

# Sex, ethnic and socioeconomic inequalities and trajectories in child and adolescent mental health in Australia and the UK: findings from national prospective longitudinal studies

Sonia Terhaag,<sup>1</sup> Emla Fitzsimons,<sup>2</sup> Galina Daraganova,<sup>1</sup> and Praveetha Patalay<sup>2,3</sup>

<sup>1</sup>Australian Institute of Family Studies, Department of Social Services, Australian Government, Melbourne, Australia; <sup>2</sup>Centre for Longitudinal Studies, UCL Institute of Social Research, University College London, London, UK; <sup>3</sup>MRC Unit for Lifelong Health and Ageing, University College London, London, UK

**Background:** This study investigates the sex, ethnic and socioeconomic inequalities in emotional difficulties over childhood and adolescence using longitudinal cohort studies in the UK and Australia. Estimating cross-national differences contributes to understanding of the consistency of inequalities in mental health across contexts. **Methods:** Data from 19,748 participants in two contemporary representative samples in Australia (*Growing Up in Australia: The Longitudinal Study of Australian Children*,  $n = 4,975$ ) and UK (Millennium Cohort Study,  $n = 14,773$ ) were used. Emotional difficulties were assessed using the parent-reported Strengths and Difficulties Questionnaire at ages 4/5, 6/7, 11/12 and 14/15 years and the self-reported Short Moods and Feelings Questionnaire at age 14/15. Latent Growth Curve Modelling was used to examine mental health over time. **Results:** There were significant increases in emotional difficulties in both countries over time. Emotional difficulties were higher in Australian children at all ages. The gender gap in self-reported depressive symptoms at age 14/15 was larger in the UK (8% of UK and 13% of Australian boys were above the depression cut-off, compared with 23% of girls). Ethnic minority children had higher emotional difficulties at age 4/5 years in both countries, but over time this difference was no longer observed in Australia. In the UK, this reversed whereby at ages 11/12 and 14/15 ethnic minority children had lower symptoms than their White majority peers. Socioeconomic differences were more marked based on parent education and employment status in Australia and by parent income in the UK. UK children, children from White majority ethnicity and girls evidenced steeper worsening of symptoms from age 4/5 to 14/15 years. **Conclusions:** Even in two fairly similar countries (i.e. English-speaking, high-income, industrialised), the observed patterns of inequalities in mental health symptoms based on sociodemographics are not the same. Understanding country and context-specific drivers of different inequalities provides important insights to help reduce disparities in child and adolescent mental health. **Keywords:** Mental health; disadvantage; inequality; ethnicity; young people; internalising.

## Introduction

Mental ill-health is a leading cause of disease burden globally, and for many individuals, mental health difficulties are first experienced in childhood and adolescence (Kessler et al., 2005; Patel, Flisher, Hetrick, & McGorry, 2007). It is estimated that over 75% of those who experience mental ill-health first do so before the age of 25 (Kessler et al., 2007). Recent findings highlight increasing prevalence in internalising symptoms which constitute symptoms of the most common mental health disorders, namely depression and anxiety (Bor, Dean, Najman, & Hayatbakhsh, 2014; Patalay & Gage, 2019). Overall, emotional difficulties tend to increase over time and are highly prevalent in adolescence and early adulthood, and differences between sexes can become more pronounced with age (Dekker et al., 2007; Kessler et al., 2007).

Sex differences in internalising mental health are consistently observed from early adolescence, with

girls and women being more likely to suffer from greater symptoms of anxiety and depression (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998; Nolen-Hoeksema & Girgus, 1994; Patalay & Fitzsimons, 2017). However, the extent of the gender gap is not consistent across countries. Campbell, Bann, and Patalay (2020) recently investigated the gender gap in internalising symptoms in adolescents across over 70 countries and found great heterogeneity in the size of the gender gap. The size of the gender gap is also associated with country level characteristics such as income inequality and gender inequality, highlighting that country level contextual and policy factors can play a role in sex-based differences in mental health.

Ethnic disparities in child mental health outcomes in some countries are not consistently found. A systematic review of ethnic inequalities in health outcomes among adolescents in Scandinavian welfare states found that while overall non-western immigrant children had poorer outcomes, for mental health it was also found that children from certain countries or regions and descendants from non-

Conflict of interest statement: No conflicts of interest declared.

western immigrants had comparable or better outcomes than majority children (Mock-Muñoz de Luna, Vitus, Torslev, Krasnik, & Jervelund, 2019). Recent evidence from some industrialised White majority countries (e.g. UK) suggests that ethnic minority children might have better mental health outcomes than their White majority peers (NHS Digital, 2018), whereas evidence from other countries (eg USA) consistently highlights greater mental health difficulties for ethnic minorities (Eaton et al., 2008; Wickrama, Noh, & Bryant, 2005). In Australia, children from visible ethnic minorities report more racism discrimination (Priest, King, Becares, & Kavanagh, 2016), but findings are highly variable in terms of mental health outcomes of ethnic minority children in Australia compared with their peers (Minas et al., 2013). In the context of increasing globalisation around the world, as well as forced migration due to natural disasters, war and political unrest (Czaika & de Haas, 2014), many high-income, White majority countries have become increasingly heterogeneous in terms of the ethnic make-up of the general population (Czaika & de Haas, 2014). Both the UK and Australia have large immigrant communities, with around 15-30% of young people identifying as ethnic minorities. However, the minority groups in both countries are very different owing to different geographical location and migration histories (Australian Bureau of Statistics, 2020a, 2020b). Australia is 32 times the size of the UK, and while the majority of ethnic minorities live in the larger capital cities (Australian Bureau of Statistics, 2020a), there are active incentives for migrants to settle in regional or remote areas, such as specific visa streams, established migrant communities and living affordability (Department of Home Affairs, 2020). Australia has experienced a significant shift in the past 50 years of the most common countries of origin/birth for migrants; in the past, this was mostly from Anglo-European countries and New Zealand, whereas now immigration is predominantly from Asia (Australian Bureau of Statistics, 2018, 2020b). Moreover, young Indigenous Australians have consistently been found to be at significantly higher risk for experiencing a range of adverse mental health outcomes (Macedo, Smithers, Roberts, Paradies, & Jamieson, 2019), often associated with experiences of systemic, interpersonal and internalised racism (Priest, Baxter, & Hayes, 2012; Priest, Paradies, Gunthorpe, Cairney, & Sayers, 2011). In comparison, the UK is much more densely populated, and ethnic minorities have settled in both urban and rural areas (Catney & Simpson, 2010; Craig, 2012). From the mid-20th century onwards, migration was common from former British colonies and the largest ethnic minority groups are from South Asia (Indian, Pakistani and Bangladeshi). Ethnic differences in mental health outcomes may therefore be different across these two countries, but very little formal investigation of the cross-cultural

experience of being an ethnic minority and mental health outcomes exists. There is limited cross-national research on understanding the ethnic disparities in child mental health and it is plausible that their outcomes are different based on the ethnic minority groups, the immigration histories of different countries and the levels of discrimination and racism faced by ethnic minorities in different countries. Population health perspective insight into whether the inequalities operate in the same way, and if they do not why and what national policy or societal factors (e.g. lower discrimination) might reduce these inequalities. In particular, we need a better understanding of the patterns of mental health over time across inequalities, ideally across different contexts in order to examine the consistency (or lack) of sociodemographic and ethnic differences on mental health outcomes.

Socioeconomic inequalities in child mental health are well documented (Reiss, 2013) and recent evidence from the UK suggests that these disparities might be getting wider in more recently born cohorts (Collishaw, Furzer, Thapar, & Sellers, 2019). Socioeconomic inequalities have also been linked to the overall levels of inequality in a country, as measured for instance by the GINI coefficient (an index of wealth inequality in a given country), whereby both overall levels of ill-health and their inequalities are larger in countries with greater socioeconomic inequality (Patel et al., 2018).

In summary, there are established sociodemographic inequalities in the experience of mental ill-health from childhood, including by sex, ethnicity and socioeconomic position – albeit variations in the extent of the inequalities is observed. Context and environmental contribution to health inequalities matter, and sex, socioeconomic and ethnic inequalities might not be the same across different developmental stages and countries/contexts.

Therefore, the main aim of this study is to investigate sex, ethnic and socioeconomic inequalities in the experience of mental health difficulties over childhood and adolescence using two nationally representative studies in the UK and Australia. We examine both parent and self-reported symptoms when examining inequalities, and also control for parent's own mental health to account for potential confounding with their reports of their child's mental health. Estimating cross-national differences in these inequalities contributes to understanding of the consistency in the presence and extent of observed inequalities. Furthermore, understanding how these inequalities may affect mental health across childhood, and if this is consistent across country contexts, is vital to getting a better sense of how systemic these inequalities are. This can inform policy approaches for how to potentially reduce inequalities and allow cross-country knowledge exchange.

## Methods

### Design

This study utilised data collected from two national studies of child health and well-being in the United Kingdom and Australia. In both samples, participants were recruited from stratified areas around the respective country to achieve a nationally representative sample of children. Data used in the studies were collected between 2004/2005 (age 4/5) and 2014/2015 (age 14/15). Measures are harmonised to allow joint analyses across the cohorts.

Both studies had ethical review board approval from their respective institutions (MCS in the UK = Medical Research Ethics Committee; LSAC in Australia = Australian Institute of Family Studies Ethics Committee, which is a Human Research Ethics Committee registered with the National Health and Medical Research Council (NHMRC)).

### Participants

Millennium Cohort Study (MCS) is a cohort of 19,517 children born in 2000–02 sampled from the whole of the UK (Connelly & Platt, 2014). Data are currently available at ages 9 months, 3, 5, 7, 11 and 14 years. 15,246 families participated in the age 5 data collection which is the baseline time point for this study. The *study website* contains details regarding all the data available and information on accessing the data sets.

Longitudinal Study of Australian Children (LSAC) is a cross-sequential Australian national study of children since 2003 across two cohorts (B and K) followed from birth (B cohort; born March 2003–February 2004) and 4/5 years of age (K cohort, born March 1999–February 2000,  $n = 4,975$ ). The K cohort was used for this study as they are comparable to MCS and includes children born between March 1999 and February 2000, who at study commencement were 4/5 years old. Informed consent was provided by a parent, and participants complete follow-up at regular intervals (~every 2 years). For detailed information on the study, refer to Soloff, Lawrence, and Johnstone (2005) and Sanson et al., (2002). The *Growing Up in Australia website* includes access to documentation, data available and publications/resources developed from the study.

For comparative purposes between the two datasets, data collected at comparable ages and years were utilised for analyses: age 4/5 years (2004), 6/7 years (2006), 10/11 years (2010) and 14/15 years (2014) in both samples. The analytic sample in both cohorts was participants with outcome data on at least one time point of interest. This resulted in a total analysis sample of 19,748 participants (MCS,  $n = 14,773$ ; LSAC,  $n = 4,975$ ).

### Measures

**Emotional symptoms.** The Strengths and Difficulties Questionnaire (SDQ) is a brief emotional and behavioural measure for young people (Goodman, 2001). The emotional symptoms subscale consists of 5 items assessing emotional symptoms and items are rated from 0 'Not True' to 2 'Certainly True'. A parent reported on children's emotional symptoms at all time-points. Scores range from 0 to 10, with higher scores indicating more emotional symptoms. A score of 5 or higher is considered the cut-off for likely emotional problems (<https://www.sdqinfo.org/>).

**Depressive symptoms.** The 13-item Short Mood and Feelings Questionnaire (SMFQ) (Angold et al., 1995) was utilised as a self-report measure of depressive symptoms at the last time point (age 14/15 years old). Items include items such as 'I felt miserable or unhappy' in the past two weeks and

are rated on a 3-point Likert scale ranging from 0 'True' to 2 'Not true'. A score of 12 or higher is considered as indicating possible depressive disorder (Thabrew, Stasiak, Bavin, Framp-ton, & Merry, 2018).

**Parent mental health.** The Kessler (Kessler et al., 2002, 2010) 6-item measure was used as a self-report measure of parent mental health at all time points. Items are rated on a scale of 0 'none of the time' to 4 'all of the time'. Total scores range from 0 to 24, with higher scores indicating more distress. The measure from the responding parent (who reported on the child's mental health) at each age are used in this study.

**Sociodemographic variables.** Child sex, ethnicity and socioeconomic position (as measured by parent education, parent employment and income) from when children were aged 5 years old are used in both cohorts. Some variables were recoded to create harmonised variables between the two datasets (see Table S1 for a breakdown of harmonised variables). In particular, binary variables were created for ethnicity (ethnic majority, ethnic minority) in each country, parent education (no degree, degree and above) and parent employment (employed, unemployed). Equivalised income quintiles when children were aged 4/5 were created within each country database.

In Australia, self-reported ethnicity is not routinely collected. In LSAC, ethnicity is collected by proxy of parents' country of birth, coded according to the Australian Bureau of Statistics Standard Classification of Cultural and Ethnic Groups (Australian Bureau of Statistics, 2016). From each parents' country of birth, we created proxy ethnicity variables according to ethnic majority and minority status. Specifically, based on parents' country of birth, the study child's ethnicity was derived. Ethnicity was coded using a top-down approach, meaning that one parent's minority status 'trumped' the other parents' majority status where applicable. For example, if one parent was European and the other parent a visible minority, the study child was coded as a visible minority. This created the following categories: Australian Caucasian, Anglo/European, Visible Minority, Aboriginal and Torres Strait Islander and Other. The first two categories were collapsed (Australian Caucasian and Anglo/European), and the last three categories were collapsed (Visible Minority, Aboriginal and Torres Strait Islander, Other), to create binary ethnicity: Caucasian Majority and Ethnic Minority. This approach mirrors previous analyses in Australia constructing ethnicity from country of birth (Priest et al., 2016). In MCS, ethnicity was measured using parent-reported child ethnicity in early childhood using categories as used by the Office of National Statistics in the UK. The White British, White Irish and any other White background groups were included in the White majority group and all visible ethnic minority groups (Asian, Black, mixed) were included in the Ethnic Minority grouping.

### Statistical analyses

All analyses were conducted in Stata 16.0 (StataCorp, 2019) and MPlus 7.4 (Muthén & Muthén, 1998–2017). Descriptive analyses were conducted on each data set separately, after which the data sets were appended to allow whole sample analyses and country comparisons.

**Missing data.** Analysis of missing data across time showed there was some attrition in both datasets. To account for this and maximise data use, multiple imputation with chained equations (MI) was used to generate imputed data sets ( $m = 25$  data sets) separately in each cohort. Missing data patterns in MCS and LSAC showed that attrition in both data sets was mostly comparable over time, with MCS showing slightly higher attrition at early ages. Compared with baseline

at age 5, MCS and LSAC had around 14% and 10% of missing data at age 6/7, 20% and 15% age 10/11, and 29% and 30% at 14/15 years, respectively. In both cohorts, attrition was not random, with parent characteristics such as age, socioeconomic position predicting loss to follow-up. Further detailed information on attrition patterns in LSAC can be found in Usback, Australian Bureau of Statistics LSAC processing team, and Australian Bureau of Statistics Household Survey Methodology team (2018), and for MCS in Mostafa and Ploubidis (2017). MI resulted in an imputed data set across MCS and LSAC of  $n = 19,748$  participants. The imputed data were utilised for all descriptive and regression analyses.

MCS has sampling design weights to account for the sampling design of the study, and attrition weights for each wave to account for non-response between sweeps (Fitzsimons, 2017). In this study, we used the combined sampling and non-response weights at the age 5 wave, thus appropriately accounting for the sample design and attrition from birth to age 5.

**Measurement invariance.** Item-level invariance between countries was assessed in MPlus using multiple group factor analysis. The SDQ at each age and SMFQ were explored for invariance between the two countries. These analyses (analysis description and results in Table S2) showed that the measures had configural, metric and scalar invariance between the two countries. These analyses provide support that the measures are assessing the same things in both countries and any country differences observed are not likely to be due to differences in how the questionnaires are interpreted and answered.

**Inequalities in mental health outcomes at each age.** All continuous scores were standardised and used in regression analysis to permit interpretation of effect sizes. To assess the relative contribution of various predictors to outcomes, regressions were conducted stepwise. Regression analyses were conducted in the following consecutive order: (a) overall associations with sex, SEP, ethnicity and country, (b) interactions of country with sociodemographic variables to estimate whether differences moderated by country, and (c) addition of parent mental health at the respective time-point to control for any influence of parent's own mental health on their reporting of children's symptoms.

**Longitudinal development of symptoms.** Latent Growth Curve Models (LGCM) were conducted in MPlus to examine trajectories of change over time in emotional symptoms. To account for missing data in these models, full

information maximum likelihood (FIML) was used for the estimation of trajectories (and data were not multiply imputed for the LGCM analysis). Intercept only, linear and quadratic models were specified and assessed for model fit. Model fit was assessed using fit indices such as Bayesian Information Criterion (BIC), sample size-adjusted BIC (SS-BIC), Akaike information criterion (AIC), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) (Bentler, 1990; Marsh, Hau, & Wen, 2004). Based on these indices, the best fitting model was selected and parameter estimates exported to Stata to allow regressions predicting slope using sociodemographic predictors.

## Results

### Sample descriptives

Table 1 shows the sociodemographic make-up of both samples. In Australia, there was a larger proportion of ethnic minority children (21%) compared with the UK sample (15%) at age 4/5. The Australian children also had a higher percentage of parents with higher degrees (38%) compared with the UK (28%). More children in the UK sample lived in unemployed households (17%) compared with the Australian children (12%). Further breakdown of sociodemographics by sample can be found in Table S3. Correlations of measures within and across time were consistent and showed that parent-child agreement was generally moderate in both countries (for more information, refer to supporting information and Tables S4 and S5).

### Inequalities in mental health outcomes at each age

Table 2 includes descriptive statistics of mental health outcomes at each age by country and sociodemographic characteristics (see Table S6 for parent mental health outcomes by country and key sociodemographics). Figure 1 includes plots with model predicted means, showing differences in emotional symptoms across sociodemographic characteristics at each age. Overall, there were increases over time in parent-reported emotional symptoms in the UK

**Table 1** Sociodemographic characteristics of the sample by country when children were aged 4/5 years

	MCS (UK) ( $n = 14,773$ )		LSAC (Australia) ( $n = 4,975$ )	
	%/M	95% CI	%/M	95% CI
Gender (female)	48.90	48.09, 49.70	49.14	47.76, 50.54
Ethnicity (minority) <sup>a</sup>	14.88	14.31, 15.46	20.64	19.54, 21.79
Parent Education * (high school or below)	72.37	71.64, 73.08	61.80	60.44, 63.15
higher degree	27.63	26.92, 28.36	38.21	36.87, 39.57
Parent Employment * (both parents unemployed)	17.38	16.78, 18.00	11.64	10.77, 12.56
Equalised income <sup>a</sup>	377.55	373.04, 382.06	649.49	635.36, 663.63
Average age at age 5	5.21	5.20, 5.21	4.78	4.77, 4.79
Average age at age 7	7.22	7.21, 7.22	6.86	6.85, 6.87
Average age at age 11	10.83	10.83, 10.84	10.86	10.85, 10.87
Average age at age 14	14.26	14.25, 14.26	14.92	14.91, 14.93

<sup>a</sup>These sociodemographic characteristics were measured at age 4/5 in both cohorts and were harmonised to be comparable across the two studies. M = Mean, 95%CI = 95% Confidence Interval. Total N = 19,748.

**Table 2** Mental health outcomes of study children by country and sociodemographic variables

	SDQ (M, 95% CI)			SMFQ (M, 95% CI)	
	Age 4/5	Age 6/7	Age 10/11	Age 14/15	Age 14/15
<i>Mean mental health scores</i>					
<b>Total</b>					
UK	1.37 [1.34, 1.41]	1.53 [1.49, 1.57]	1.87 [1.82, 1.92]	2.01 [1.95, 2.06]	5.65 [5.49, 5.81]
Australia	1.75 [1.69, 1.81]	1.68 [1.62, 1.74]	2.01 [1.95, 2.08]	2 [1.92, 2.08]	5.59 [5.33, 5.86]
<b>Gender</b>					
<b>Male</b>					
UK	1.32 [1.28, 1.37]	1.49 [1.43, 1.54]	1.79 [1.73, 1.84]	1.70 [1.63, 1.77]	4.12 [3.92, 4.31]
Australia	1.76 [1.68, 1.84]	1.64 [1.56, 1.72]	1.95 [1.85, 2.04]	1.73 [1.63, 1.84]	4.48 [4.17, 4.78]
<b>Female</b>					
UK	1.42 [1.37, 1.47]	1.57 [1.52, 1.63]	1.95 [1.88, 2.02]	2.32 [2.25, 2.4]	7.25 [7.01, 7.49]
Australia	1.74 [1.66, 1.82]	1.72 [1.64, 1.8]	2.08 [2, 2.17]	2.29 [2.18, 2.39]	6.77 [6.35, 7.18]
<b>Ethnicity</b>					
<b>Ethnic Minority</b>					
UK	1.69 [1.56, 1.82]	1.71 [1.59, 1.83]	1.83 [1.71, 1.96]	1.98 [1.85, 2.12]	4.92 [4.61, 5.22]
Australia	2.11 [1.97, 2.24]	2 [1.86, 2.14]	2.21 [2.06, 2.36]	1.97 [1.79, 2.16]	5.3 [4.72, 5.88]
<b>Ethnic Majority</b>					
UK	1.33 [1.29, 1.36]	1.50 [1.46, 1.55]	1.87 [1.82, 1.93]	2.01 [1.95, 2.07]	5.76 [5.58, 5.93]
Australia	1.65 [1.59, 1.7]	1.59 [1.53, 1.65]	1.96 [1.89, 2.03]	2.01 [1.93, 2.09]	5.68 [5.4, 5.96]
<b>Income</b>					
<b>Lowest 20%</b>					
UK	1.77 [1.69, 1.86]	2.00 [1.90, 2.09]	2.30 [2.18, 2.42]	2.53 [2.42, 2.65]	6.16 [5.82, 6.49]
Australia	2.14 [2, 2.28]	2.07 [1.91, 2.22]	2.46 [2.29, 2.63]	2.39 [2.2, 2.57]	6.43 [5.8, 7.07]
<b>Remaining 80%</b>					
UK	1.28 [1.25, 1.32]	1.42 [1.38, 1.47]	1.77 [1.72, 1.82]	1.89 [1.84, 1.94]	5.54 [5.38, 5.71]
Australia	1.64 [1.59, 1.7]	1.57 [1.51, 1.63]	1.89 [1.82, 1.96]	1.89 [1.81, 1.97]	5.36 [5.09, 5.63]
<i>% above cut-offs indicating high symptoms levels<sup>a</sup></i>					
<b>Total</b>					
UK	5.32 [4.83, 5.82]	6.71 [6.20, 7.21]	10.08 [9.41, 10.75]	11.76 [11.01, 12.50]	15.37 [14.52, 16.22]
Australia	8.04 [7.16, 8.91]	6.93 [6.12, 7.74]	11.05 [10.07, 12.02]	10.58 [9.46, 11.71]	17.51 [16.06, 18.96]
<b>Gender</b>					
<b>Male</b>					
UK	5.07 [4.49, 5.65]	6.91 [6.19, 7.63]	9.51 [8.70, 10.32]	8.93 [8.17, 9.68]	8.36 [7.46, 9.26]
Australia	8.01 [6.83, 9.20]	6.97 [5.85, 8.1]	10.87 [9.45, 12.28]	7.87 [6.49, 9.24]	12.49 [10.76, 14.22]
<b>Female</b>					
UK	5.59 [4.93, 6.24]	6.49 [5.82, 7.17]	10.68 [9.65, 11.71]	14.71 [13.51, 15.9]	22.68 [21.24, 24.12]
Australia	8.06 [6.85, 9.28]	6.88 [5.77, 7.99]	11.23 [9.89, 12.58]	13.43 [11.79, 15.07]	22.77 [20.53, 25.01]
<b>Ethnicity</b>					
<b>Ethnic minority</b>					
UK	8.53 [6.67, 10.38]	7.82 [6.35, 9.29]	9.52 [7.94, 11.1]	10.92 [8.98, 12.85]	12.28 [10.34, 14.22]
Australia	12.29 [10.11, 14.47]	9.91 [7.95, 11.87]	13.72 [11.13, 16.31]	9.48 [7.15, 11.8]	15.28 [12.43, 18.12]
<b>Ethnic majority</b>					
UK	4.88 [4.41, 5.35]	6.55 [6.04, 7.07]	10.16 [9.45, 10.87]	11.87 [11.07, 12.67]	15.8 [14.88, 16.72]
Australia	6.83 [6.02, 7.64]	6.09 [5.21, 6.96]	10.29 [9.28, 11.3]	10.9 [9.67, 12.13]	18.14 [16.56, 19.72]
<b>Income</b>					
<b>Lowest 20%</b>					
UK	9.34 [7.99, 10.7]	11.36 [9.88, 12.84]	14.14 [12.37, 15.9]	16.47 [14.57, 18.37]	17.94 [16.06, 19.81]
Australia	13.89 [11.49, 16.29]	10.77 [8.49, 13.05]	15.73 [13.22, 18.23]	14.71 [11.91, 17.52]	20.72 [17.23, 24.21]
<b>Remaining 80%</b>					
UK	4.43 [3.95, 4.9]	5.67 [5.16, 6.18]	9.18 [8.49, 9.87]	10.71 [9.93, 11.49]	14.8 [13.86, 15.75]
Australia	6.39 [5.48, 7.29]	5.85 [5.06, 6.64]	9.73 [8.71, 10.74]	9.42 [8.26, 10.58]	16.6 [15.1, 18.11]

Mean outcomes are presented as means with 95% confidence intervals in brackets; above cut-off (categorical) outcomes are presented as percentages (%) with 95% confidence intervals in brackets at each respective time point. *N* = 19,478; SDQ, Strength and Difficulties Questionnaire; SMFQ, Short Mood and Feelings Questionnaire.

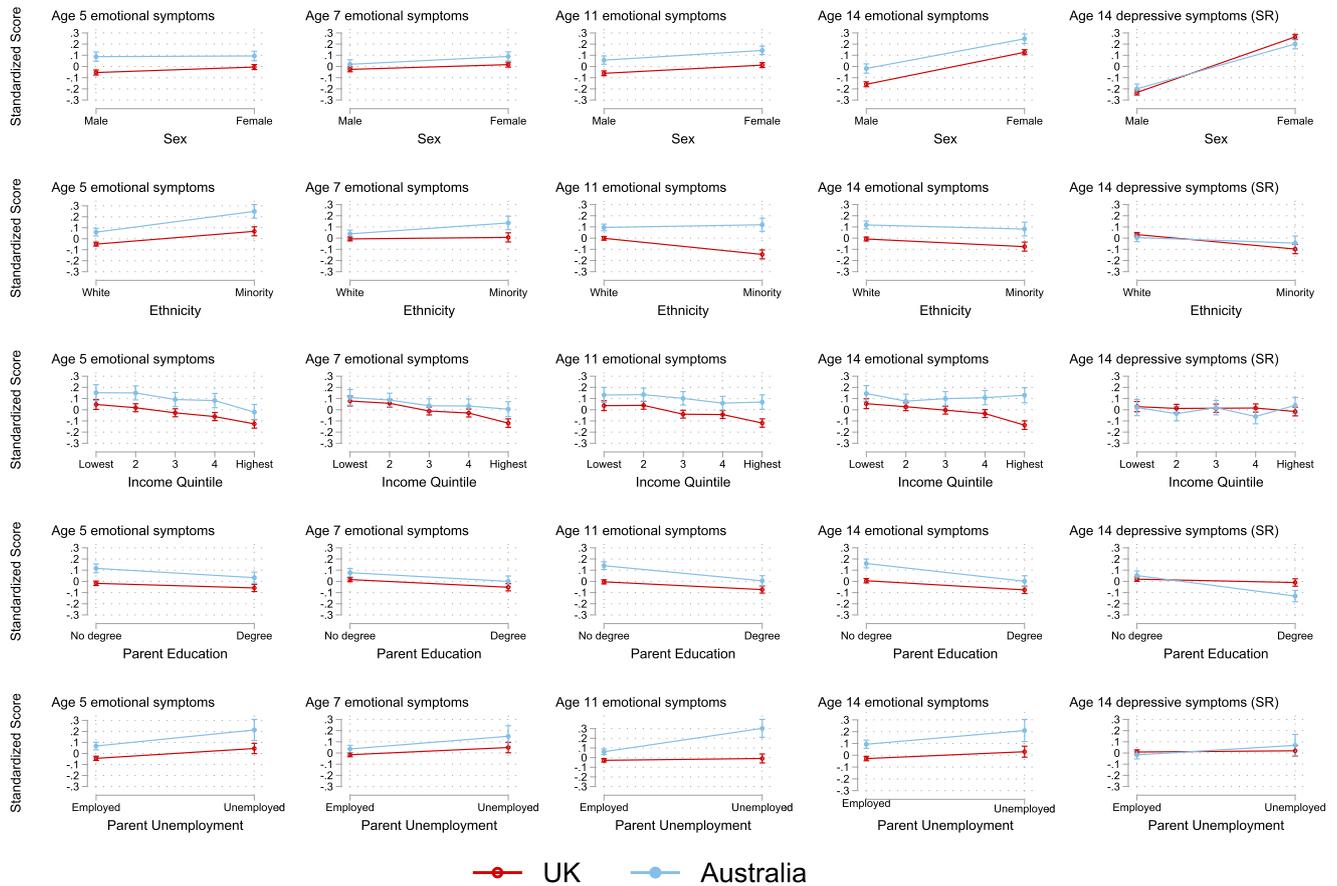
<sup>a</sup>Cut-offs indicating high symptoms levels for each measure: SDQ ≥5; SMFQ: ≥12.

and Australian children, with the Australian children having significantly higher emotional symptoms at age 5, 7 and 11, but not age 14, compared with UK children.

The descriptive findings around demographic and socioeconomic differences in emotional symptoms across time are supplemented by multivariate regression models that examine adjusted

associations, interactions and parental mental health at the same time point with the outcome (Table S7).

**Sex differences.** Across the whole sample significant sex differences emerged at age 11, with girls having higher emotional symptoms in both the UK and Australia (Figure 1). In the UK the sex



**Figure 1** Child emotional symptoms in the UK and Australia across ages by sex, ethnicity and socioeconomic factors (income, parent education and employment) based on the adjusted model. Unadjusted estimates are presented in Figure S1. Source: MCS (UK) Ages 4/5–14/15, LSAC (Australia) Data Ages 4/5–14/15. SR = Self-report.  $N = 19,748$ .

differences in self-reported symptoms at age 14/15 were larger than in Australia.

**Ethnicity differences.** In both countries, ethnic minority children had significantly higher emotional symptoms at age 5; however, this reversed from age 7 onwards. Specifically, ethnic minority children's mental health was not different from their White majority counterparts at age 7 in Australia or the UK, at ages 11 and 14, ethnic minority children had significantly lower emotional symptoms in the UK but not Australia. In Australia, at ages 11 and 14 ethnic minority children had similar emotional symptoms scores as their White majority counterparts (Figure 1).

There were also substantial ethnic differences on self-report depressive symptoms at age 14 in the UK children, but not among Australian children. Specifically, ethnic minority children in the UK had lower depressive symptoms at age 14, but Australian ethnic minority children did not report average difficulties that were different from their White majority counterparts. There was further evidence of variability within the ethnic minority groups in each country. Specific ethnic minorities in each country further evidenced particularly poor outcomes compared with other ethnic minorities

(Table 3). In Australia for example, Indigenous children had the worst mental health, while in the UK, Pakistani and Bangladeshi children had poorer mental health than children from other ethnic minority backgrounds.

**Socioeconomic differences.** Some differences also emerged by socioeconomic status. In particular, higher household income was associated with lower parent-reported emotional symptoms in Australia and the UK, although there were no significant differences by income quintile for self-reported depressive symptoms at age 14. Higher parental education (degree or above) was associated with lower emotional symptoms, although this difference was more pronounced among Australian children across all ages. Parental unemployment was also associated with higher emotional symptoms, although again this effect was strong among Australian children. In particular, at ages 11 and 14, Australian children with unemployed parents had significantly higher emotional symptoms, but this was not the case for UK children. No differences in self-report depressive symptoms at age 14 emerged by parents' unemployment.

Parents' own mental health at each time point was significantly associated with child emotional

**Table 3** Descriptive statistics of the mental health outcomes by ethnicity subgroups in UK and Australia at each age

	SDQ					SMFQ					Kessler-6													
						Age 14/15					Age 10/11					Age 6/7								
	Age 4/5	Age 6/7	Age 10/11	Age 14/15	Age 14/15	Age 10/11	Age 10/11	Age 10/11	Age 10/11	Age 6/7	Age 14/15	Age 14/15	Age 14/15	Age 14/15										
Australia	1.69 [1.63, 1.75]	1.62 [1.55, 1.69]	1.99 [1.91, 2.07]	2.04 [1.95, 2.13]	5.69 [5.39, 6]	4.04 [3.88, 4.19]	3.13 [3, 3.27]	3.44 [3.29, 3.6]	3.35 [3.18, 3.53]															
Australian (not Indigenous)	1.48 [1.37, 1.59]	1.48 [1.36, 1.6]	1.82 [1.67, 1.97]	1.9 [1.74, 2.05]	5.63 [5.08, 6.17]	4.07 [3.78, 4.36]	2.86 [2.63, 3.08]	3.22 [2.95, 3.49]	3.17 [2.89, 3.46]															
Anglo/European	2.14 [1.97, 2.32]	2.06 [1.89, 2.23]	2.18 [2, 2.37]	1.98 [1.77, 2.19]	5.24 [4.61, 5.87]	5.25 [4.87, 5.63]	4.27 [3.89, 4.65]	4.28 [3.86, 4.69]	4.01 [3.61, 4.41]															
Visible Minority	2.54 [2.18, 2.9]	2.18 [1.84, 2.52]	2.61 [2.23, 3]	2.25 [1.83, 2.68]	6.02 [4.74, 7.29]	5.8 [5.05, 6.56]	4.38 [3.77, 4.99]	4.66 [3.96, 5.36]	4.66 [3.91, 5.42]															
Indigenous (Aboriginal or Torres Strait Islander)	1.5 [1.24, 1.75]	1.58 [1.29, 1.87]	1.9 [1.59, 2.22]	1.66 [1.28, 2.03]	4.8 [3.44, 6.15]	4.35 [3.69, 5.02]	3.76 [3.13, 4.38]	3.68 [3, 4.35]	3.27 [2.52, 4.03]															
UK	1.33 [1.29, 1.36]	1.5 [1.46, 1.55]	1.88 [1.82, 1.93]	2.01 [1.95, 2.07]	5.76 [5.59, 5.92]	3.09 [3, 3.18]	3.08 [2.99, 3.18]	3.9 [3.79, 4.02]	4.4 [4.27, 4.53]															
White	1.51 [1.34, 1.69]	1.6 [1.39, 1.82]	1.88 [1.65, 2.11]	1.92 [1.67, 2.18]	5.54 [4.83, 6.25]	3.86 [3.45, 4.26]	3.79 [3.32, 4.27]	4.71 [4.2, 5.23]	4.68 [4.19, 5.17]															
Mixed	1.48 [1.22, 1.75]	1.46 [1.19, 1.73]	1.63 [1.34, 1.93]	1.68 [1.39, 1.98]	4.8 [4.03, 5.56]	4.01 [3.36, 4.66]	3.66 [3.09, 4.22]	4.91 [4.33, 5.5]	4.58 [3.98, 5.19]															
Indian	2.07 [1.83, 2.31]	2.02 [1.85, 2.19]	2.06 [1.91, 2.21]	2.31 [2.12, 2.51]	4.47 [3.95, 4.98]	4.91 [4.48, 5.33]	4.31 [3.89, 4.73]	5.68 [5.24, 6.12]	5.4 [5.01, 5.8]															
Pakistani and Bangladeshi	1.46 [1.2, 1.73]	1.52 [1.29, 1.74]	1.59 [1.28, 1.9]	1.8 [1.56, 2.04]	4.69 [4.05, 5.33]	4.15 [3.49, 4.81]	3.57 [2.89, 4.24]	4.68 [4.03, 5.33]	4.46 [3.94, 4.98]															
Black or Black British	1.93 [1.64, 2.22]	1.89 [1.57, 2.22]	1.89 [1.5, 2.29]	2.14 [1.76, 2.53]	5.29 [4.13, 6.45]	4.76 [3.88, 5.64]	4.52 [3.66, 5.37]	5.61 [4.71, 6.51]	5.45 [4.58, 6.32]															

*N* = 19,748. All mental health outcomes are presented as *M* (95% CI). SDQ, Strengths and Difficulties Questionnaire – Emotional symptoms subscale; SMFQ, Short-form Moods and Feelings Questionnaire.

symptoms at that age, where parents who reported psychological distress themselves also reported higher emotional symptoms in their children.

*Longitudinal development of symptoms*

A series of LGCMs were run to assess change over time by country. The quadratic model did not converge, and based on a range of model fit indices, the linear model was selected as the most parsimonious (Table S8).

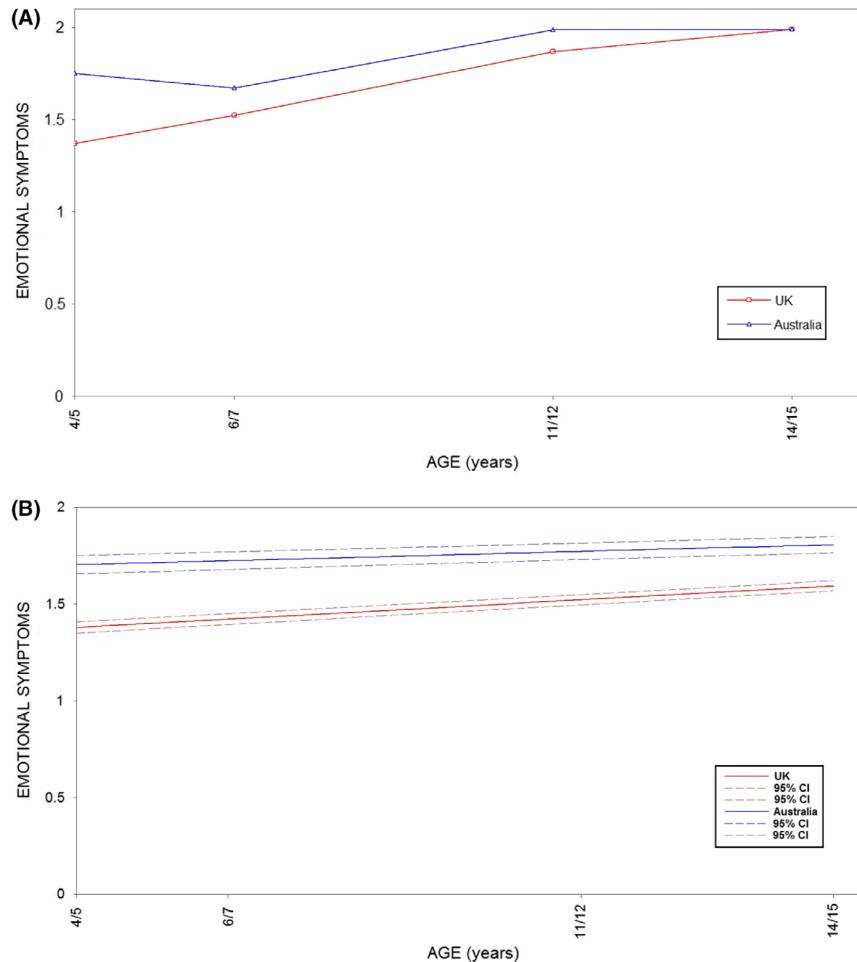
Consistent with descriptive findings, the LGCM showed overall increase over time in emotional symptoms from ages 5 to 14 (Figure 2), with initial symptoms from age 5 that narrowed over time until at age 14 the UK and Australian children were most similar.

We examine the sociodemographic predictors of developmental trajectories by investigating the predictors of intercept and slope parameters for each individual (Table 4). Children from the UK evidenced steeper consistent worsening of symptoms over time compared with children from Australia, as did children from White majority ethnicity, and girls in both countries. Steeper slopes were also observed for those whose parents had relatively lower education, and children in households where neither parent was employed or a lone parent was not employed. There was a country interaction for income whereby UK participants had steeper worsening over time across the lower income quintiles.

**Discussion**

This study establishes the extent of sex, ethnic and socioeconomic differences in emotional symptoms among children from ages 5 to 14 between Australia and the UK using aggregated nationally representative contemporary cohort datasets. In both countries, children experienced an increase in emotional symptoms from age 5 to 14, and self-reported depressive symptoms at age 14 were comparable between the UK and Australia. In both countries, girls at all ages exhibited higher emotional symptoms. While ethnic minority children in both countries exhibited higher symptoms at age 5, this difference disappeared in Australian children over time and reversed in UK children: by age 11 UK ethnic minority children experienced lower emotional symptoms than their White majority counterparts, and this remained the case through age 14.

As expected for internalising symptoms, girls by adolescent ages had higher parent and self-reported symptoms than boys in both countries. However, this gender gap in adolescent mental health varies across countries (Campbell et al., 2020), and there might be differences between the countries that explain the larger gender gap we observe in the UK compared to in Australia. The UK and Australia have similar sex equality scores on several international



**Figure 2** Latent Growth Curve Model of change over time of emotional symptoms by country. (A) Represents sample means across time and (B) represents growth curve models by country with 95% confidence intervals. Source: MCS (UK) Data Ages 4/5–14/15, LSAC (Australia) Data Ages 4/5–14/15.  $N = 19,748$ . Dashed lines represent 95% Confidence Intervals

indices (e.g. UK 0.12 and Australia 0.10 on the Sex Inequality Index (GII) as of 2018). Compared with Australia, the UK does poorer on some indices, like discrimination against women in regard to restricted access to resources and assets such as education (Ferrant et al., 2020). This may help explain some of the difference in the gender gaps; however, mechanisms specific to adolescence in both countries need to be investigated to help understand the gender gap difference across countries.

The UK findings that ethnic minority children had lower emotional symptoms compared with their White majority counterparts at ages 11 and 14 are contrary to much prior research that has found that ethnic minority children are at higher risk of experiencing adverse mental health, often attributed to the higher likelihood of ethnic minority children to experience socioeconomic disadvantage, discrimination and victimisation (Assari, Moazen-Zadeh, Caldwell, & Zimmerman, 2017; Priest et al., 2016). It is important to note that in both countries parents of ethnic minority children reported greater psychological distress compared with the parents of the White

majority group. Analyses disaggregating further by more specific ethnic minority groups highlight that in the UK, this finding is observed across all ethnic minority groups. In Australia, we see a particularly vulnerable group is children and parents that report to be of Aboriginal or Torres Strait Islander background, where those parents reported the highest average emotional symptoms for themselves and their children across all ages. This is consistent with previous research in Australia that Aboriginal and Torres Strait Islander children experience poorer outcomes on a wide range of mental and physical health outcomes (Shepherd, Li, Cooper, Hopkins, & Farrant, 2017). In the UK, the poorest mental health outcomes were reported by Pakistani and Bangladeshi minority children. There was overall worsening in mental health outcomes over time by ethnic minority children in both countries. However, the size of the gap in outcomes between various ethnic minority subgroups narrowed over time; by age 14–15, differences between most ethnic minority subgroups were insignificant. As noted in the introduction, while the UK and Australia are similar in many ways in regard

**Table 4** Regressions predicting developmental slope from age 5 to 14 years

	Model 1 – Adjusted coefficients		Model 2 – Adjusted coefficients + country interactions	
	coef	95%CI	coef	95%CI
Country	–0.01	[–0.02, –0.01]	0.00	[–0.01, 0.01]
Gender	0.02	[0.02, 0.02]	0.02	[0.02, 0.02]
Ethnicity	–0.02	[–0.02, –0.01]	–0.02	[–0.02, –0.01]
Parent Education	–0.01	[–0.01, –0.01]	–0.01	[–0.01, 0]
Parent Unemployment	0.00	[0, 0.01]	0.00	[0, 0.01]
Income (Quintiles; compared with 20% highest income)				
1	0.01	[0, 0.01]	0.01	[0.01, 0.02]
2	0.01	[0, 0.01]	0.01	[0.01, 0.02]
3	0.01	[0, 0.01]	0.01	[0, 0.01]
4	0.00	[0, 0.01]	0.01	[0, 0.01]
Age	0.00	[–0.01, 0]	0.00	[–0.01, 0]
Sex * country			0.00	[–0.01, 0.01]
Ethnicity * country			0.00	[–0.01, 0.01]
Parent education * country			0.00	[–0.01, 0.01]
Parent unemployment * country			0.00	[–0.01, 0.02]
Income * country				
1			–0.02	[–0.03, 0]
2			–0.02	[–0.03, –0.01]
3			–0.01	[–0.02, –0]
4			–0.02	[–0.03, –0.01]
Constant	0.08	[0.05, 0.11]	0.07	[0.04, 0.1]

$N = 19,726$ . Higher slope scores mean worsening of emotional symptoms. Sociodemographic characteristics (ethnicity, parent education, parent unemployment, parent income) were measured when study children were aged 4/5 years. coef = coefficient. 95% CI in parentheses.

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < 0.1$ .

to being large, English-speaking developed nations with a long-standing history of receiving immigrants, there are some important differences that should be considered in the interpretation of findings. Australia has focussed its immigration policy in admitting higher skilled and educated migrants, while immigration to the UK has been dominated by migrants from its colonial past (Washbrook, Waldfoegel, Bradbury, Corak, & Ghanghro, 2012). Further, in the two decades since these studies started, the ethnicity compositions of both countries will have changed, and also the sociopolitical context, and experiences of recently and currently being born children might again differ from those of the generation we have investigated in this study.

Discrimination and victimisation experiences among ethnic minority children may play a role (Cokley, Hall-Clark, & Hicks, 2011). Among Australian children, it has been found that children from visible ethnic minority backgrounds experienced more racial discrimination, with the highest rate among Indigenous children (Priest et al., 2016). Further, cumulative exposure to racial discrimination and bullying has incremental negative effects on socioemotional difficulties among ethnic minority children (Priest, Kavanagh, Becares, & King, 2019). On the other hand, recent analyses in the UK indicate that ethnic minority adolescents were not more likely to be victims of bullying than their White peers (Tippett, Wolke, & Platt, 2013). Given the known associations between victimisation and mental health, the difference in the likelihood of being

bullied across the two countries might be one of many factors contributing to the different ethnicity findings observed across the two countries, and efforts in Australia to reduce victimisation of ethnic minority youth continue. Further analyses to understand the reasons for the variability in ethnic minority children experiencing better or poorer mental health than their ethnic majority counterparts in the UK (compared with in other countries) are needed as this might help inform efforts in other countries to improve the mental health of ethnic minority young people. In addition, it will be important to investigate whether this is specific to adolescence, or whether as this generation gets older this difference is observed in adulthood as well.

Socioeconomic differences were observed in both countries, but the salience of different measures of socioeconomic position varied between the two countries. Specifically, while in Australia lower parent education and unemployment status were associated with higher emotional symptoms, in the UK, it was lower parent income that was associated with higher emotional symptoms. These findings might reflect different patterns of higher education and income distributions in both countries. Overall levels of income inequality in a country are associated with mental health, with greater income inequality being associated with poorer mental health (over and above economic measures such as GDP) (Patel et al., 2018). In terms of overall income inequality, the UK has slightly higher inequality (GINI coefficient = 0.36) compared with Australia (GINI

coefficient = 0.34), although Australia has a somewhat higher poverty rate. Our findings speak to the nuanced ways in which socioeconomic inequalities can play out in what are otherwise fairly similar countries and economies (i.e. English-speaking, high-income and industrialised) and provide useful information about needing to regularly include and account for different SEP indicators in child mental health research.

In interpreting the findings from this study, a few limitations should be considered. A systematic approach was taken to coding ethnicity status that was consistent between the two countries, however, it needs to be acknowledged that there is no self-report ethnicity variable in Australia. Instead, studies rely on using country of birth of the child and their parents as a proxy to derive ethnicity. Future research in Australia should consider supplementing country of birth questions with self-identified ethnicity.

As it is common in large-scale population-based studies, parent and child reported symptoms based on widely used questionnaires are used in this study. In interpreting the emotional mental health of children over time, it is important to note that emotional symptoms were by parent report; not self-report. It is common for parents to report on children's mental health, especially when they are younger, and measures like the SDQ are well established and validated for this use (Goodman, 2001). However, it is well established that there is weak agreement between parent and child reports of common mental health problems ( $r = 0.2-0.3$ ) (Achenbach, McConaughy, & Howell, 1987; Rescorla et al., 2013), and there is also evidence that their associations with covariates also varies, for instance, socioeconomic disparities are wider in parent-reported symptoms compared with child self-reported symptoms (Johnston, Propper, Pudney, & Shields, 2014), potentially reflecting influence of parent's own mental health when reporting about their child. The addition of self-report depressive symptoms at age 14/15 using the SMFQ to our investigation illustrates some differences in parent and child estimations of emotional symptoms at age 14 years. Future studies would benefit from including child self-reports of symptoms from earlier ages to ensure their perspective and minimise biases that might be inherent in relying only on parent-reported symptoms.

Overall, the findings from this study highlight the importance of conducting cross-country comparisons on mental health outcomes using harmonised and nationally representative datasets. For example, Australia more frequently conducts national youth mental health surveys than the UK, which enables policy and practice to be up-to-date and informed by current needs. Australian schools have access to a wide range of mental health school support programmes and organisations. However, there are also more gaps in how schooling is adjusted for the needs

of immigrant children (Matthews, 2008) and ethnic minority children experience more victimisation in Australia compared with in the UK, suggesting policy lessons on reducing bullying experienced by minority groups might be a useful target for intervention. Future research will also be needed to further guide policy and interventions that considers the potential intersectionality of disadvantage. New insights can be gained from such examinations that consider and evaluate the role of national indicators of economic and social environments and the policy context in understanding the epidemiology of childhood mental health.

## Conclusion

The extent of the sex, ethnic and SES inequalities in the UK and Australia differs across country, ages and reporter of mental health. The findings underline the importance of considering country-specific sociodemographic inequalities and highlight the need to understand inequalities across all countries and contexts as findings from a select group of countries are unlikely to translate, even to other very similar countries. Programmes and policies designed to reduce the mental health burden on young people in the UK and Australia need to consider how sex, ethnic and socioeconomic disadvantages may overlap and be sensitive to different backgrounds and contexts.

## Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article:

**Table S1.** Harmonised variables across MCS and LSAC.

**Table S2.** Measurement invariance.

**Table S3.** Sociodemographic breakdown by country.

**Table S4.** Measure stability and correlations over time.

**Table S5.** Parent child correlations by groups for SDQ (parent report) and SMFQ (self-report) at age 14.

**Table S6.** Mean parent mental health (Kessler-6) by key sociodemographic characteristics of the child and country at each age.

**Table S7.** Estimates from unadjusted and adjusted regression models to predict emotional symptoms at each age.

**Table S8.** Latent growth curve models fit statistics.

**Figure S1.** Child emotional symptoms in the UK and Australia across ages by sex, ethnicity and socioeconomic factors (income, parent education and employment) based on model predicted marginal means from a model with mutual adjustment. Adjusted estimates are presented in Figure 1 in the main paper.

## Acknowledgements

The authors are grateful for the co-operation of the Millennium Cohort Study and *Growing Up in Australia*

families who voluntarily participate in these studies. The authors thank the Economic and Social Research Council and the co-funding by a consortium of UK government departments for funding the Millennium Cohort Study through the Centre for Longitudinal Studies (CLS) at the UCL Institute of Education, London. The authors thank the Australian Institute of Family Studies, the Department of Social Services and the Australian Bureau of Statistics in Australia, the Consortium Advisory group for their ongoing support. They would also like to thank a large number of stakeholders from academic, policymaker and funder communities and colleagues at CLS involved in data collection and management. The funders of the study had no role in the design of this study paper, data collection, data analysis, data interpretation or writing

of this paper, although the Department of Social Services Australia has played a central role to the design of LSAC overall. Findings and views expressed in this publication are those of the individual authors and may not reflect those of the Australian Institute of Family Studies, the Department of Social Services or the Australian Bureau of Statistics. The authors have declared that they have no competing or potential conflicts of interest.

## Correspondence

Praveetha Patalay, University College London, Gower Street, London, UK; Email: p.patalay@ucl.ac.uk

## Key points

- The extent of the sex, ethnic and socioeconomic disparities in the UK and Australia differs across country, ages and reporter of mental health.
- Girls experience greater difficulties in adolescence, but the gender gap in depressive symptoms in adolescence is wider in the UK, highlighting that the magnitude of the gender gap is not ubiquitous.
- In the UK, ethnic minority children have better mental health than their White majority peers in adolescence, whereas in Australia this is not the case. Understanding context-specific explanations for this difference (e.g. differences in racial discrimination and bullying victimisation) might help identify targets for effective intervention for prevention of widening ethnic inequalities.

## References

- Achenbach, T.M., McConaughy, S.H., & Howell, C.T. (1987). Child-adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, 101, 213.
- Angold, A., Costello, E.J., Messer, S.C., Pickles, A., Winder, F., & Silver, D. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, 5, 237–249.
- Assari, S., Moazen-Zadeh, E., Caldwell, C.H., & Zimmerman, M.A. (2017). Racial discrimination during adolescence predicts mental health deterioration in adulthood: Gender differences among blacks. *Frontiers in Public Health*, 5, 104.
- Australian Bureau of Statistics (2016). Australian standard classification of cultural and ethnic groups. Available from: <https://www.abs.gov.au/AUSSTATS/abs@.Nsf/7d12b0f6763c78caca257061001cc588/964d7ded6ce6f93aca2578ed0021374b!OpenDocument#:~:text=The%20Australian%20Standard%20Classification%20of,and%20cultural%20and%20ethnic%20groups.&text=The%20broad%20group%20level%20is%20the%20highest%20level%20of%20the%20classification%20from%20Australian%20Bureau%20of%20Statistics>.
- Australian Bureau of Statistics (2018). *Census of Population and Housing, 1901, 1954, 2001 and 2016*. Canberra, ACT, Australia: Author. Available from: <https://www.abs.gov.au/census>
- Australian Bureau of Statistics (2020a). *3218.0 - Regional Population Growth, Australia, 2018-19*. Canberra, ACT, Australia: Author. Available from: [https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3218.0Main+Feature\\_s12018-19?OpenDocument](https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3218.0Main+Feature_s12018-19?OpenDocument)
- Australian Bureau of Statistics (2020b). 6250.0 - Characteristics of Recent Migrants, Australia, Nov 2019. Canberra, Australia. Available from: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/0/E92EA270A32AF8F1CA256953007D9AFA?OpenDocument>
- Bentler, P.M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bor, W., Dean, A.J., Najman, J., & Hayatbakhsh, R. (2014). Are child and adolescent mental health problems increasing in the 21st century? A systematic review. *Australian & New Zealand Journal of Psychiatry*, 48, 606–616.
- Campbell O. L. K., Bann D., Patalay P. (2021). The gender gap in adolescent mental health: A cross-national investigation of 566,829 adolescents across 73 countries. *SSM - Population Health*, 13, 100742. <http://dx.doi.org/10.1016/j.ssmph.2021.100742>
- Catney, G., & Simpson, L. (2010). Settlement area migration in England and Wales: Assessing evidence for a social gradient. *Transactions of the Institute of British Geographers*, 35, 571–584.
- Cokley, K., Hall-Clark, B., & Hicks, D. (2011). Ethnic minority-majority status and mental health: The mediating role of perceived discrimination. *Journal of Mental Health Counseling*, 33, 243–263.
- Collishaw, S., Furzer, E., Thapar, A.K., & Sellers, R. (2019). Brief report: A comparison of child mental health inequalities in three UK population cohorts. *European Child & Adolescent Psychiatry*, 11, 1547.
- Connelly, R., & Platt, L. (2014). Cohort profile: UK Millennium Cohort Study (MCS). *International Journal of Epidemiology*, 43, 1719–1725.
- Craig, G. (2012). The history and pattern of settlement of the UK's black and minority ethnic population. In *Understanding 'Race' and ethnicity: Theory, history, policy, practice* (pp.

- 41–69). [https://www.researchgate.net/publication/320691287\\_The\\_history\\_and\\_pattern\\_of\\_settlement\\_of\\_the\\_UK's\\_black\\_and\\_minority\\_ethnic\\_population](https://www.researchgate.net/publication/320691287_The_history_and_pattern_of_settlement_of_the_UK's_black_and_minority_ethnic_population)
- Czaika, M., & de Haas, H. (2014). The globalization of migration: Has the world become more migratory? *International Migration Review*, 48, 283–323.
- Dekker, M.C., Ferdinand, R.F., van Lang, N.D.J., Bongers, I.L., van der Ende, J., & Verhulst, F.C. (2007). Developmental trajectories of depressive symptoms from early childhood to late adolescence: Gender differences and adult outcome. *Journal of Child Psychology and Psychiatry*, 48, 657–666.
- Department of Home Affairs (2020). Regional migration. Canberra, Australia. Available from: <https://immi.homeaffairs.gov.au/visas/working-in-australia/regional-migration#:~:text=The%20Australian%20Government%20is%20committed,to%20settle%20in%20regional%20areas.&text=a%20refined%20definition%20of%20'regional,and%20work%20in%20regional%20Australia>
- Eaton, K.M., Hoge, C.W., Messer, S.C., Whitt, A.A., Cabrera, O.A., & McGurk, D. (2008). Prevalence of mental health problems, treatment need, and barriers to care among primary care-seeking spouses of military service members involved in Iraq and Afghanistan deployments. *Military Medicine*, 173, 1051–1056.
- Ferrant, G., Fuirot, L., & Zambrano, E. (2020). The Social Institutions and Gender Index (SIGI) 2019: A revised framework for better advocacy. OECD Development Centre Working Papers, No. 342, Paris: OECD Publishing. <https://doi.org/10.1787/022d5e7b-en>
- Fitzsimons, E. (2017). *Millennium Cohort Study Sixth Survey 2015–2016: User guide* (1st edn). London: Centre for Longitudinal Studies.
- Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40, 1337–1345.
- Johnston, D.W., Propper, C., Pudney, S.E., & Shields, M.A. (2014). The income gradient in childhood mental health: all in the eye of the beholder? *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 177, 807–827.
- Kessler, R.C., Amminger, G.P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T.B. (2007). Age on onset of mental disorders: A review of recent literature. *Current Opinion in Psychiatry*, 20, 359. Available from: <https://ezp.lib.unimelb.edu.au/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsbl&AN=RN210416261&site=eds-live&scope=site>
- Kessler, R.C., Andrews, G., Colpe, L.J., Hiripi, E., Mroczek, D.K., Normand, S.-L., ... & Zaslavsky, A.M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959–976.
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., & Walters, E.E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 593–602.
- Kessler, R.C., Green, J.G., Gruber, M.J., Sampson, N.A., Bromet, E., Cuitan, M., ... & Zaslavsky, A.M. (2010). Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) survey initiative. *International Journal of Methods in Psychiatric Research*, 19, 4–22.
- Lewinsohn, P.M., Gotlib, I.H., Lewinsohn, M., Seeley, J.R., & Allen, N.B. (1998). Gender differences in anxiety disorders and anxiety symptoms in adolescents. *Journal of Abnormal Psychology*, 107, 109.
- Macedo, D.M., Smithers, L.G., Roberts, R.M., Paradies, Y., & Jamieson, L.M. (2019). Effects of racism on the socio-emotional wellbeing of Aboriginal Australian children. *International Journal for Equity in Health*, 18, 132.
- Marsh, H.W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, 11, 320–341.
- Matthews, J. (2008). Schooling and settlement: Refugee education in Australia. *International Studies in Sociology of Education*, 18, 31–45.
- Minas, H., Kakuma, R., Too, L.S., Vayani, H., Orapeleng, S., Prasad-Ildes, R., ... & Oehm, D. (2013). Mental health research and evaluation in multicultural Australia: Developing a culture of inclusion. *International Journal of Mental Health Systems*, 7, 23.
- Mock-Muñoz de Luna, C.J., Vitus, K., Torslev, M.K., Krasnik, A., & Jervelund, S.S. (2019). Ethnic inequalities in child and adolescent health in the Scandinavian welfare states: The role of parental socioeconomic status - A systematic review. *Scandinavian Journal of Public Health*, 47, 679–689.
- Mostafa, T., & Ploubidis, G.B. (2017). *Millennium Cohort Study. Sixth Survey 2015-2016: Technical report on response (Age 14)*. London: Centre for Longitudinal Studies.
- Muthén, L.K., & Muthén, B.O. (1998–2017). *Mplus user's guide*. Los Angeles: Muthén and Muthén.
- NHS Digital (2018). Mental health of children and young people in England, 2017. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2017/2017>
- Nolen-Hoeksema, S., & Girgus, J.S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, 115, 424–443.
- Patalay, P., & Fitzsimons, E. (2017). Mental ill-health among children of the new century: trends across childhood with a focus on age 14. London. Available from: [https://www.ncb.org.uk/sites/default/files/uploads/documents/Research\\_reports/UCL%20-%20NCB%20-%20Mental\\_Ill-Health%20FINAL.pdf](https://www.ncb.org.uk/sites/default/files/uploads/documents/Research_reports/UCL%20-%20NCB%20-%20Mental_Ill-Health%20FINAL.pdf)
- Patalay, P., & Gage, S.H. (2019). Changes in millennial adolescent mental health and health-related behaviours over 10 years: a population cohort comparison study. *International Journal of Epidemiology*, 48, 1650–1664.
- Patel, V., Burns, J.K., Dhingra, M., Tarver, L., Kohrt, B.A., & Lund, C. (2018). Income inequality and depression: A systematic review and meta-analysis of the association and a scoping review of mechanisms. *World Psychiatry*, 17, 76–89.
- Patel, V., Flisher, A.J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: A global public-health challenge. *The Lancet*, 369, 1302–1313.
- Priest, N., Baxter, J., & Hayes, L. (2012). Social and emotional outcomes of Australian children from Indigenous and culturally and linguistically diverse backgrounds. *Australian and New Zealand Journal of Public Health*, 36, 183.
- Priest, N., Kavanagh, A., Becares, L., & King, T. (2019). Cumulative effects of bullying and racial discrimination on adolescent health in Australia. *Journal of Health and Social Behavior*, 60, 344–361.
- Priest, N., King, T., Becares, L., & Kavanagh, A.M. (2016). Bullying victimization and racial discrimination among Australian Children. *American Journal of Public Health*, 106, 1882–1884.
- Priest, N., Paradies, Y., Gunthorpe, W., Cairney, S., & Sayers, S. (2011). Racism as a determinant of social and emotional wellbeing for Aboriginal Australian youth. *The Medical Journal of Australia*, 194, 546–550.
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science and Medicine*, 90, 24–31.
- Rescorla, L.A., Ginzburg, S., Achenbach, T.M., Ivanova, M.Y., Almqvist, F., Begovac, I., ... & Verhulst, F.C. (2013). Cross-Informant agreement between parent-reported and

- adolescent self-reported problems in 25 societies. *Journal of Clinical Child & Adolescent Psychology*, 42, 262–273.
- Sanson, A., Nicholson, J., Ungerer, J., Zubrick, S., Wilson, K., Ainley, J., ... & Rodgers, B. (2002). Introducing the longitudinal study of Australian children. LSAC Discussion Paper No 1. Australian Institute of Family Studies: Melbourne Australia.
- Shepherd, C.C.J., Li, J., Cooper, M.N., Hopkins, K.D., & Farrant, B.M. (2017). The impact of racial discrimination on the health of Australian Indigenous children aged 5–10 years: Analysis of national longitudinal data. *International Journal for Equity in Health*, 16, 116.
- Soloff, C., Lawrence, D., & Johnstone, R. (2005). LSAC sample design (Technical paper No.1). Melbourne.
- StataCorp. (2019). *Stata statistical software: Release 16*. College Station, TX: Author.
- Thabrew, H., Stasiak, K., Bavin, L.-M., Frampton, C., & Merry, S. (2018). Validation of the Mood and Feelings Questionnaire (MFQ) and Short Mood and Feelings Questionnaire (SMFQ) in New Zealand help-seeking adolescents. *International Journal of Methods in Psychiatric Research*, 27, e1610.
- Tippett, N., Wolke, D., & Platt, L. (2013). Ethnicity and bullying involvement in a national UK youth sample. *Journal of Adolescence*, 36, 639–649.
- Usback, S., Australian Bureau of Statistics LSAC Processing Team, & Australian Bureau of Statistics Household Survey Methodology Team (2018). The Longitudinal Study of Australian Children: LSAC Technical paper No.20, Wave 7 Weighting and Non-Response. Canberra: Australia. [https://growingupinaustralia.gov.au/sites/default/files/lzac\\_wave\\_7\\_weighting\\_and\\_non-response\\_paper\\_20.pdf](https://growingupinaustralia.gov.au/sites/default/files/lzac_wave_7_weighting_and_non-response_paper_20.pdf)
- Washbrook, E., Waldfogel, J., Bradbury, B., Corak, M., & Ghangro, A.A. (2012). The development of young children of immigrants in Australia, Canada, the United Kingdom, and the United States. *Child Development*, 83, 1591–1607.
- Wickrama, K.A.S., Noh, S., & Bryant, C.M. (2005). Racial differences in adolescent distress: Differential effects of the family and community for blacks and whites. *Journal of Community Psychology*, 33, 261–282.

Accepted for publication: 16 February 2021