadjusted analysis, having any mental disorder was found to be more common in children whose parent had no qualifications (16.8%) than in children whose parent had at least one qualification (8.4%). A similar pattern of association was also found between a parent’s qualification status and the presence of emotional and behavioural disorders in 5 to 10 year olds. After controlling for all factors, we found:

- Increased odds of a child having any mental disorder where the parent reported having no qualifications (OR 1.47, CI: 1.00 - 2.16) compared to children whose parent reported having any qualification. (Figure 4; Table 1a)

- No difference in the odds of a child having an emotional or behavioural disorder where the parent reported having no qualifications compared to children whose parent reported having at least one qualification. (Table 1b, Table 1c)

Marital status of the parent

In unadjusted analysis, children of a married parent were less likely to have any mental disorder (6.2%) than children whose parent reported they were cohabiting (12.2%) or a lone parent (single, 17.0% or previously married, 18.2%). This was also the case for emotional and behavioural disorders. After controlling for all factors:

- Increased odds of having any mental disorder were found for children of a previously married lone parent (OR 1.80, CI: 1.21 – 2.68) compared to children of a married parent. (Figure 4; Table 1a)

- No association was found between marital status of the parent and the presence of emotional disorders. (Table 1b)

- Increased odds of having a behavioural disorder were found for children living with stepsiblings (OR 1.79, CI: 1.20 - 2.68) compared to children living without them. (Figure 6; Table 1c)

Family type

In unadjusted analysis, children living with stepsiblings were more likely to have a mental disorder (15.0%) than children not living with stepsiblings (8.7%). This pattern of association was also observed for emotional disorders and behavioural disorders. After controlling for other factors:

- Increased odds of having any mental disorder were found for children living with stepsiblings (OR 1.57, CI: 1.13 - 2.18) compared to children not living with them. (Figure 4; Table 1a)

- No association was found between family type and the presence of emotional disorders. (Table 1b)
Socioeconomics

This section explores socioeconomic factors related to income (occupational classification of the parent, receipt of welfare benefits and equivalised household income), and where a child lives (region, neighbourhood deprivation, household tenure and accommodation type). The analyses presented here examined the associations between mental disorders in 5 to 10 year olds and each socioeconomic factor, before and after controlling for all factors in the adjusted analyses.

Occupational classification of the parent

In unadjusted analyses, children of a parent in routine and manual occupations were more likely to have any mental disorder (11.1%) than children whose parent worked in managerial and professional occupations (6.3%). This pattern of association was observed for behavioural disorders but was not found for emotional disorders. After controlling for other factors, no association was found between a parent’s occupational classification and the presence of any mental disorder, emotional disorders or behavioural disorders. (Table 1a, Table 1b, Table 1c)

Welfare benefits

In unadjusted analysis, children with a parent in receipt of welfare benefits were more likely to have a mental disorder (16.9%) than children with a parent not in receipt of welfare benefits (5.3%). This pattern of association was also observed for emotional and behavioural disorders. After controlling for other factors, we found:

- Increased odds of children living with a parent in receipt of welfare benefits having any mental disorder (OR 2.37, CI: 1.69 - 3.34) compared to children living with a parent not receiving benefits. (Figure 7; Table 1a)

- Increased odds of emotional disorders in children with a parent receiving welfare benefits (OR 2.65, CI: 1.68 - 4.19) than in children with a parent not receiving such benefits. (Figure 8; Table 1b)

- Increased odds of behavioural disorders in children with a parent in receipt of welfare benefits (OR 2.57, CI: 1.75 - 3.79) compared to children with a parent not receiving them. (Figure 9; Table 1c)

Equivalised household income

In unadjusted analysis, rates of any mental disorder were higher for children living in households earning in the middle-income quintile or below, compared to children living in the highest income households. This was also the case for emotional disorders and behavioural disorders. After controlling for all factors, no association was found between a child’s equivalised household income and the presence of mental disorders. (Table 1a, Table 1b, Table 1c)
Region

In unadjusted analysis, children living in London had lower rates of any mental disorder (4.8%) and behavioural disorders (1.7%) than children living in other regions. However, only the South of England had higher rates of emotional disorders (5.2%) compared to London (2.6%). After controlling for other factors:

- Increased odds of having any mental disorder were found for children living in the Midlands and East of England (OR 1.94, CI: 1.12 - 3.37) and the South of England (OR 1.85, CI: 1.05 - 3.27) compared to children living in London. (Figure 7; Table 1a)

- No association was found between region and the presence of emotional disorders. (Table 1b)

- Increased odds were found for a child living in the Midlands and East of England (OR 2.66, CI: 1.09 - 6.52) having a behavioural disorder compared to a child living in London. (Figure 9; Table 1c)

Household tenure

In unadjusted analysis, children living in social rented (17.9%) or privately rented accommodation (9.5%) were more likely to have any mental disorder than children from owner occupied accommodation (5.9%). This pattern of association was also observed for emotional disorders. However, only children from socially rented accommodation had higher rates of behavioural disorders (10.6%) compared to children living in owner occupied accommodation (2.9%). After controlling for other factors:

- Increased odds of having any mental disorder were found for children living in social rented accommodation (OR 1.63, CI: 1.14 - 2.33) compared to children living in owner occupied accommodation. (Figure 7; Table 1a)

- No difference was found in the odds of a child from social rented accommodation having an emotional disorder compared to those of children from owner occupied accommodation. (Table 1b)

- Increased odds of behavioural disorders were found for children living in social rented accommodation (OR 1.89, CI: 1.23 - 2.92) compared to children living in owner occupied accommodation. (Figure 9; Table 1c)

Neighbourhood deprivation

Neighbourhood deprivation was not found to be associated with mental disorders before or after controlling for all factors in the model. (Table 1a, Table 1b, Table 1c)

Accommodation type

Accommodation type was not found to be associated with mental disorders before or after controlling for all factors in the model. (Table 1a, Table 1b, Table 1c)
Secondary school children: factors associated with mental disorders

This section explores demographic, family and socioeconomic factors associated with mental disorders in 11 to 16 year olds when controlling for other aspects of the child’s life. We also explored whether these factors differed for emotional and behavioural disorders. The results discussed in this section can be found in the Figures section and accompanying tables.

While this section is able to show the associations between factors and the presence of mental disorders in secondary school aged children, it is not able to show whether the factors were the cause or result of the mental disorder.

**Demographics**

**Sex**

In unadjusted analysis, boys and girls were equally likely to have any mental disorder. However, girls were more likely than boys to have an emotional disorder (10.9% and 7.1% respectively) and boys were more likely than girls to have a behavioural disorder (7.4% and 5.0%, respectively). These patterns of associations emerged after controlling for other factors, where:

- No association was found between sex and the presence of any mental disorder. (Table 2a)
- Increased odds of girls having emotional disorders (OR 1.61, CI: 1.23 - 2.12) were found compared to boys. (Figure 11; Table 2b)
- Decreased odds of girls having behavioural disorders (OR 0.58, CI: 0.42 - 0.80) were found compared to boys. (Figure 12; Table 2c)

**Ethnic group**

In unadjusted analysis, rates of any mental disorder were higher in children identifying as White (16.9%) compared to children from Black and Minority Ethnic backgrounds (6.5%). This was also the case for emotional and behavioural disorders. After controlling for other factors, we found:

- Decreased odds of a child from Black and Minority Ethnic backgrounds having any mental disorder (OR 0.27, CI: 0.19 - 0.40) compared to a child identifying as White. (Figure 10; Table 2a)
- Decreased odds of children from Black and Minority Ethnic groups having emotional disorders (OR 0.29, CI: 0.17 - 0.48) compared to White children. (Figure 11; Table 2b)
- Decreased odds of children from Black and Minority Ethnic backgrounds having behavioural disorders (OR 0.34, CI: 0.20 - 0.57) compared to White children. (Figure 12; Table 2c)
Family characteristics

Family functioning

In unadjusted analysis, children with unhealthy family functioning were more likely to have any mental disorder (25.2%) than those with healthy family functioning (11.2%). Similarly, this pattern was observed for emotional and behavioural disorders. After controlling for other factors, we found:

- Increased odds of a child from an unhealthy functioning family having any mental disorder (OR 2.13, CI: 1.63 - 2.77) compared to children from families of healthy functioning. (Figure 13; Table 2a)

- Increased odds of children from unhealthy functioning families having emotional disorders (OR 1.79, CI: 1.28 - 2.51) compared to those from healthy functioning families. (Figure 14; Table 2b)

- Increased odds of behavioural disorders (OR 2.86, CI: 2.03 - 4.02) in children from unhealthy functioning families compared to children with healthy family functioning. (Figure 15; Table 2c)

Parental mental health

In unadjusted analysis, the presence of any mental disorder was more common in children whose parents were considered to have poor mental health (29.6%) than in children whose parents were considered to have good mental health (10.9%). This pattern of association was also observed for emotional and behavioural disorders. After controlling for all factors, we found:

- Increased odds of having any mental disorder for children of parents with poor mental health (OR 2.48, CI: 1.92 - 3.21) compared to children whose parents were considered to have good mental health. (Figure 13; Table 2a)

- Increased odds of emotional disorders in children whose parents had poor mental health (OR 2.34, CI: 1.72 - 3.18) compared to children whose parents had good mental health. (Figure 14; Table 2b)

- Increased odds of a child whose parent was considered to have poor mental health having a behavioural disorder (OR 2.64, CI: 1.86 - 3.74) compared to children whose parent had good mental health. (Figure 15; Table 2c)
Qualification status of the parent

In unadjusted analysis, no association was found between qualification status of the parent and the presence of any mental disorder or emotional disorders. However, behavioural disorders were more common in children whose parent reported having no qualifications (8.9%) than in children whose parent reported having at least one qualification (5.7%). After controlling for all factors, the qualification status of the parent was not found to be associated with any mental disorder, emotional or behavioural disorders in 11 to 16 year olds.

Marital status of the parent

In unadjusted analysis, children whose parent reported being a lone parent (single, 27.4% or previously married, 18.5%) were more likely to have any mental disorder than children whose parent reported being married (11.6%). This was also the case for emotional and behavioural disorders. After controlling for all factors, we found:

- Increased odds of children of a single lone parent having any mental disorder (OR 1.74, CI: 1.18 - 2.55) compared to children of a married parent. (Figure 13; Table 2a)

- No association between marital status of the parent and the presence of emotional or behavioural disorders. (Table 2b, Table 2c)

Family type

Family type was not found to be associated with mental disorders in secondary school aged children before or after controlling for all factors. (Table 2a, Table 2b, Table 2c)
Socioeconomics

This section explores socioeconomic factors related to income (occupational classification of the parent, receipt of welfare benefits and equivalent household income), and where a child lives (region, neighbourhood deprivation, household tenure and accommodation type). The analysis presented here examined the associations between mental disorders in 11 to 16 year olds and each socioeconomic factor, before and after controlling for all factors in the model.

Occupational classification of the parent

In unadjusted analysis, similar rates of any mental disorder were found in children whose parent reported working in any of the three occupation classification groups (managerial and professional occupations, intermediate occupations, and routine and manual occupations). This was also observed for emotional and behavioural disorders in 11 to 16 year olds. After controlling for all factors:

- Decreased odds of having an emotional disorder were found for children whose parent reported working in intermediate occupations (OR 0.67, CI: 0.45 - 0.98) compared to children whose parent reported working as a manager or professional. (Figure 17; Table 2b)

- No difference between the odds of a child whose parent reported working in intermediate or routine and manual occupations having any mental disorder and the odds of a child whose parent reported working in managerial and professional occupations. (Table 2a)

- No difference between the odds of a child whose parent reported working in intermediate or routine and manual occupations having behavioural disorders and the odds of a child whose parent reported working in managerial and professional occupations. (Table 2c)

Welfare benefits

In unadjusted analysis, rates of any mental disorder were higher in 11 to 16 year olds with a parent in receipt of welfare (related to low-income and disability) benefits (20.7%) compared to children with a parent not in receipt of these benefits (10.1%). This pattern of association was also observed for emotional and behavioural disorders. After controlling for all factors, we found:

- Increased odds of having any mental disorder for a child with a parent in receipt of welfare benefits (OR 2.09, CI: 1.53 - 2.86) compared to a child with a parent not in receipt of these benefits. (Figure 16; Table 2a)

- Increased odds of emotional disorders for children of a parent in receipt of welfare benefits (OR 2.03, CI: 1.39 - 2.96) compared to children of a parent not receiving them. (Figure 17; Table 2b)
• Increased odds of **behavioural disorders** for children with a parent receiving welfare benefits (OR 1.56, CI: 1.01 - 2.41) compared to children of a parent not receiving welfare benefits. (Figure 18; Table 2c)

**Equivalised household income**

In unadjusted analysis, children of secondary school age living in households with the highest levels of income (8.2%) had lower rates of any mental disorder compared to children with lower levels of household income. However, rates of emotional and behavioural disorders were higher in children from middle-income households or below compared to children from households with the highest levels of income (5.3% and 2.3% respectively). After controlling for all factors, we found:

• Increased odds of having **any mental disorder** for children whose equivalised household income fell in the second highest (OR 1.61, CI: 1.02 - 2.54) or middle (OR 1.83, CI: 1.14 - 2.93) income groups compared to children whose equivalised household income fell in the highest income group. (Figure 16; Table 2a)

• No association between the presence of **emotional disorders** and equivalised household income. (Table 2b)

• Increased odds of having a **behavioural disorder** for children in middle-income households (OR 2.35, CI: 1.09 - 5.08) compared to children in the highest earning households. (Figure 18; Table 2c)

**Region**

In unadjusted analysis, rates of any mental disorder were higher in 11 to 16 year olds living in the North (17.2%) or South of England (14.7%) compared to London (10.0%). Emotional disorders were more likely to occur in children living in the South of England (10.1%) than in children living in London (6.0%). Rates of behavioural disorders were higher for children living outside London compared to those living in London (2.5%). After controlling for other factors:

• Increased odds of **behavioural disorders** were found for children living outside of London, compared to children living in London. The highest odds were observed for children in the North of England (OR 3.48, CI: 1.74 - 6.98), followed by the Midlands and East of England (OR 2.41, CI: 1.24 - 4.70) and the South of England (OR 2.19, CI: 1.13 - 4.27). (Figure 18; Table 2c)

• No association was found between region and the presence of **any mental disorder** or **emotional disorders**. (Table 2a, Table 2b)
Neighbourhood deprivation

In unadjusted analysis, no association was found between neighbourhood deprivation and the presence of any mental disorder or emotional disorders in 11 to 16 year olds. However, behavioural disorders were more common in children living in the most deprived areas of England (8.3%) than in children from the least deprived areas (3.8%). After controlling for all factors, the deprivation level of a child’s neighbourhood was not found to be associated with any mental disorder, emotional disorders or behavioural disorders. (Table 2a, Table 2b, Table 2c)

Household tenure

In unadjusted analysis, children living in owner occupied accommodation had lower rates of any mental disorder (11.5%) compared to children from private (16.7%) or social rented accommodation (21.1%). This was also the case for emotional disorders. Rates of behavioural disorders were higher in children from social rented accommodation (11.6%) than in children from owner occupied accommodation (4.5%). After controlling for all factors, we found:

- No association between household tenure and the presence of any mental disorder. (Table 2a)

- No difference in the odds of children in rented accommodation (private or social) having an emotional disorder and those living in owner occupied accommodation. (Table 2b)

- Increased odds of behavioural disorders in children from social rented accommodation (OR 1.75, CI: 1.12 - 2.73) compared to children from owner occupied accommodation. (Figure 18; Table 2c)

Accommodation type

Accommodation type was not found to be associated with mental disorders before or after controlling for all factors. (Table 2a, Table 2b, Table 2c)
Preschool children: factors associated with any mental disorder

This section explores which demographic, family and socioeconomic factors were associated with the presence of any mental disorder in preschool aged children before and after controlling for other factors. The unadjusted analyses in this section are based on the Preschool Children topic report, with the inclusion of some new factors. In addition, the adjusted analysis in this section controls for all factors in the logistic regression model. Associations with emotional and behavioural disorders were not studied for preschool children because of small sample sizes. The results discussed in this section can be found in the Figures section and accompanying tables.

While this section is able to show the associations between factors and the presence of mental disorders in preschool children, it is not able to show whether the factors were the cause or result of the mental disorder.

Due to the challenges of measuring the rate of mental disorders in this age group, the figures presented in this section have been labelled as “Experimental Statistics”. Experimental Statistics are Official Statistics that are published to involve users and stakeholders in their development, and to introduce quality at an early stage.

Demographics

Sex

In unadjusted analysis, boys (6.8%) were more likely than girls (4.2%) to have a mental disorder. After controlling for all factors, decreased odds of having any mental disorder were found for girls (OR 0.56, CI: 0.35 - 0.90) compared to boys. (Figure 19; Table 3)

Ethnic group

In unadjusted analysis, similar rates of any mental disorder were found in children of White and Black or Minority Ethnic backgrounds. After controlling for other factors in the model, children of Black and Minority Ethnic backgrounds were found to have lower odds (OR 0.45, CI: 0.22 - 0.93) of having a mental disorder than White children. (Figure 19; Table 3)
**Family characteristics**

**Family functioning**

In unadjusted analysis, children from families with unhealthy functioning were more likely to have a mental disorder (10.2%) than children from healthy functioning families (4.8%). However, after controlling for other factors, the odds of children from unhealthy functioning families having a mental disorder were not significantly different to the odds of children with healthy family functioning. (Table 3)

**Parental mental health**

In unadjusted analysis, children of parents with poor mental health were more likely (14.9%) to have any mental disorder than children whose parents were considered to have good mental health (4.1%). This remained the case after controlling for other factors, where the odds of a child whose parents had poor mental health were almost 3 times greater (OR 2.86, CI: 1.61 - 5.10) than the odds of children whose parents had good mental health. (Figure 20; Table 3)

**Qualification status of the parent**

In unadjusted analysis, no association was found between the qualification status of the parent and the presence of any mental disorder in preschool children. This was also the case after controlling for all factors. (Table 3)

**Marital status of the parent**

In unadjusted analysis, children of a married parent were less likely to have a mental disorder (3.9%) than children of a cohabiting (7.1%) or lone parent (10.5%). However, after controlling for other factors, marital status of the parent was not found to be associated with the presence of any mental disorder. (Table 3)

**Family type**

In unadjusted analysis, rates of any mental disorder were higher in children living with stepsiblings (9.5%) than in children not living with them (5.1%). However, after controlling for all factors, a child’s family type was not associated with the presence of any mental disorder. (Table 3)
Socioeconomics

This section explores socioeconomic factors related to income (occupational classification of the parent, receipt of welfare benefits and equivalised household income), and where a child lives (region, neighbourhood deprivation, household tenure and accommodation type). The analysis presented here examines the associations between mental disorders in 2 to 4 year olds and each socioeconomic factor before and after controlling for all factors in the model.

**Occupational classification of the parent**

In unadjusted analysis, occupational classification of the parent was found to be associated with the presence of any mental disorder, with children of a parent in routine and manual occupations being more likely to have a mental disorder (7.0%) than children whose parent reported working as a manager or other professional (3.5%). This was not observed after controlling for all factors, where no association between occupational classification of the parent and the presence of a mental disorder was found. (Table 3)

**Welfare benefits**

In unadjusted analysis, children living with a parent in receipt of welfare benefits were more likely to have any mental disorder (10.4%) than children whose parent was not receiving such benefits (2.8%). After controlling for all factors in the model this pattern of association was still found, where the odds of a child whose parent received welfare benefits having a mental disorder were over twice (OR 2.44, CI: 1.22 – 4.87) those of a child whose parent was not receiving these benefits. (Figure 21; Table 3)

**Equivalised household income**

In unadjusted analysis, 8.9% of children living in the third of households with the lowest levels of income had a mental disorder, compared to 4.0% of children in households with higher levels of income. After controlling for all factors, household income was not found to be associated with a child having any mental disorder. (Table 3)

**Region**

In unadjusted analysis, differences in the rates of mental disorders were found between regions. However, after controlling for all factors in the model, the odds of children living in London having a mental disorder were not significantly different to those living outside of London. (Table 3)

**Neighbourhood deprivation**

Neighbourhood deprivation was not found to be associated with the presence of any mental disorder before or after controlling for all factors. (Table 3)
Household tenure

In unadjusted analysis, children living in socially rented accommodation were more likely (11.2%) to have a mental disorder than those living in owner occupied accommodation (3.4%). This was not observed after controlling for all factors, as household tenure was not found to be associated with having a mental disorder. (Table 3)

Accommodation type

Accommodation type was not found to be associated with the presence of any mental disorder before or after controlling for all factors. (Table 3)
Figures

Figure 2: Demographic factors associated with any mental disorder in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

Sex
Compared to boys (OR = 1)

Ethnic group
Compared to White (OR = 1)

Odds Ratio

Source: NHS Digital
Figure 3: Demographic factors associated with behavioural disorders in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

- **Sex** compared to boys (OR = 1)
- **Ethnic group** compared to White (OR = 1)

Source: NHS Digital
Figure 4: Family-related factors associated with any mental disorder in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

- **Family functioning**
  - Compared to healthy family functioning (OR = 1)
  - Unhealthy family functioning

- **Parental mental health**
  - Compared to good mental health (OR = 1)
  - Poor mental health

- **Qualification status of the parent**
  - Compared to any qualification (OR = 1)
  - No qualifications

- **Marital status of the parent**
  - Compared to married (OR = 1)
  - Cohabiting
  - Lone parent - single
  - Lone parent - previously married

- **Family type**
  - Compared to no stepchildren or stepsiblings in household (OR = 1)
  - Stepchildren and/or stepsiblings in household

Odds Ratio

Source: NHS Digital
Figure 5: Family-related factors associated with emotional disorders in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

Parental mental health
Compared to good mental health (OR = 1)

Footnote
The following family-related factors were not associated with emotional disorders in 5 to 10 year olds after controlling for all factors: marital status of the parent, family type.

The following family-related factors did not have any categories where the odds ratios differed significantly from the reference category: family functioning, qualification status of the parent.
Figure 6: Family-related factors associated with behavioural disorders in 5 to 10 year olds 2017

Base: 5 to 10 year olds

**Family functioning**
Compared to healthy family functioning (OR = 1)

**Parental mental health**
Compared to good mental health (OR = 1)

**Family type**
Compared to no stepchildren or stepsiblings in household (OR = 1)

The following family-related factors were not associated with behavioural disorders in 5 to 10 year olds after controlling for all factors: marital status of the parent.

The following family-related factors did not have any categories where the odds ratios differed significantly from the reference category: qualification status of the parent.
Figure 7: Socioeconomic factors associated with any mental disorder in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

Welfare benefits
Compared to not in receipt of welfare benefits (OR = 1)

Region
Compared to London (OR = 1)

South of England
North of England
Midlands and East of England

Private rented
Social rented

Household tenure
Compared to owner occupied (OR = 1)

0.1 Less likely
1 Odds Ratio
10 More likely

Source: NHS Digital

Footnote
The following socioeconomic factors were not associated with any mental disorder in 5 to 10 year olds after controlling for all factors: occupational classification of the parent, equivalised household income, neighbourhood deprivation, accommodation type.
Figure 8: Socioeconomic factors associated with emotional disorders in 5 to 10 year olds, 2017

Base: 5 to 10 year olds

Footnote
The following socioeconomic factors were not associated with emotional disorders in 5 to 10 year olds after controlling for all factors: occupational classification of the parent, equivalised household income, region, neighbourhood deprivation, accommodation type.

The following socioeconomic factors did not have any categories where the odds ratios differed significantly from the reference category: household tenure.
**Figure 9: Socioeconomic factors associated with behavioural disorders in 5 to 10 year olds, 2017**

Base: 5 to 10 year olds

- **Welfare benefits**: Compared to not in receipt of welfare benefits (OR = 1)
- **Region**: Compared to London (OR = 1)
  - South of England
  - North of England
  - Midlands and East of England
- **Household tenure**: Compared to owner occupied (OR = 1)
  - Private rented
  - Social rented

Odds Ratio

Source: NHS Digital

**Footnote**
The following socioeconomic factors were not associated with behavioural disorders in 5 to 10 year olds after controlling for all factors: occupational classification of the parent, equivalised household income, neighbourhood deprivation, accommodation type.
Figure 10: Demographic factors associated with any mental disorder in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

Footnote
The following demographic factors were not associated with any mental disorder in 11 to 16 year olds after controlling for all factors: sex.
Figure 11: Demographic factors associated with emotional disorders in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

Sex
Compared to boys (OR = 1)

Girls

Ethnic group
Compared to White (OR = 1)

Black and Minority Ethnic

Source: NHS Digital

Odds Ratio

Less likely 1 More likely
Figure 12: Demographic factors associated with behavioural disorders in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

![Diagram showing odds ratios for sex and ethnicity comparison]

Source: NHS Digital
Figure 13: Family-related factors associated with any mental disorder in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

Family functioning
Compared to healthy family functioning (OR = 1)

Parental mental health
Compared to good mental health (OR = 1)

Marital status of the parent
Compared to married (OR = 1)

Unhealthy family functioning

Poor mental health

Cohabiting

Lone parent - single

Lone parent - previously married

Odds Ratio

Source: NHS Digital

Footnote
The following family-related factors were not associated with any mental disorder in 11 to 16 year olds after controlling for all factors: qualification status of the parent, family type.
Footnote
The following family-related factors were not associated with emotional disorders in 11 to 16 year olds after controlling for all factors: qualification status of the parent, marital status of the parent, family type.
Figure 15: Family-related factors associated with behavioural disorders in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

Family functioning
Compared to healthy family functioning (OR = 1)

Parental mental health
Compared to good mental health (OR = 1)

Unhealthy family functioning

Poor mental health

Footnote
The following family-related factors were not associated with behavioural disorders in 11 to 16 year olds after controlling for all factors: qualification status of the parent, marital status of the parent, family type.

Source: NHS Digital
Figure 16: Socioeconomic factors associated with any mental disorder in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

Footnote

The following socioeconomic factors were not associated with any mental disorder in 11 to 16 year olds after controlling for all factors: region, neighbourhood deprivation, household tenure, accommodation type.

The following socioeconomic factors did not have any categories where the odds ratios differed significantly from the reference category: occupational classification of the parent.
Figure 17: Socioeconomic factors associated with emotional disorders in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

- Occupational classification of the parent
  Compared to managerial and professional occupations (OR = 1)

- Welfare benefits
  Compared to not in receipt of welfare benefits (OR = 1)

Source: NHS Digital

Odds Ratio

Footnote

The following socioeconomic factors were not associated with emotional disorders in 11 to 16 year olds after controlling for all factors: equivalised household income, region, neighbourhood deprivation, accommodation type.

The following socioeconomic factors did not have any categories where the odds ratios differed significantly from the reference category: household tenure.
Figure 18: Socioeconomic factors associated with behavioural disorders in 11 to 16 year olds, 2017

Base: 11 to 16 year olds

- **Welfare benefits**
  Compared to not in receipt of welfare benefits (OR = 1)

- **Equivalised household income**
  Compared to highest quintile (OR = 1)

- **Region**
  Compared to London (OR = 1)

- **Household tenure**
  Compared to owner occupied (OR = 1)

Footnote
The following socioeconomic factors were not associated with behavioural disorders in 11 to 16 year olds after controlling for all factors: neighbourhood deprivation, accommodation type. The following socioeconomic factors did not have any categories where the odds ratios differed significantly from the reference category: occupational classification of the parent.
Figure 19: Demographic factors associated with any mental disorder in 2 to 4 year olds, 2017

Base: 2 to 4 year olds

- **Sex**: Compared to boys (OR = 1)
- **Ethnic group**: Compared to White (OR = 1)

Source: NHS Digital
Figure 20: Family-related factors associated with any mental disorder in 2 to 4 year olds, 2017

Base: 2 to 4 year olds

Parental mental health
Compared to good mental health (OR = 1)

Footnote
The following family-related factors were not associated with any mental disorder in 2 to 4 year olds after controlling for all factors: qualification status of the parent, marital status of the parent, family type.
The following family-related factors did not have any categories where the odds ratios differed significantly from the reference category: family functioning.
Figure 21: Socioeconomic factors associated with any mental disorder in 2 to 4 year olds, 2017

Base: 2 to 4 year olds

**Footnote**

The following socioeconomic factors were not associated with any mental disorder in 2 to 4 year olds after controlling for all factors: occupational classification of the parent, equivalised household income, neighbourhood deprivation, household tenure, accommodation type. The following socioeconomic factors did not have any categories where the odds ratios differed significantly from the reference category: region.
Methods

Survey design

The Mental Health of Children and Young People (MHCYP) survey was conducted with 5 to 15 year olds living in Britain in 1999 and 5 to 16 year olds living in Britain in 2004. The 1999 and 2004 surveys sampled from Child Benefit records. For the 2017 survey a stratified multistage random probability sample of 18,029 children was drawn from NHS Patient Register in October 2016. Children and young people were eligible to take part if they were aged 2 to 19, lived in England, and were registered with a GP. Children, young people and their parents were interviewed face-to-face at home using a combination of Computer Assisted Personal Interview (CAPI) and Computer Assisted Self Interview (CASI), between January and October 2017. A short paper or online questionnaire was completed by a nominated teacher for children aged 5 to 16 years old. Data collection varied with the selected child’s age:

- 2 to 10 year olds: parent interview and teacher interview (teacher interview was only for children aged 5 to 10 years old).
- 11 to 16 year olds: parent interview, child interview and teacher interview.
- 17 to 19 year olds: young person and parent interview (if parent present at the same address).

Productive interviews (involving one or more participants in each household) were achieved for 9,117 children (1,463 2 to 4 year olds; 3,597 5 to 10 year olds; 3,121 11 to 16 year olds; 936 17 to 19 year olds), and 3,595 teachers (54% of eligible children). The survey included the detailed and comprehensive Development and Well-Being Assessment (DAWBA). This allowed the assessment of emotional, hyperkinetic, behavioural and less common disorders, like autism. After interviews were complete, eleven trained clinical raters reviewed the data to reach disorder codings for each participant. Raters applied the diagnostic criteria for specific disorders set out in the tenth International Classification of Disease (ICD-10) (WHO, 1992), and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (APA, 2013).

The 2017 interviews and analyses are based on participants’ age at 31 August 2017, with participants grouped with their peers in terms of school year.

Further information on the methodology used in the 2017 survey can be found in the Survey Design and Methods Report.
Weighting

In the other topic reports, the data were weighted to be representative of all 2 to 19 year olds in England, accounting for those who did not take part in the survey (population weight). This topic report used the average population weight for each age group (2 to 4, 5 to 10, 11 to 16) to calculate a sample weight, which scaled back the data to the achieved sample size within each age group. This improved the interpretation of statistics related to the model of best fit. The sample weight was derived as follows:

\[
\text{Sample weight} = \frac{\text{Population weight}}{\text{Average population weight}}
\]

Logistic regression

This topic report explores the results from a series of binomial logistic regression models, which have been used to explain the relationships between the presence of a mental disorder and a range of factors. The logistic regression models allow us to explore which factors remain associated with mental disorders while controlling for multiple factors at the same time, and how the likelihood of a mental disorder differs for each level within a factor (indicated by odds ratios). For example, exploring whether a child’s sex is associated with the presence of a mental disorder, while controlling for household income.

One of the main uses of logistic regression is the prediction of group membership (i.e. whether a child had a mental disorder). Since logistic regression calculates the probability of one outcome over another from a total of two possible outcomes, the results of the analysis are in the form of an odds ratio.

The goal of modelling with logistic regression is to correctly predict the category of outcome for individual cases using the model that delivers the desired level of prediction with as few factors as possible. To accomplish this goal, a model is created that includes all predictor factors that are useful in predicting the outcome variable.

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1 The average population weight for children aged 2 to 4 was 1391.870.
The average population weight for children aged 5 to 10 was 1154.151.
The average population weight for children aged 11 to 16 was 1180.690.
Interpreting odds ratios

The odds ratios in this report can be reported in terms of a given category’s odds compared to the reference category, and can potentially be interpreted in the following ways:

<table>
<thead>
<tr>
<th>Odds ratio (Reference category = 1.00)</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 0 and 0.49</td>
<td>Much less likely than reference category to have a mental disorder</td>
</tr>
<tr>
<td>Between 0.5 and 1.00</td>
<td>Less likely than reference category to have a mental disorder</td>
</tr>
<tr>
<td>Between 1.01 and 2.00</td>
<td>More likely than reference category to have a mental disorder</td>
</tr>
<tr>
<td>2.01 or more</td>
<td>Much more likely than reference category to have a mental disorder</td>
</tr>
</tbody>
</table>

For example, the odds between boys and girls can be interpreted by setting boys as the reference category (with an odds ratio of 1.00). We can then assess the odds of a girl having a mental disorder as follows. If the odds ratios for girls:

- Are 3, this can be interpreted as ‘the odds of a girl having a mental disorder are three times greater than the odds of a boy having a mental disorder’.
- Are 1.5, this can be interpreted as ‘the odds of a girl having a mental disorder are one and a half times greater than the odds of a boy having a mental disorder’.
- Are 0.5, this can be interpreted as ‘girls are less likely than boys to have a mental disorder’, or ‘girls have half the odds of having a mental disorder compared with boys’. This can also be interpreted as ‘the odds of a boy having a mental disorder are twice the odds of a girl having a mental disorder’. This number can be derived by dividing one by the odds of a girl having a mental disorder (i.e. 1/0.5 = 2).
- Are 0.2, this can be interpreted as ‘girls are much less likely than boys to have a mental disorder’. This can also be interpreted as ‘the odds of a boy having a mental disorder are five times greater than the odds of a girl having a mental disorder’. Again, this can be derived by dividing one by the odds of a girl having a mental disorder (i.e. 1/0.2 = 5).
Backwards logistic regression

The goal of logistic regression is to fit a model that includes all factors that are useful in predicting the outcome variable. This report used backwards regression to look at the significant predictors of mental disorders in children. Separate models were produced for all three age groups due to the differing characteristics and predictors of mental disorders through childhood and adolescence.

The backwards regression process involved:

- Starting with a model of fourteen factors as independent variables and the presence of a mental disorder as the dependent variable.

- Assessing the p-value associated (Wald Chi-Squared Test) with each independent variable, and manually removing the factor with the largest non-significant p-value one at a time (where our null hypothesis is that a factor has no association with mental disorders in children).

- Repeating this process until a model was produced containing factors that had significant associations with the dependent variable. In some instances, non-significant factors were retained if they contributed to the quality of the final model.

Determining a model of best-fit

Following the iterative process as explained above, a final model was chosen by assessing the Akaike information criterion (AIC), as a measure of the goodness of fit.

The AIC is widely used to determine the quality of a statistical model for a given set of data and is therefore used when selecting the model that best represents the data. It estimates the information lost by a given model, relative to another model: the less information a model loses, the higher the quality of that model. In making an estimate of the information lost, the AIC considers both the goodness of fit and simplicity of the model (reducing the issues of overfitting or underfitting our final regression model).

A final model for each age group was determined by assessing, at each iteration, the AIC values and the number of independent variables in the model. The iteration with the lesser number of variables was preferred to avoid overfitting the model. As a result of this approach, the final models for all age groups may have included factors that did not have significant associations with the presence of a mental disorder, but nevertheless made a contribution to the quality of the overall model.

For example, the logistic regression model for 2 to 4 year olds included household tenure in the final model, despite a p-value suggesting no association with mental disorders for this age group. Including this factor resulted in a more optimal model, with household tenure aiding interpretation of other factors in the model.
Factors in the logistic regression model

The factors chosen for inclusion in the logistic regression models in this report were studied in the 2017 series analyses and in the 2004 series of the survey (Green et al., 2005). The child’s general health and the presence of special educational needs were studied in the 2017 series but were excluded from the model as it is possible that some aspects of these factors can also include elements of the child’s mental health. The number of children in the household and ACORN group were also included in the 2004 series but were excluded from the model due to changes in methodology, definitions and scope.

To prepare the factors for the model, response categories were collapsed where appropriate to achieve the simplest model (with the least assumptions and factors) but with the greatest explanatory power. Some factor categories for the 2 to 4 age group were collapsed further due to small sample sizes; these are outlined in italics below. More information on each factor can be found in the Definitions section of this report.

The factors selected were categorised into three groups: demographics (Table 4), family-related factors (Table 5) and socieconomics (Table 6).

Table 4: Demographic factors in the model

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>1 Boys (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Girls</td>
</tr>
<tr>
<td>Ethnic group</td>
<td>1 White (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Black and Minority Ethnic</td>
</tr>
</tbody>
</table>
### Table 5: Family-related factors in the model

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family functioning</td>
<td>1 Score 0 to 2.00 - Healthy functioning (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Score 2.01 or more - Unhealthy functioning</td>
</tr>
<tr>
<td>Parental mental health</td>
<td>1 Score 0 to 3 – good mental health (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Score 4 or more – poor mental health (indicative of a common mental disorder)</td>
</tr>
<tr>
<td>Qualification status of the</td>
<td>1 Any qualification (Reference category)</td>
</tr>
<tr>
<td>parent</td>
<td>2 No qualifications</td>
</tr>
<tr>
<td>Marital status of the parent</td>
<td>1 Married (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Cohabiting</td>
</tr>
<tr>
<td></td>
<td>3 Lone parent – single</td>
</tr>
<tr>
<td></td>
<td>4 Lone parent – previously married</td>
</tr>
<tr>
<td>Marital status of the parent</td>
<td>1 Married (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Cohabiting</td>
</tr>
<tr>
<td></td>
<td>3 Lone parent – single or previously married</td>
</tr>
<tr>
<td>Family type</td>
<td>0 Neither stepchildren nor stepsiblings in household (Reference category)</td>
</tr>
<tr>
<td></td>
<td>1 Either/both stepchildren and/or stepsiblings in household</td>
</tr>
</tbody>
</table>
Table 6: Socioeconomic factors in the model

<table>
<thead>
<tr>
<th>Factor</th>
<th>Response categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational classification of the parent</td>
<td>1 Managerial and professional occupations (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Intermediate occupations</td>
</tr>
<tr>
<td></td>
<td>3 Routine and manual occupations</td>
</tr>
<tr>
<td>Receipt of welfare (low-income or disability) benefits</td>
<td>1 No (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Yes</td>
</tr>
<tr>
<td>Equivalised household income</td>
<td>1 Highest quintile (&gt; £43,624) (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Second highest quintile (£27,274 – £43,624)</td>
</tr>
<tr>
<td></td>
<td>3 Middle quintile (£17,529 – £27,273)</td>
</tr>
<tr>
<td></td>
<td>4 Second lowest quintile (£10,636 – £17,528)</td>
</tr>
<tr>
<td></td>
<td>5 Lowest quintile (£0 – £10,635)</td>
</tr>
<tr>
<td>Equivalised household income</td>
<td>1 Highest / Middle tertile (&gt; £15,205) (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Lowest tertile (&lt;= £15,205)</td>
</tr>
<tr>
<td>Region</td>
<td>1 London (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 South of England</td>
</tr>
<tr>
<td></td>
<td>3 North of England</td>
</tr>
<tr>
<td></td>
<td>4 Midlands and East of England</td>
</tr>
<tr>
<td>Neighbourhood deprivation</td>
<td>1 Least deprived (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 2nd quintile</td>
</tr>
<tr>
<td></td>
<td>3 3rd quintile</td>
</tr>
<tr>
<td></td>
<td>4 4th quintile</td>
</tr>
<tr>
<td></td>
<td>5 Most deprived</td>
</tr>
<tr>
<td>Neighbourhood deprivation</td>
<td>1 Least deprived to 3rd quintile (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 4th quintile to most deprived</td>
</tr>
<tr>
<td>Household tenure</td>
<td>1 Owner occupied (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Private rented</td>
</tr>
<tr>
<td></td>
<td>3 Social rented</td>
</tr>
<tr>
<td>Accommodation type</td>
<td>1 House or bungalow (Reference category)</td>
</tr>
<tr>
<td></td>
<td>2 Flat or maisonette / Other</td>
</tr>
</tbody>
</table>
Pre-modelling considerations

Treatment of missing values

Some factors in the models experienced high levels of non-response. Table 7 shows the number of cases with item non-response and the percentage of missing cases within the corresponding age group.

Table 7: Levels of non-response for each factor, by age

<table>
<thead>
<tr>
<th>Factor</th>
<th>2 to 4</th>
<th>5 to 10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Missing cases</td>
<td>%</td>
<td>Missing cases</td>
</tr>
<tr>
<td>Sex</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ethnic group</td>
<td>1</td>
<td>0.07</td>
<td>1</td>
</tr>
<tr>
<td>Family functioning</td>
<td>27</td>
<td>1.85</td>
<td>53</td>
</tr>
<tr>
<td>Parental mental health</td>
<td>21</td>
<td>1.44</td>
<td>44</td>
</tr>
<tr>
<td>Qualification status of the parent</td>
<td>102</td>
<td>6.97</td>
<td>192</td>
</tr>
<tr>
<td>Marital status of the parent</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Family type</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Occupational classification of the parent</td>
<td>147</td>
<td>10.05</td>
<td>411</td>
</tr>
<tr>
<td>Receipt of welfare benefits</td>
<td>129</td>
<td>8.82</td>
<td>255</td>
</tr>
<tr>
<td>Equivalised household income</td>
<td>140</td>
<td>9.57</td>
<td>331</td>
</tr>
<tr>
<td>Region</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Neighbourhood deprivation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household tenure</td>
<td>4</td>
<td>0.27</td>
<td>5</td>
</tr>
<tr>
<td>Accommodation type</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The models in this report included cases with item non-response for 2 to 16 year olds, with missing values treated as a response category for each factor (where at least one missing value was present). While all missing values were included in the model, they are only presented as a response category in the accompanying data tables where they represented 30 or more cases.

As demonstrated in table 7, four factors (qualification status of the parent, occupational classification of the parent, receipt of welfare benefits and equivalised household income) had at least 30 cases with missing data for 2 to 4, 5 to 10 and 11 to 16 year olds, with an additional two factors (family functioning and parental mental health) for 5 to 10 and 11 to 16 year olds. In the accompanying data tables, missing values for these factors have been presented as ‘Not available’.
Testing for multicollinearity

Multicollinearity arises when two or more independent variables in the logistic regression model are highly related to each other, therefore introducing the possibility of a biased outcome (Yoo et al., 2014). It is important to test for multicollinearity within the proposed model to ensure efficiency and identify any variables that may be problematic. Prior to running the logistic regression models, tests identifying multicollinearity among factors were conducted by looking at the variance inflation factor (VIF).

Variance inflation factor (VIF)

The VIF is a numerical representation of the degree of multicollinearity that is present in a dataset. It is calculated for each factor and determines how much that factor is correlated with all other factors in the model. If the factor is closely related to at least one other factor in the model, then the estimate of the association between that factor and the variable of interest (whether a child has a mental disorder) will be less precise.

A VIF value of 1 indicates no multicollinearity among the independent variables. A VIF value greater than 1 suggests moderate correlation among the independent variables, while a VIF value between 5 and 10 indicates high levels of multicollinearity. If the VIF value is above 10, it can be assumed that the regression coefficients will be poorly estimated due to the multicollinearity. In models with multiple independent variables, multicollinearity may indicate a problem when the VIF values are near or above 5 (Akinwande et al., 2015). These variables should be treated with caution, while independent variables with a VIF above 10 should be removed from the model. Table 8 shows the VIF values for each factor in the models.

Table 8: Variance inflation factors (VIFs) for each independent variable, by age

<table>
<thead>
<tr>
<th></th>
<th>2 to 4 model</th>
<th>5 to 10 model</th>
<th>11 to 16 model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>1.01</td>
<td>1.00</td>
<td>1.01</td>
</tr>
<tr>
<td>Ethnic group</td>
<td>1.14</td>
<td>1.11</td>
<td>1.13</td>
</tr>
<tr>
<td>Family functioning</td>
<td>1.13</td>
<td>1.12</td>
<td>1.16</td>
</tr>
<tr>
<td>Parental mental health</td>
<td>1.03</td>
<td>1.03</td>
<td>1.03</td>
</tr>
<tr>
<td>Qualification status of the parent</td>
<td>1.30</td>
<td>1.24</td>
<td>1.20</td>
</tr>
<tr>
<td>Marital status of the parent</td>
<td>1.09</td>
<td>1.07</td>
<td>1.11</td>
</tr>
<tr>
<td>Family type</td>
<td>1.07</td>
<td>1.04</td>
<td>1.06</td>
</tr>
<tr>
<td>Occupational classification of the parent</td>
<td>1.10</td>
<td>1.24</td>
<td>1.26</td>
</tr>
<tr>
<td>Receipt of welfare benefits</td>
<td>1.18</td>
<td>1.17</td>
<td>1.14</td>
</tr>
<tr>
<td>Equivalised household income</td>
<td>1.16</td>
<td>1.19</td>
<td>1.16</td>
</tr>
<tr>
<td>Region</td>
<td>1.11</td>
<td>1.16</td>
<td>1.20</td>
</tr>
<tr>
<td>Neighbourhood deprivation</td>
<td>1.51</td>
<td>1.53</td>
<td>1.42</td>
</tr>
<tr>
<td>Household tenure</td>
<td>1.23</td>
<td>1.25</td>
<td>1.20</td>
</tr>
<tr>
<td>Accommodation type</td>
<td>1.17</td>
<td>1.17</td>
<td>1.19</td>
</tr>
</tbody>
</table>
Guidance when reading this report

- While this report is able to show the associations between a factor and presence of mental disorders, it is not able to show whether the factor was the cause or result of the mental disorder. For example, an association was found between the poor mental health of the parent and the presence of a mental disorder in children. However, this report is not able to say whether the presence of a mental disorder in a child was the result of a parent’s poor mental health, or whether the parent’s poor mental health was a result of the child’s mental disorder.

- ‘Parent’ factors (for example, qualification status, marital status and occupational classification) were based on the household representative person (HRP). This was normally the mother, however in some instances it could have been another adult in the household. Furthermore, some factors will have only been based on the interviewed parent, whose characteristics may have differed from other adults in the household.

- Some important factors could not be included in the analyses (for example, special educational needs or the general health of the child), due to their relationship with the presence of mental disorders in children. It is possible that some aspects of these factors may include elements of the child’s mental health.

- Children aged 17 to 19 year olds were not included in this report due to the availability of data for some of the factors. Interviews primarily took place with the young person for this age group and were supplemented with an interview with a parent where possible. In many instances, a parent was not available for the interview which meant that information on certain characteristics was not collected. For this reason, 17 to 19 year olds were excluded from the logistic regression analysis.
Definitions

Analysis variables

Ethnic group
Ethnic group was self-reported directly by children and young people aged 11 or more, and by parents for children aged 10 or under.

Parental mental health
The mental health of the interviewed parent or guardian (usually the mother), was assessed using the GHQ-12. Scores range from 0 (no psychological distress) to 12 (severe psychological distress). A score between 0 and 3 has been used to indicate ‘good’ mental health, while a score of 4 or more has been used to indicate ‘poor’ mental health (i.e. the presence of a common mental disorder in the parent).

Family functioning
Family functioning was measured using the General Functioning Scale of the McMaster Family Activity Device (FAD). It comprises 12 statements that parents rate on a four-point scale. A score between 0 and 2.00 was considered to indicate ‘healthy’ family functioning, while a score above 2 was considered to indicate ‘unhealthy’ family functioning.

Equivalised household income
An estimate of overall equivalised household income was established by means of a showcard and was adjusted to reflect the number and ages of people living in the household. For further details please refer to the Survey Design and Methods Report.

Welfare (low-income or disability) benefits
A household was classified as in receipt of ‘low income benefits’ if any resident adult with parental responsibility for the child reported being in receipt of any of the following: Housing Benefit, Working Tax Credit, Income Support, Universal Credit (UC), Job Seekers' Allowance, or Pension Credit. Child Tax Credit did not count as the eligible income threshold for this is higher. While UC could be received for disability-related reasons this was not distinguishable in the data collected.

A household was classified as in receipt of ‘disability-related benefits’ if an adult with parental responsibility for the sample child received any of: Disability Living Allowance, Carer’s Allowance, Employment and Support Allowance, Personal Independence Payment, Industrial Injuries Disablement Benefit, Severe Disablement Allowance, Incapacity Benefit, Armed Forces Compensation Scheme, or Attendance Allowance.
Neighbourhood deprivation

The Index of Multiple Deprivation (IMD) 2015 combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score for each small area (or as described here neighbourhoods) in England. This allows each neighbourhood to be ranked relative to others according to their level of deprivation. In this report quintiles of IMD are used to give an area-level measure of socioeconomic status, as opposed to a household-level measure. For further details about IMD please refer to the Survey Design and Methods Report.

Region

The regional measure in this topic report was based on Public Health England (PHE) regions:

- London (integrated region and centre)
- North of England
- Midlands and East of England
- South of England

This differs from the use of Government Office Regions in other topic reports. Regions were grouped in this way due to small sample sizes in each Government Office Region.

Family type

Family type refers to whether a family is considered to be reconstituted. Reconstituted families are those where two separate families of a parent and a child, or children, have joined together so that the reconstituted family is made up of a couple and two sets of children of different parentage. Family type are referred to in the tables as containing step-children/stepsiblings in the household.

Qualification status of the parent

The qualification status of the interviewed parent was based on the highest educational qualification obtained.

‘Any qualification’ includes qualifications such as a degree, A-levels, GCSEs, apprenticeships and other nationally recognised qualifications. ‘No qualifications’ represents individuals with no formal qualifications.
Marital status of the parent

Two questions were asked to obtain the marital status of the interviewed parent. The first asked: “Are you single, that is never married, married and living with your husband/wife, married and separated from your husband/wife, divorced or widowed?”. The second question, which was asked of everyone except those married and living with husband/wife, was “May I just check, are you living with someone else as a couple?”. The stability of the cohabitation was not assessed.

Four categories are presented (the latter two were combined for analysis on the 2 to 4 age group):

- Married
- Cohabiting
- Lone parent – single
- Lone parent – previously married

Household tenure

Household tenure was classified into 3 categories:

- **Owned** includes buying with a mortgage and owned outright, that is, bought without a mortgage or loan or with a mortgage or loan which has been paid off. It also includes co-ownership and shared ownership schemes.

- **Social sector renting** includes rented from local authorities, New Town corporations or commissions and housing associations which include co-operatives and property owned by charitable trusts.

- **Private renting** includes renting from organisations (property company, employer or other organisation) and from individuals (relative, friend, employer or other individual).

Occupational classification of the parent

The interviewed parent was asked about their employment status, which was used to create an occupational classification status. This was based on the National Statistics Socio-economic Classifications (NSSEC), and comprised three categories:

- Managerial and professional occupations
- Intermediate occupations
- Routine and manual occupations

Accommodation type

Accommodation type refers to the type of accommodation lived in by the child (i.e. a house/bungalow or a flat/maisonette or some other type of accommodation such as a caravan).
Disorder types

Mental disorder

Mental disorders were identified on the survey according to the standardised diagnostic criteria in the tenth edition of the International Classification of Diseases (ICD-10). Specific mental disorders were grouped into four broad categories: emotional, behavioural, hyperactivity and other less common disorders. While some of the symptoms covered in this report may be present in many children, to count as a disorder they had to be sufficiently severe to cause distress to the child or impair their functioning (WHO, 1993). More information on emotional disorders can be found in the Survey Design and Methods Report; a topic report published as part of this series.

Emotional disorders

Emotional disorders include a range of different types of anxiety disorders (characterised by fear and worry), depressive disorders (characterised by sadness, loss of interest and energy, and low self-esteem) and a small number of cases of mania and bipolar affective disorder. More information on emotional disorders can be found in the Survey Design and Methods Report; a topic report published as part of this series.

Behavioural disorders

A group of disorders characterised by repetitive and persistent patterns of disruptive and violent behaviour in which the rights of others, and social norms or rules, are violated. The umbrella term used in ICD-10 is conduct disorders, in this report we have used the term ‘behavioural disorders’ to avoid confusion with the sub-types of disorder included in the survey. More information on behavioural disorders can be found in the Survey Design and Methods Report; a topic report published as part of this series.
References


