

Annual Research Review: Secular trends in child and adolescent mental health

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Background: Child and adolescent mental health problems are common, associated with wide-ranging functional impairments, and show substantial continuities into adult life. It is therefore important to understand the extent to which the prevalence of mental health problems has changed over time, and to identify reasons behind any trends in mental health. **Scope and Methodology:** This review evaluates evidence on whether the population prevalence of child and adolescent mental health problems has changed. The primary focus of the review is on epidemiological cross-cohort comparisons identified by a systematic search of the literature (using the Web of Knowledge database). **Findings:** Clinical diagnosis and treatment of child and adolescent psychiatric disorders increased over recent decades. Epidemiological comparisons of unselected population cohorts using equivalent assessments of mental health have found little evidence of an increased rate of ADHD, but cross-cohort comparisons of rates of ASD are lacking at this time. Findings do suggest substantial secular change in emotional problems and antisocial behaviour in high-income countries, including periods of increase and decrease in symptom prevalence. Evidence from low- and middle-income countries is very limited. Possible explanations for trends in child and adolescent mental health are discussed. The review also addresses how cross-cohort comparisons can provide valuable complementary information on the aetiology of mental illness. **Keywords:** Time trends, secular change, depression, antisocial, psychopathology.

Introduction

Epidemiological surveys indicate that psychiatric disorders in children and adolescents are common, affecting at least one in ten 5–16-year olds (Green, McGinnity, Meltzer, Ford, & Goodman, 2005; Meltzer, Gatward, Goodman, & Ford, 2000). These include neurodevelopmental disorders such as autism spectrum disorder (ASD) and attention-deficit hyperactivity disorder (ADHD), mood and anxiety disorders, and conduct disorders. Emotional and behavioural problems more broadly defined are considerably more common. Mental health problems have wide-ranging detrimental impacts on young people's well-being, health and education. They are also not transient phenomena (Maughan & Collishaw, 2015; Thapar, Collishaw, Pine, & Thapar, 2012). Long-term prospective studies highlight continuities between child and adult mental health, with over half of disorders in young adulthood preceded by a psychiatric disorder in childhood (Kim-Cohen et al., 2003), and conversely strong persistence and recurrence of childhood psychiatric conditions into adulthood (Birmaher et al., 2004). Psychiatric problems account for a substantial and increasing world-wide burden of ill health (Murray et al., 2012). Psychopathology is associated with risk for suicide, the second or third leading cause of death in adolescents and young adults (Windfuhr et al., 2008); and with effects on chronic illness and early

mortality (Jokela, Ferrie, & Kivimaki, 2009; Maughan, Stafford, Shah, & Kuh, 2014; Thapar et al., 2012). The prevention of child and adolescent mental health problems is therefore an important health priority (Institute of Medicine, 2009), and an accurate understanding of secular trends in child and adolescent psychopathology is needed to gauge the success of attempts to reduce the burden of child psychiatric problems.

Despite efforts to better understand child and adolescent psychiatric conditions and how to prevent them, there are concerns among parents, teachers and health professionals that today's children are more prone to mental health problems than were previous generations of children and young people (Barnard, Potter, Broach, & Prior, 2002; Russell, Kelly, & Golding, 2010). Indeed, the past 20 years has seen considerable increases in the diagnosis and treatment of child and adolescent psychiatric disorders (Fombonne, 2009; Getahun et al., 2013; Ma, Lee, & Stafford, 2005; Smith, Larkin, & Southwick, 2008). As discussed below, there are a range of explanations for such trends, including increased help-seeking by parents and young people, improved screening and clinical recognition in schools and primary care, medicalization of feelings and behaviours previously considered as normal (Dowrick & Frances, 2013), and a broadening of diagnostic classifications of psychiatric disorders. It is also possible that there have been real changes in the prevalence of childhood psychiatric conditions.

Conflict of interest statement: No conflicts declared.

The first aim of this review was to evaluate evidence on whether the *population prevalence* of child and adolescent mental health problems has changed. It is first necessary to consider the strengths and weaknesses of different methodological designs that have been used to address this question. These include cross-sectional studies comparing lifetime prevalence across different age cohorts, meta-analyses of epidemiological studies using psychiatric interviews, cross-cohort comparisons in which symptom prevalence is directly compared, and time series tracking population suicide and offending rates. Using convergent evidence across these different study methods, but with a primary focus on epidemiological cross-cohort comparisons, this paper will review trends in the most common types of child and adolescent psychopathology – neurodevelopmental problems, antisocial behaviour and emotional problems. In understanding these trends, it is important to consider possible variations between children and adolescents, boys and girls, different socioeconomic groups and across different countries. Social change affecting risks for mental health problems is unlikely to have impacted in the same way on these different groups. The review focuses on trends since the middle of the last century, but recent fluctuations may be relatively minor when compared to very long-term historical change in rates of mental ill health and violence (Pinker, 2011). It is also important to note from the outset that epidemiological ‘like-for-like’ comparisons of trends in population prevalence are at this stage only available for a small number of high-income countries, and almost completely lacking in low- and middle-income countries.

Next, the review considers the reliability and validity of evidence about trends in child and adolescent mental health, and in particular, the possibility that changes in reporting confound observed trends. A number of methods can help point to more robust conclusions. These include the consideration of convergent evidence across multiple informants and study methods, data about predictive validity where longitudinal data have been collected across multiple cohorts, and evidence for specificity of trends in particular aspects of child mental health.

Cross-cohort comparisons provide an opportunity to address a number of other important questions beyond simply tracking trends in prevalence. A second aim was to consider possible explanations for any increases or decreases in the prevalence of child mental health problems. The past 50 years has seen substantial societal changes which are likely to have had far-reaching impacts on children’s lives and well-being. Cross-cohort comparisons with linked data on risk factors and mental health are sparse, but where such data are available they provide valuable opportunities for understanding the possible impact of changes in risk factors on

child psychopathology. A related issue is whether social inequalities in child mental health have increased or decreased. Addressing health inequalities in morbidity and mortality is recognized as an important policy priority nationally and internationally (Marmot, 2010). However, the extent of social inequalities affecting child and adolescent mental health, and whether progress is being made in reducing such inequalities, is rarely considered. A full review of the myriad changes in children’s lives that have occurred over recent decades is beyond the scope of this review. Instead, a number of illustrative examples are discussed to highlight the methodological and conceptual challenges involved.

A third aim was to highlight examples where cross-cohort comparisons have provided novel insights on the role of hypothesized risk factors. Sudden discontinuities in the social environment can approximate features of a ‘natural experiment’ (Thapar & Rutter, 2015). In addition, studies of secular change for a range of phenotypes (e.g. height, age at pubertal maturation, cognitive ability) have pointed to somewhat different conclusions regarding the role of environmental and heritable factors when compared to studies of within-population variation (Dickens & Flynn, 2001; Silventoinen et al., 2003).

Throughout, this review aims to identify important knowledge gaps and to provide guidance on priorities for future research.

Methodological considerations

Studies have used various designs to consider whether the prevalence of child mental health problems has changed across time. Apart from research tracking rates of diagnosis and treatment in clinical practice, studies have also examined population suicide and crime rates, generational differences in lifetime rates of retrospectively reported mental ill health, used meta-analytic methods to compare rates of interview-assessed disorder in epidemiological surveys conducted at different time points, and undertaken direct cross-cohort comparisons of epidemiological studies using equivalent mental health symptom screens.

Each of these approaches has pros and cons. Four general issues are important to consider. First, to what extent is a study able to compare ‘like with like’, both in terms of samples and measurement? Second, to what extent does the coverage of a study extend to the whole population rather than focusing on selected subgroups? A third challenge relates to the possibility that the way informants report mental health problems has changed, even when equivalent measures are used in different cohorts. Finally, linked data on hypothesized explanatory factors is required in order to test explanations for trends in mental health.

More specifically, time trends studies can be evaluated according to the extent to which they

encompasses the following features: (a) comparison of unselected representative epidemiological cohorts using the same sampling frames; (b) equivalence in response and methods for dealing with selective nonresponse; (c) use of equivalent measures of mental health symptoms or disorders; (d) the ability to provide convergent data across multiple methods or informants; (e) data on impairment as well as symptoms of psychopathology; (f) contemporaneous rather than retrospective assessment; (g) linked and comparable data on hypothesized explanatory factors; (h) longitudinal follow-up or data linkage allowing a test of the predictive validity of mental health trends with respect to independently assessed functional outcomes.

Finally, it is important to consider distinctions between age, period and cohort effects (Robertson & Boyle, 1998). These are typically confounded in most studies, but have important implications for understanding reasons behind changes in prevalence. It is well known that patterns of disease vary by age. They might also vary for different periods of historical time, for example as a result of economic recession. Cohorts of individuals born at the same time may also share risk for disease independent of their age and period of assessment. Comparisons of longitudinal birth cohorts at multiple points in times are required to distinguish between period and cohort effects (Keyes et al., 2014), but very few such studies have been undertaken. In this paper, the term 'cross-cohort comparison' refers to comparisons of repeat epidemiological samples assessed at different points in times. It is important to remember that any difference could reflect either period effects or cohort effects or some combination of the two.

Trends in child and adolescent mental health

This section of the review focuses on trends in the most commonly occurring types of child and adolescent psychopathology. The main focus is on studies that meet the most important of the criteria outlined above, namely those in which contemporaneous representative population samples have been compared using equivalent assessments of mental health.

Tables 1–3 provide overviews of key studies of children, adolescents and mixed age groups respectively that were included in this section of the review (see online supporting information for description of search strategy). In total, 21 studies were identified that met relevant inclusion and exclusion criteria. Of these, the majority were undertaken in the United Kingdom (6), Finland (3), other Nordic countries (3) or the Netherlands (3). Five used samples of children, 11 of adolescents, and 5 included children and adolescents. Studies used various sampling approaches, including via schools, private households or follow-ups of birth cohorts. Most studies used equivalent sampling approaches at each time

point. Studies have typically reported high response rates (>80%) or addressed the possibility of selective drop-out analytically, for example by using cohort-specific sample weights derived from prior more complete data. All selected studies used validated symptom screens with little or no variation across assessments. One longer term trends study, where similar but nonidentical assessments were compared used calibration methods to ensure comparability of comparisons across time (Collishaw, Maughan, Goodman, & Pickles, 2004). Not included are studies which have used bespoke items to examine trends in mental health-related phenomena, including self-reported feelings of depression or anxiety, self-harm or suicidality, delinquency and substance use. It was beyond the scope of this review to fully consider these here, but they may also provide valuable information on trends in child and adolescent mental health. One example is the cross-national World Health Organization Health Behaviour among School-aged Children series of studies (see HBSC.org for details). Turning back to the studies included here, data from multiple informants, information about functional impact of symptoms, longitudinal validation of trends, information on whether trends differ by gender or sociodemographic subgroup and linked data on potential explanatory factors all provide important strengths. Most studies included only one informant, typically parent reports for younger children and youth self-reports in adolescence. One Finnish study of 8-year-old children also included child-based reports of symptoms (Sourander, Niemelä, Santalahti, Helenius, & Piha, 2008). Impact of symptoms on psychosocial functioning has rarely been assessed, and only one study used independent data on longitudinal outcomes to validate trends (Collishaw et al., 2004). Finally, while most studies examined whether trends differed by gender, only a minority of studies directly tested how far trends in mental health might be accounted for by trends in hypothesized explanatory factors.

Neurodevelopmental disorders

Perhaps, the most dramatic increases in child psychiatric diagnoses relate to changes in ADHD and autism spectrum disorders (ASD). In the 1960s around one in 2500 children were diagnosed with autism (Lotter, 1966); the incidence of autism spectrum disorders has increased steadily to around 3–6 children per 1000 children at the beginning of the 21st Century (Baird et al., 2006; Rutter, 2005). There is some evidence of a continuing increase in diagnoses of autism spectrum disorders in the 21st Century (Boyle et al., 2011; Russell, Rodgers, Ukoumunne, & Ford, 2014; but see also Taylor, Jick, & MacLaughlin, 2013). A recent systematic review of worldwide studies found a median prevalence of 62 per 10,000 (Elsabbagh et al., 2012), and in some

Table 1 Summary of cross-cohort comparison studies of children using mental health symptom screens

Lead author (year)	Country	Study years	Age (years)	Sample	Ns	Response rates (%)	Informants	Measures	Outcomes	Trends by subgroup	Explanatory factors	Key findings
Sourander (2004, 2008)	Finland	1989–1999	8	HH/ SCH	986	96	Parent	Rutter A	Means	Gender	SES	Decreased parent-report conduct and total problem high scores 1989–1999 (boys)
Santalahti (2005, 2008)		2005		HH/ SCH	831	86	Teacher	Rutter B	High score		Family type	Increased child-reported depression (girls)
Iloa (2013)				HH/ SCH	870	84	Child	CDI			Life events	Increased somatic symptoms
Luntamo (2012)				SCH								Changes in bully/victimization
Sellers (2014)	UK	1999–2004–2008	7	HH HH BC	1,033 648 13 857	83 76 72	Parent Teacher	SDQ	Means Variance High score Impact	Gender SES	Demograph	Mean problems, variance, and high problems all reduced (especially boys; gender converged) Impact changed (esp boys) Trends not explained by demographic changes Small drop in mean problems and high scores
Tick (van der Ende, Koot, & Verhulst 2007)	Netherlands	1989–2003	2–3	HH	394 279	90 80	Parent	CBCL	Means High score	Gender SES	No	Substantial increases in means and abnormal range scores, especially aggressive behaviour, but attention problems decreased; Similar trends by gender; Increased problems most marked for low SES. Increases not explained by explanatory factors
Matijasevich (2014)	Brazil	1993–2004	4	BC BC	634 3,750	87 91	Parent	CBCL	Means High score	Gender SES	Demograph, perinatal, maternal psychiatric	Reduced rate of high scores
McArdle (2003)	UK	1973–1994	7–9	SCH SCH	515 1,044	Not reported	Teacher	Rutter B	High score	No	No	

HH, random sample of private households; BC, birth cohort; SCH, school-based sampling.

Table 2 Summary of cross-cohort comparison studies of adolescents using mental health symptom screens

Lead author (year)	Country	Study years	Age (yrs)	Sample	Ns	Response rates (%)	Informants	Measures	Outcomes	Trends by subgroup	Explanatory factors	Key findings
von Soest (2014)	Norway	1992–2002–2010	16–17	SCH SCH SCH	2,994 3,438 2,813	97 91 84	Youth	Depressive Mood Inventory	Means Variance High score	Gender SES Family type	Substance Conduct Eating Appearance	Increased mean depression (boys) and high depression scores (greater for boys) from 1992 to 2002 Increased variance No interaction by SES, fam type Decreased conduct problems (2002–10 boys) Cannabis, eating problems partly mediate cohort effect (92–02) on depression, as well as appearance in girls Increased depression and SDQ emotional and hyperactivity scores, decreased conduct scores
Fleming (2014)	New Zealand	2007–2012	10–17	SCH SCH	9,107 8,500	74 68	Youth	RADS-SF SDQ	High score	Gender Age	Demograph	Increased depression and SDQ emotional and hyperactivity scores, decreased conduct scores
Torikka (2014)	Finland	2000–2011 (annual)	14–16	SCH	618 084 total	85–90	Youth	R-BDI	High score	Gender SES	None	Small increase severe depression, more marked increases in low SES groups
Sourander (2012)	Finland	1998–2008	13–17	SCH SCH	1,458 1,569	89 92	Youth	SDQ	Means High score	Gender	None	No change in mean emotional or conduct problems, small decrease in hyperactivity (girls); no change in high problem scores
Collishaw (2010, 2012) Schepman (2011)	UK	1986–2006	16–17	BC HH	4,524–7,120 ^a 747	32–50 53	Youth Parent	GHQ-12 Malaise Rutter	Means High score	Gender Fam type SES	Parenting Parent mental health	Increased depression scores and high scorers (girls), no differences in trends by SES or family type; Increase attenuated when accounting for parental distress; small increase in parent-reported conduct not accounted by parenting; no change in hyperactivity

(continued)

Table 2 (continued)

Lead author (year)	Country	Study years	Age (yrs)	Sample	Ns	Response rates (%)	Informants	Measures	Outcomes	Trends by subgroup	Explanatory factors	Key findings
Sweeting (2009, 2010) West (2003)	UK	1987 1999 2006	15	HH SCH SCH	505 2,195 3,194	65 79 81	Youth	GHQ-12	Means High score	Gender SES	School Family Worries Lifestyle	Increased depression means and high scores for girls from higher SES (1987–1999) and for boys and girls (1999–2006) Increase attenuated when controlling for family arguments/worries, and school disengagement/worries. Evidence for increased exposure to and vulnerability to risk factors Depression increased (girls), anxiety increased (boys and girls)
Sigfusdottir (2008)	Iceland	1997 2000 2003 2006	14– 15	SCH	3,913 6,346 3,556 7,430	78–90	Youth	Depression and anxiety dimension scales	Means	Gender	No	Depression increased (girls), anxiety increased (boys and girls)
Tick (2008)	Netherlands	1993 2003	11– 18	SCH	1,095 810	82 83	Youth	YSR	Means High score	Gender Age SES	No	Decreased problems (boys), increased internalizing problems (girls; especially younger adolescents). No change emotional and antisocial mean scores; increased variability antisocial; and with low antisocial behaviour
Wangby (2005)	Sweden	1970 1996	15	SCH SCH	522 529	89 88	Youth	The Symptom Quest	Means Variance High and Low scores	Girls only	No	Increased mean and high emotional and eating disturbance symptom scores in both locations
Fichter (2004, 2005)	Greece Greek immigrants to Germany	1980 1998 1980 1998	11– 26 ^b 10– 21	SCH SCH SCH SCH	2,631 2,920 815 881	NK 90 NK 90	Youth	GHQ-28 ANIS	Means High score	Gender	No	Increased mean and high emotional and eating disturbance symptom scores in both locations

(continued)

Table 2 (continued)

Lead author (year)	Country	Study years	Age (yrs)	Sample	Ns	Response rates (%)	Informants	Measures	Outcomes	Trends by subgroup	Explanatory factors	Key findings
Collishaw (2004, 2007), Gore-Langton (2011)	UK	1974–1986–1999	15–16	BC BC HH	10 499 7,293 868	62 45 83	Parent	Rutter-A/SDQ ^c	Means High score	Gender Family type SES	Family structure SES	Increased conduct problems (1974–1999) validated using adult outcomes; Increase emotional problems (1986–1999); No systematic change hyperactivity; Similar trends by gender, family type, SES; Trends not explained by changes in family type or SES; Increased income inequalities in emotional problems

HH, random sample of private households; BC, birth cohort; SCH, school-based sampling.

^aHigher response for parent than youth.

^bSchool-based sample with some outliers-mean ages 14.8–15.8 years ($SD = 1.3$ – 1.6 years). Age included as covariate in analyses.

^cCalibration methods used to compare across similar but nonidentical measures.

countries including Sweden and the United States, one in every 100 children now meets criteria for an autism spectrum disorder (Centres for Disease Control & Prevention, 2012; Idring et al., 2012). A recent meta-analysis estimated that the most recent changes to the diagnostic classification system, DSM-5, will result in a decrease in the number of children diagnosed (Kulage, Smaldone, & Cohn, 2014).

There have also been marked increases in clinical diagnoses of ADHD, and corresponding increases in the prevalence of medication treatment for ADHD in many countries across the world, including in North America (Getahun et al., 2013; Olfson, Gameroff, Marcus, & Jensen, 2003; Toh, 2006), Europe (Atladdottir et al., 2014; Hsia & MacLennan, 2009; McCarthy et al., 2012; Wong, Murray, Novak-Camilleri, & Stephens, 2004), Australia (Stephenson, Karanges, & McGregor, 2013) and Asia (Man et al., 2014; Scheffler, Hinshaw, Modrek, & Levine, 2007). A recent meta-analysis of epidemiological studies, however, found no evidence for any systematic change in the prevalence of ADHD diagnoses once methodological variability across studies is accounted for (Polanczyk, Willcutt, Salum, Kieling, & Rohde, 2014). It seems likely that long-term increases in incidence of clinical diagnoses of neurodevelopmental disorders are largely explained by a broadening of diagnostic definitions and better recognition by professionals (Elsabbagh et al., 2012).

Indeed, most studies which have directly compared rates of parent- or teacher-endorsed reports of hyperactivity/inattention using equivalent epidemiological samples and symptom screens (see Tables 1–3) have found no evidence for a systematic increase in prevalence of ADHD-related difficulties either in adolescent or child samples, with symptom levels and the proportion of children with high scores remaining stable or showing small reductions over recent decades (e.g. Achenbach, Dumenci, & Rescorla, 2002a; McArdle, Prosser, Dickinson, & Kolvin, 2003; Collishaw et al., 2004; Tick, van der Ende, Koot, & Verhulst, 2007; Sourander, Niemela, Santalahti et al., 2008; Collishaw, Maughan, Natarajan, & Pickles, 2010; Hölling, Schlack, Petermann, Ravens-Sieberer, & Mauz, 2014; Sellers, Maughan, Pickles, Thapar, & Collishaw, 2015; but see also Tick, van der Ende, & Verhulst, 2007; Fleming et al., 2014). Similar studies are lacking in relation to symptoms of ASD, but constitute an urgent priority given public concern about a possible real change in population prevalence.

Affective disorders

Service use for affective disorders – including help-seeking, diagnosis, and medication treatment – has increased substantially in high-income countries over recent decades (Kosidou et al., 2010; Olfson, Blanco, Wang, Laje, & Correll, 2014; Smith et al.,

Table 3 Summary of cross-cohort comparison studies of mixed age ranges using mental health symptom screens

Lead author (year)	Country	Study years	Age (years)	Sample	Ns	Response rates (%)	Informants	Measures	Outcomes	Trends by subgroup	Explanatory factors	Key findings
Hölling (2014)	Germany	2003–6 2009–12	3–17	HH – quest HH-phone	14 477 10 353 ^a	67 39–73	Parent	SDQ ^b	Means High score	Gender Age SES	No	Small increases emotional problems (adolescents), conduct problems (children), no change hyperactivity; Mean trends only for low SES. No change high scores Reduced total problems (parent-rated), conduct problems (parent, youth-rated), hyperactivity (parent-rated), emotional problems (youth-rated), but reverse teacher-rated). No variation in trends by gender or most sociodemographic variables. Changes partly explained by improving social conditions
Maughan (2008)	UK	1999 2004	5–15	HH HH	10 438 7 977	83 76	Parent Teacher Child (11+)	SDQ	Means	Gender Age SES Fam type	SES Family type	Small increases in mean problem and % high scores (parent reports). Similar trends by gender; early increases only for adolescents
Tick (van der Ende, & Verhulst, 2007)	Netherlands	1983 1993 2003	6–16	HH HH HH	1,735 1,715 1,417	85 82 75	Parent Teacher	CBCL TRF	Means High score	Gender Age SES Ethnic	No	Increased emotional problems (boys and girls); small increase in externalizing behaviour (girls)
Lin (2007)	China	1993 ^c 2003	6–14	SCH SCH	1,960 3,711	Not known	Parent	Rutter A	High score	Gender	No	Increase in parent problems 1976–1989 and teacher problems 1981–1989 then decrease in problem scores but remaining higher than 1976 (reverse pattern for competence scores). No difference in trends by gender, age or SES Youth reports (11–18) also show decline problems 1989–1999
Achenbach (2002a, 2002b, 2003)	US	1976 ^d 1989 1999	7–16/ 18	HH HH HH	1,442 2,446 1,641	82 90 93	Parent Teacher Child	CBCL YSR TRF	Means High score	Gender Age SES	No	

HH, random sample of private households; BC, birth cohort; SCH, school based sampling.

^aOne third of sample newly recruited (39% response); rest resampled at older ages from baseline survey (73% response).^bDifferent modes of administration – questionnaire at baseline; telephone at follow-up.^cPrior time point not included because of noncomparability of measure.^dChildren referred for mental health service use omitted from 1976 sample and from some matched comparison analyses in later samples. Teacher reports from separate survey conducted in 1981 (Achenbach et al., 2002a, 2002b).

2008; Stephenson et al., 2013). This increase has been especially marked among adolescents (Olfson et al., 2014; Pottegård, Zoëga, Hallas, & Damkier, 2014). For example, visits to doctors by adolescents in the United States during which depression was reported increased from 1.4 million to 3.2 million in less than a decade between 1995 and 2002 (Ma et al., 2005). The debate about efficacy and safety of certain antidepressant drugs in adolescents (FDA, 2004; Thapar et al., 2012; Whittington et al., 2004) has not appeared to have impacted significantly on these trends. Antidepressant use in young people has continued to increase substantially (Olfson et al., 2014). Variations in clinical help-seeking and treatment cannot by themselves be seen as accurate indicators of population prevalence, not least because evidence shows that the majority of children and adolescents with psychiatric disorders, including anxiety and depression, do not access medical or other public sector services for these illnesses (Ford, Hamilton, Meltzer, & Goodman, 2007; Potter et al., 2012). As with autism and ADHD, trends in diagnosis and treatment of affective disorders are likely in part to reflect differences in ascertainment, service provision, and variation in diagnostic thresholds for identifying and treating disorders. However, there is now accumulating evidence that there has also been a real increase in population symptom prevalence, though not all evidence is consistent.

Initial indications that the population prevalence of affective disorders might have increased came from several large epidemiological investigations of adults which compared lifetime rates of depression across different age groups. If there are no secular changes in risk for depression then lifetime rates would be expected to increase with age given individuals' longer at-risk periods. However, the reverse has consistently been observed when different age cohorts are compared, with lifetime rates up to four times higher in young adults compared to those aged 65 and over, and an increased prevalence of (retrospectively reported) adolescent onset depression (Burke, Burke, Rae, & Regier, 1991; Kessler et al., 2005; Robins & Regier, 1991). Evidence for this pattern has been observed in the Epidemiological Catchment Area study, the National Comorbidity Survey and in other epidemiological studies of adults across the world (e.g. Cross-National Collaborative Group, 1992; Kessler et al., 2005). However, there are a number of methodological artefacts that are difficult to account for in retrospective cross-sectional comparisons. For example, age is confounded with length of recall period, older participants may be more reluctant to report depression, and depression is associated with earlier mortality which may result in an underrepresentation of earlier-born individuals suffering from depression (Cuijpers & Smit, 2002). A direct comparison of multiple epidemio-

logical samples using prospective assessments is therefore essential.

Evidence against a secular trend in depression comes from a meta-analysis of 26 epidemiological studies with data on rates of depressive disorder in children and adolescents between 1965 and 1999 (Costello, Erkanli, & Angold, 2006). This analysis not only modelled effects of time, but also adjusted for the substantial variations between studies in terms of diagnostic systems, assessment methods, and sample characteristics such as age and gender. The study found no evidence that rates of depression had changed once methodological differences were accounted for. However, caution is also needed in interpreting these findings. The wide variation in prevalence estimates from one study to the next (prevalence estimates ranged from <1% to >25%) may have made it difficult to detect systematic secular trends in depression prevalence.

Cross-cohort comparisons in which epidemiological studies at different time points have used identical screens for symptoms of anxiety and depression are helpful as these studies allow a like-for-like comparison of unselected population samples, albeit focusing on symptoms rather than disorder. Studies using this kind of design have now been undertaken in several countries (see Tables 1–3). Many of these studies support the view that adolescent emotional problems have shown a long-term increase over the past 30 years, including in the United Kingdom, Greece, Iceland, the Netherlands and Norway (Collishaw et al., 2004, 2010; Fichter, Xepapadakis, Quadflieg, Georgopoulos, & Fthenakis, 2004; Sigfusdottir, Asgeirsdottir, Sigurdsson, & Gudjonsson, 2008; Sweeting, Young, & West, 2009; Tick, van der Ende, & Verhulst, 2008; von Soest & Wichstrøm, 2014). The majority of these studies also suggest that this increase has been greater for girls than for boys. One exception is the study by Wångby, Magnusson, and Stattin (2005) finding no evidence of long-term change in self-rated emotional problems in Sweden between 1970 and 1996 respectively.

In the United Kingdom, a number of independent cross-cohort comparisons of adolescent emotional problems have now been undertaken, allowing clearer conclusions to be drawn. In one study, parent-reported symptoms of depressed mood, anxiety and fearfulness among 15/16-year olds were assessed across three national cohorts in the 1970s, 80s and 90s and showed a substantial increase between 1986 and 1999 (Collishaw et al., 2004). Evidence from youth self-reports, including a comparison of Scottish samples assessed in 1987, 1999 and 2006 (Sweeting et al., 2009), and of English teenagers in 1986 and 2006 (Collishaw et al., 2010) also points to a substantial increase in symptoms of anxiety/depression. Increases in emotional problems were not confined to those with low-level

difficulties. In fact, secular increases were more marked for those with more severe symptom levels. These studies also undertook more detailed analyses of whether patterns of secular change varied by type of affective symptoms (Collishaw et al., 2010; Sweeting et al., 2009). In one study, increases in problems were evident across all symptoms assessed (Sweeting et al., 2009). In the other, the increase was specific to a subset of items (worry, irritability, fatigue, sleep disturbance and feeling stressed; Collishaw et al., 2010). In terms of absolute effect sizes, all three UK epidemiological studies point to non-trivial increases in prevalence of youth emotional problems. The proportion of parents reporting high problem scores increased by 70% between 1986 and 1999 (Collishaw et al., 2004), the number of young people meeting established GHQ 'case criteria' almost doubled for Scottish boys and more than doubled for Scottish girls between 1987 and 2006 (Sweeting et al., 2009), and twice as many adolescents endorsed five or more symptoms of anxiety or depression in 2006 compared to 1986 (15% vs. 7%; Collishaw et al., 2010).

Epidemiological evidence from other countries also indicates a rise in youth emotional problems. Cross-cohort comparisons from an increasing number of countries including Greece, Germany, Sweden, Iceland, Norway, China and New Zealand have all shown increased self-reported adolescent symptoms of depression and anxiety from the 1980s onwards (Fichter et al., 2004; Fleming et al., 2014; Hölling et al., 2014; Lin & Wang, 2007; Kosidou et al., 2010; Sigfusdottir et al., 2008; von Soest & Wichstrøm, 2014), as well as increased sleep-onset difficulties (Pallesen et al., 2008). Tick, van der Ende, & Verhulst (2007) also report long-term increases in parent-reported emotional problems in the Netherlands. Evidence of recent trends is relatively sparse. von Soest & Wichstrøm compared rates of youth-reported symptoms of depression in Norway. There was a substantial increase in both male and female adolescent depression high symptom scores during the 1990s, but no significant change between 2002 and 2010. Sourander et al. (2012) found no change in adolescent emotional symptoms assessed using the SDQ in Finland between 1998 and 2008, although other Finnish evidence using the BDI suggests the possibility of an increase in the proportion of adolescents with moderate or severe depressive symptoms between 2000 and 2011, especially in more deprived subgroups (Torikka et al., 2014).

Evidence from low- and middle-income countries is largely lacking, but constitutes an important research priority. There is considerable cross-cultural variation in prevalence of child and adolescent mental health problems (Crijnen, Achenbach, & Verhulst, 1997), and the burden of psychiatric problems is often especially high in developing countries (Kieling et al., 2011). Furthermore,

resources to deal with mental health problems are typically scarcer than in high-income countries. Low- and middle-income countries also often experience more rapidly changing social conditions. Tracking trends in youth mental health in low-income countries therefore constitutes an important priority for future epidemiological research. Suggestive evidence for an increase in adolescent emotional problems comes from two national population-based surveys of Vietnamese adolescents which showed a high and increasing prevalence of self-reported low mood over the past decade, together with a marked increase in reports of suicidal thoughts or self-harm (Le, Nguyen, Tran, & Fisher, 2012).

In contrast to a sizeable body of evidence on trends in adolescent depression, there is less evidence on long-term trends in emotional problems among younger children. Parent-reported emotional problems in preschool children in the Netherlands showed a reduction between 1989 and 2003 (Tick, van der Ende, Koot, & Verhulst, 2007). A comparison of 4-year olds in the 1993 and 2004 Pelotas birth cohorts in Brazil found no evidence of a change in emotional problems, but an increase in somatic complaints (Matijasevich et al., 2014). A German study which included both children and adolescents found evidence for recent increases in adolescent, but not child emotional problems (Hölling et al., 2014). In the United Kingdom, recent evidence shows a reduction in younger children's emotional problems between 1999 and 2008 as rated by parents (Sellers et al., 2014). Very few studies of younger children have included children's own rating of emotional symptoms. One exception is a Finnish study of 8-year olds comparing cohorts assessed in 1989, 1999 and 2005 (Sourander et al., 2008). This study included children's own ratings of emotional difficulties, as well as parent and teacher reports. Findings suggested an increase in girls' self-reported depression between 1989 and 2005 when assessed using the Children's Depression Inventory, but no changes in parent- or teacher-reported emotional difficulties (Sourander et al., 2008). The same study also showed increases in child-rated sleep problems, fatigue, and somatic complaints (Luntamo, Sourander, Santalahti, Aromaa, & Helenius, 2012). These findings raise the possibility that child-based assessments may in fact reveal trends over time in emotional difficulties even when they are not apparent according to adult informants.

Nevertheless, the possibility that trends in emotional problems may be less marked in younger children relative to adolescents would perhaps not be surprising given evidence for different aetiological features being associated with pre- and postpubertal depression (Maughan, Collishaw, & Stringaris, 2013). However, direct evidence awaits developmentally informed approaches to cross-cohort comparisons

in which not only cross-sectional symptom levels but also developmental trajectories in psychopathology are compared across cohorts. This remains difficult given that it requires the comparison of multiple longitudinal cohorts tracked from childhood onwards using equivalent assessment methods.

An important question is whether longer term change in adolescent symptomatology has been sustained in the 21st Century. In the UK, comparisons of the 1999 and 2004 British Child and Adolescent Mental Health Surveys suggested that emotional symptoms levelled off or began to reverse (Maughan, Collishaw, Meltzer, & Goodman, 2008), and there was also no change in rates of anxiety or depressive disorders across these samples (Green et al., 2005). As noted, a more recent study focusing on younger children indicated a further reduction in symptom levels up to 2008 in the United Kingdom (Sellers et al., 2014). An important issue concerns the impact of the world-wide recession in 2008 on trends in child and adolescent mental health. One recent study examined two very large Canadian and US cohorts with data collected on multiple occasions between 1997 and 2010 (Keyes et al., 2014). This study is also one of very few to examine age, period and cohort effects simultaneously. The study focused primarily on symptoms of adult mental distress, but did also include adolescents in one of the two cohorts. Findings provide evidence for variations in distress by age, by period and by cohort. First, rates of psychological distress were highest in late adolescence and showed an additional peak in symptoms in the late 40s. Second, the study indicated steadily increasing rates of distress for cohorts born from the 1930s to the 1990s. Finally, the study indicated a decline in distress during the period 1997–2007, followed by an increase in distress between 2008 and 2010. Similarly, annually collected Finnish data up to 2011 also indicates a possible upturn in reports of depression in the final years of the series (Torikka et al., 2014). As discussed below, there is also now strong evidence that the global financial crisis resulted in a significant up-turn in suicides among the adult population (Barr, Taylor-Robinson, Scott-Samuel, McKee, & Stuckler, 2012). In the light of these sets of findings, an important priority is to collect further comparable epidemiological data to track trends in child and adolescent mental health postrecession.

Suicide and self-harm

Self-harm is common in adolescence. Community studies suggest that around 10% report deliberate self-injury or self-poisoning with or without suicidal intent, and there is a higher prevalence of self-harming behaviour in females than males. Of those who self-harm, around one in eight present to

hospital (Hawton, Saunders, & O'Connor, 2012). The presentation of self-harm/attempted suicide in hospitals in some high-income countries has increased over time (Hawton et al., 2003, 2012), but epidemiological evidence about trends in self-harm is lacking.

Completed suicides are less common but represent a leading cause of death globally in this age group, especially among young males (Hawton et al., 2012). Annual data on suicide rates are available for many countries – though typically only for broad age bands. Suicide rates among young males increased substantially between the 1960s and 1990s in many countries across the world, but then showed a marked decline between the 1990s and mid-to-late 2000s (Hawton et al., 2012; McKeown, Cuffe, & Schulz, 2006; Mittendorfer-Rutz & Wasserman, 2004; Várník et al., 2009). More recent data have shown a renewed upturn in young adult male suicide as the global economic crisis began in 2008 (Barr et al., 2012; Chang, Stuckler, Yip, & Gunnell, 2013), and this was especially marked in Europe and North America (Chang et al., 2013). This is consistent with similar upturns in suicide rates in countries affected by previous recessions (Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009).

There are some difficulties in interpreting long-term trends in suicide. There is a possibility of underrecording due to misclassification of some suicides as accidental deaths. Misclassification rates themselves may change over time, as they are affected by the quality of information available, and by factors such as social stigma that might influence decisions about recording a verdict of suicide (Hawton et al., 2012). There is evidence that underrecording might have been greater in the past, and that the increase in suicides in the last Century might be over-estimated (Mohler & Earls, 2001). It is not clear, however, how such biases would account for the observed pattern which saw a rise and then a fall in recorded suicides.

Several explanations have been proposed for changing rates of self-harm and suicide. In addition to trends in mental ill health and socioeconomic conditions, evidence also suggests that efforts to reduce access to and lethality of common methods of suicide have been effective public health measures and have helped reduce the incidence of suicide, for example changes in pack sizes of drugs such as paracetamol, detoxification of gas supplies, or safer storage of guns and of agricultural pesticides (Gunnell, Middleton, & Frankel, 2000; Hawton et al., 2004; Hawton et al., 2012).

Antisocial behaviour

Crime statistics, self-reports of offending and cross-cohort comparisons of reports of conduct problems in epidemiological surveys all point to substantial changes in rates of youth antisocial behaviour, with

evidence both of substantial rises and falls over the past 50–60 years.

Offending. Crime rates since the middle of the last century have followed broadly similar trends across many high-income nations. The most extensive information relates to trends in crime in the United States. These show an overall 350% increase in recorded crime between 1960 and 1990, with rising rates of violence, homicide and property crime over this period. The 1990s then saw a marked reduction in all forms of crime (Federal Bureau of Investigation, 2009; Van Dijk, van Kesteren, & Smit, 2008). In most countries in North America, Europe, Asia and Oceania, crime rates including homicides peaked in the early/mid-1990s after prolonged periods of increase, and have since fallen substantially (International Crime Victimization Survey, Van Dijk et al., 2008; UN Economic and Social Council, 2014). However, these trends are not universal, and Central and South America and some regions in Africa have seen increasing rates of crime in the 21st Century (United Nations Economic & Social Council, 2014). For example, a recent study estimated that homicide rates in Brazil increased almost threefold between 1980 and 2003, and remained substantially higher in 2010 than in the 1990s (Murray, de Castro Cerqueira, & Kahn, 2013). Victim reports of non-lethal violent crime, such as physical aggression, robbery and theft also showed substantial increases in Brazil between 1988 and 2009 (Murray et al., 2013).

Police registers, victim surveys and self-reports provide complementary information on trends in offending. It is important to note that the level of credibility of register-based information may vary across countries, and police-recorded crime statistics should be treated with caution, and not considered in isolation. Many victims do not report a crime to the police, and offences recorded by police are typically only a subset of those reported. National and local policy drivers can also influence the quality and quantity of crime data recorded by police (UK Statistics Authority, 2014). Surveys of victim-reported crime and of self-reported offending are often seen as more accurate indicators of crime trends. As expected, victim surveys suggest higher overall levels of crime than do police-recorded figures, but there is close correspondence in the direction of trends for both police-recorded and victim-reported crime in countries where both sources of information are available (Van Dijk, Tseloni, & Farrell, 2012). For example, in the United Kingdom, both sources indicate that rates of crime doubled between 1981 and 1995, and then showed a fall up to 2013. Latest figures from the Crime Survey for England and Wales indicate a fall in total number of victim-reported offences to the lowest level since the survey first began in 1981 (Office for National Statistics, 2014).

Police-recorded crime and victim-reported crime provide indexes of the total burden of criminal activity rather than estimates for the numbers of offenders in the population. It is well-established that a small minority of offenders may account for a large proportion of offences (Farrington & West, 1993). Crime surveys also do not take account of co-offending (Reiss & Farrington, 1991), and provide little if any information on the age and gender of offenders. Even though there are well-documented peaks in offending in mid-to-late adolescence (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1983), national crime rates do not therefore directly address whether and how the prevalence of youth offending has changed. Surveys assessing self-reported offending therefore in principle provide a valuable complement. Evidence is limited, but does suggest some important discrepancies which remain unexplained. For example, data from the UK Offending, Crime and Justice Survey indicated no evidence of a fall in offending by adolescents and young adults during the late 1990s and early 2000s (Home Office, 2008).

Conduct problems. Recent years have also seen increased concern about youth antisocial behaviour, whether or not this is categorized as criminal offending. Epidemiological data indicate that adolescent conduct problems (e.g. lying, disobedience, aggression, bullying) are far more prevalent than criminal offending, but also reach a peak prevalence during adolescence (Moffitt, 1993).

As shown in the accompanying Tables, a number of cross-cohort comparisons have included measures of conduct problems, for example using the CBCL or SDQ. Collishaw et al. (2004) compared the prevalence of parent-reported conduct problems in three national UK cohorts of 15/16 year olds assessed in 1974, 1986 and 1999. There was a substantial increase in adolescent conduct problems, particularly nonaggressive behaviours (lying, stealing, disobedience), over this 25-year period, with similar increases for boys and girls, and for young people from socially advantaged and disadvantaged homes. Longitudinal analyses comparing long-term outcomes for adolescents with conduct problems in 1974 and 1986 found similarly elevated odds of adult unemployment, homelessness, poor physical and mental health, problem drinking, and divorce in both cohorts. Pervasive adult psychosocial dysfunction (four or more such problems) was between three and four times more likely in both cohorts for those with adolescent conduct problems (Collishaw et al., 2004). The fact that conduct problems were as predictive of adult problems in both cohorts is important because it provides evidence that trends over time do not merely reflect changes in parental reporting. More recent evidence from the United Kingdom indicates a levelling off in rates of adolescent conduct problems since 1999 (Maughan

et al., 2008), though rates in the middle of the last decade remained considerably elevated compared with earlier cohorts.

Studies in the Netherlands have found evidence for small increases in parent-rated but not self-rated conduct problems in adolescents in the Netherlands since the early 1990s (Tick, van der Ende, & Verhulst, 2007, 2008). In the United States, evidence has shown increases in parent-, teacher- and self-rated conduct problems between the 1970s and 1980s, followed by a fall in the 1990s (Achenbach, Dumenci, & Rescorla, 2002b, 2003; Achenbach et al., 2002a). In Sweden, there is evidence for an increase in self-reported offending and conduct problems in adolescent cohorts between 1970 and 1996 (Wångby et al., 2005), followed by a decline in antisocial behaviour since the 1990s consistent with national trends in registered crime (Backman, Estrada, Nilsson, & Shannon, 2014; Estrada, Petterson, & Shannon, 2012). Evidence for an increase in behaviour problems, at least for girls, has also been reported in China between 1993 and 2003 (Lin & Wang, 2007). However, other studies of adolescents in Finland (Sourander et al., 2012), Germany (Hölling et al., 2014), Norway (von Soest & Wichstrøm, 2014) and New Zealand (Fleming et al., 2014) have found no evidence for an increase in antisocial behaviour in the 1990s and 2000s, with some evidence of a decline in conduct problems since 2000 (von Soest & Wichstrøm, 2014).

Relatively few studies have focused on younger children, but available European evidence does not indicate any major long-term increase in child conduct problems (Sourander et al., 2008; Tick, van der Ende, Koot, & Verhulst, 2007). These studies have suggested stable or declining rates of behaviour problems in prepubertal children. Recent evidence from the United Kingdom also suggests a more recent decline in behavioural problems between 1999 and 2008 that is more pronounced in boys than in girls (Sellers et al., 2014). A Brazilian study reminds us that trends in child behaviour problems may well differ across different world regions. In keeping with intercountry differences in crime trends, Matijasevich et al. (2014) found evidence for a substantial increase in problem behaviours, especially aggression, in preschool children.

In summary, police-recorded and victim-reported crime, as well as self- and parent-reported conduct problems in epidemiological studies highlight a general pattern of rising rates of youth antisocial behaviour during the 1970s, 1980s and early 1990s. Rates of antisocial behaviour appear to have levelled off or fallen since the 1990s in many but not all countries. Broadly speaking, these trends have been similar across many high-income countries, with the exception that a peak in rates was observed somewhat earlier in the United

States than in European countries. Emerging evidence from other countries, such as Brazil, indicates that rates of violent crime have not shown the same recent decline, and perhaps have continued to rise. This highlights how important it is to bear in mind that there are marked international variations in rates and trends in crime, and other forms of antisocial behaviour. As discussed, the evidence also highlights that there may be swift changes in rates of antisocial behaviour in particular societies. More systematic tracking of antisocial behaviour beyond police-recorded crime thus remains a priority. This should include continued evidence from crime victimization surveys, as well as epidemiological surveys of self-reported offending or parent- and teacher-reported conduct problems.

Changes in distribution of child and adolescent mental health problems

Beyond changes in overall population prevalence of mental health problems, it has been suggested that the *distribution* of problems within the population may have changed in important ways. Two questions are relevant here. First, has there been a convergence of gender differences? Some evidence is consistent with this possibility (e.g. Sellers et al., 2014; von Soest & Wichstrøm, 2014), but other studies have found similar trends for males and females (e.g. Collishaw et al., 2004; Matijasevich et al., 2014), while others still point to a divergence of gender differences, for example more marked increases in adolescent emotional problems in girls than in boys (e.g. Sweeting et al., 2009). Second, is there evidence for a polarization of mental health problems in society? Most studies have not tested for changes in population variance, but studies that have examined categorically defined high scores alongside mean scale score have typically provided consistent results for both (see Tables 1–3). As discussed below, there is some evidence for increasing social inequalities, particularly in relation to emotional problems (Gore Langton, Collishaw, Goodman, Pickles, & Maughan, 2011).

Real changes in prevalence or changes in reporting?

Even when representative population samples are compared using identical symptom screens it is necessary to consider whether observed trends represent real changes in mental health, or instead a shift in how symptoms are perceived and reported by informants. For example, long-term increases in adolescent emotional problems and antisocial behaviour might reflect greater openness by informants in more recent cohorts about reporting problems, a shift in thresholds for rating symptoms and behaviours as problematic, or greater sensitiv-

ity to children's problems due perhaps to societal medicalization of symptoms previously seen as normal.

Several studies demonstrate that prevalence estimates can be sensitive to measurement and reporting effects. Studies of cross-cultural variations in psychopathology suggest that intercountry comparisons of prevalence of psychopathology using symptom screens can diverge in important ways from comparisons according to diagnostic interviews (Goodman et al., 2012; Heiervang, Goodman, & Goodman, 2008). Whether the same is true for cross-cohort comparisons is unclear, but the possibility cannot be excluded. Studies also highlight that prevalence estimates and between-group comparisons of psychopathology using questionnaire screens can be very sensitive to minor variations in wording of items (Goodman, Iervolino, Collishaw, Pickles, & Maughan, 2007) and to differences across informants (Collishaw, Goodman, Ford, Rabe-Hesketh, & Pickles, 2009), further highlighting the importance of being cautious about reporting effects.

Still, there are several reasons for thinking that time trends in symptom reports do in fact reflect real changes in population prevalence of mental health problems. The first is that there is a convergence of evidence across multiple study methods and multiple informants. For example, police-recorded and victim-reported crime, as well as parent-reported conduct problems, have followed broadly similar trends. Second, it seems unlikely that there has been a general shift in openness about reporting symptoms, because there is considerable specificity in observed trends. For example, cross-cohort comparisons have demonstrated marked variations in rates of adolescent emotional and conduct problems, but much less so in symptoms of hyperactivity. This demonstrates that informants have not simply become more open about reporting difficult behaviour, or that parents have become more sensitive to troublesome behaviour in their children *per se*. The strongest evidence for real changes in mental health comes from studies that provide independent validation of informants' reports and that directly compare the validity of reports over time. Such studies are exceedingly rare, but are in principle possible. As discussed above, parent-reported conduct problems increased substantially over time, but equally strongly predicted a broad range of independently assessed adult difficulties in successive longitudinal cohorts in the United Kingdom (Collishaw et al., 2004). Future research might also consider drawing on methodologies developed in the social sciences. One approach has been to develop direct measures of incomparability in reporting using 'anchoring vignettes' and to take account of this in statistical comparisons (King, Murray, Salomon, & Tandon, 2004; Salomon, Tandon, & Murray, 2004).

Explaining trends in child and adolescent mental health

Recent decades have seen considerable changes affecting children's environments as they grow up, and a variety of explanations for trends in mental health have been proposed (Eckersley, 2006; Fombonne, 1998; Hagell, 2012; Rutter & Smith, 1995). These can broadly be classified in terms of changes in (a) individual vulnerability; (b) family life; (c) extrafamilial influences on risk and (d) broader cultural change.

When considering each of these possibilities, it is important to recognize that testing reasons for secular changes in mental health is inherently difficult. Society has changed in many ways, and it is impossible to draw simple conclusions based on two correlated trends at the population level. Considerable caution is needed in inferring explanations about differences between populations on the basis of correlations between individuals within each population (Robinson, 1950). Finally, very few cross-cohort comparisons have included like-for-like data on mental health and relevant hypothesized explanatory factors.

Change in individual vulnerability

One possibility is that changes in perinatal conditions have influenced patterns of individual vulnerabilities across successive generations of children. For example, epidemiological evidence suggests risk for neurodevelopmental disorders such as autism and ADHD may be associated with increased survival of very premature or extreme low birth weight babies, in utero exposure to antidepressant medication, and advancing parental age (Frans et al., 2013; Lampi et al., 2012; Raj et al., 2013). However, several points need to be considered. First, epidemiological evidence alone is typically insufficient to test the causal nature of hypothesized risk factors, and the causal role of many early risk factors remains uncertain (Thapar & Rutter, 2009). Second, as noted by Raj et al. (2013) even if one assumes causality, changes in relatively rare risk factors such as antidepressant use in pregnancy are unlikely to have any major effect on the overall population prevalence of common mental health problems. Third, there have also been notable improvements in early life conditions; for example, decreased exposure to maternal smoking in pregnancy (Ekblad, Gissler, Korkeila, & Lehtonen, 2014). Finally, as we have seen, population-level evidence for trends in childhood neurodevelopmental problems remains weak. In contrast, there is much more convincing evidence for trends in adolescent mental health. It is therefore also important to consider secular changes affecting individual vulnerabilities later in development.

Secular trends in the timing of puberty may be important here. Adolescence is associated with

heightened risk for the onset of range of mental health problems such as depression (Thapar et al., 2012). Evidence also suggests that early pubertal timing is associated with increased risks for mental health and psychosocial problems that persist across adolescence and into adulthood (Golub et al., 2008). There was a marked decrease in age of puberty up to the middle of the 20th Century, but recent evidence is more complex, suggesting a levelling of trends in the timing of pubertal markers such as age at menarche, followed by renewed decreases in timing over the past 25 years (Sorensen et al., 2012). However, the timing of hormonal changes associated with puberty does not appear to have changed over recent years (Sorensen et al., 2012). There is a lack of direct evidence testing the extent to which changes in pubertal maturation account for secular changes in mental health. Cross-cohort comparisons including measures of mental health and pubertal timing are needed.

Finally, given evidence of co-occurrence between many forms of psychopathology, trends in adolescent psychopathology may be interlinked. Trends in affective symptoms might to some extent be attributable to changes in behavioural adjustment or vice versa (Collishaw et al., 2004). More generally, it is possible that trends in related difficulties such as sleep problems or eating problems have contributed to trends in adolescent depression (Pallesen et al., 2008; von Soest & Wichstrøm, 2014). Indeed, a recent meta-analytic review has highlighted a substantial decline in sleep time among school-aged children and adolescents over the past 100 years (Matricciani, Olds, & Petkov, 2012). Meta-analyses showing substantial changes in personality inventory scores across successive generations also indicate a possible contribution of personality traits to trends in mental health (Twenge, 2011). Further methodologically rigorous studies are required to address each of these possibilities. The use of developmentally sensitive data across multiple longitudinal cohorts would be especially helpful.

Changes in family life

It has been suggested that substantial increases in nonmarital cohabitation and parental separation might explain increases in youth psychosocial problems over the 20th Century (see Rutter & Smith, 1995 for a discussion). However, drawing conclusions about the implications of correlated trends is particularly problematic when these are distal risk markers whose ‘meaning’ has changed over time. Nonmarital cohabitations are now much more common, but today often show little differences in terms of child outcomes when compared to marriages (Rutter & Solantaus, 2014). Similarly, the relationships between parental separation and child mental health are not straightforward.

Although there are well-documented associations with child psychopathology, these in large part reflect the influence of more proximal family processes and living conditions that both precede and follow parental separation (Rutter, 2013). It has also been suggested that associations of divorce with child mental health have reduced over time as parental divorce has become more common; possibly because of changes in the characteristics of parents who become separated, their reasons for separation, improved awareness about potential impacts on children, or reduced social stigma associated with divorce (Amato & Keith, 1991; but see also Amato, 2001). Evidence suggests that trends in adolescent conduct and emotional problems (at least in the United Kingdom) are equally evident for single-parent as for two-parent families. This suggests that changes in family composition are not a primary driver of mental health trends (Collishaw et al., 2004).

Understanding of how children’s proximal family environments have changed over time is relatively limited, but studies are beginning to provide useful information about changes in parental psychopathology, parent–child relationships and child maltreatment experiences. One of the best established risk factors for child and adolescent psychopathology is having a parent who suffers with depression (Thapar et al., 2012). Rates of adult depression have also risen considerably over time (Olfson et al., 2014; Ferri, Bynner, & Wadsworth, 2003), and this might have contributed to trends in adolescent emotional problems. A recent study in the United Kingdom included data on maternal and adolescent symptoms of depression (Schepman et al., 2011). Findings showed substantial increases in youth and maternal depression symptoms between 1986 and 2006. Cross-cohort differences in adolescent depression were attenuated, but remained significant when controlling for trends in maternal depression.

Studies have also examined possible changes in parent–child relationships, with conflicting findings. First, a cross-cohort comparison of epidemiological samples of Scottish teenagers found that adolescents reported increased worries about family life, and more frequent arguments with parents. Multivariate models suggested a possible contribution to increased levels of adolescent depression (Sweeting, West, Young, & Der, 2010). However, another study focusing on different youth-reported indicators of parenting and parent–child relationship quality found no evidence for a ‘decline in parenting’. Levels of youth-reported parental interest did not differ between 1986 and 2006, while reported quality time spent with parents, parental expectations of good behaviour and monitoring of out-of-home activities all increased over time. Furthermore, analyses suggested that each of these parenting indicators was associated with lower levels of antisocial behaviour in both cohorts, and that changes in

parenting may have limited the observed increase in parent-reported youth conduct problems over this time period (Collishaw, Gardner, Maughan, Scott, & Pickles, 2012).

Apart from normative changes in parenting, some countries have also seen apparent changes in rates of child maltreatment, though accurate monitoring of maltreatment rates is especially challenging. In the United States, both agency-recorded and adolescent self-reported rates of maltreatment have reduced since the early 1990s in the United States (Finkelhor, Turner, Ormrod, & Hamby, 2010), a period which has also seen improvements in children's emotional and behavioural adjustment (Achenbach et al., 2003). Maltreatment is an established causal risk factor for child psychopathology (Jaffee, Strait, & Odgers, 2012), and so a reduction in maltreatment would seem likely to have contributed to US trends in child psychopathology over this period.

Finally, many low- and middle-income countries face different and profound challenges affecting family life; for example, an estimated 17 million children have lost one or both parents to the AIDS epidemic (UNICEF, 2013), and risks of this kind are strongly associated with risk for psychopathology in children and young people (e.g. Cluver, Gardner, & Operario, 2007). Understanding the impact of changing health and social conditions on families and on children's mental health in low-income and middle-income countries is an urgent priority.

Changes in extrafamilial psychosocial influences on mental health

Two examples highlight that extrafamilial psychosocial influences are also likely involved in explaining youth mental health trends.

Bullying is a well-established risk factor for mental health problems in children and adolescents (Arsenault, Bowes, & Shakoor, 2010). The majority of studies that have examined long-term trends point to a decline in peer victimization (Finkelhor, 2013; Molcho et al., 2009; Rigby & Smith, 2011), but caution is needed in drawing firm conclusions, given evidence of variation in trends by country (Molcho et al., 2009), by informant, and by child gender (Ilola & Sourander, 2013). Most studies point to a reduction in rates of bullying, but there are exceptions. These include a Finnish study which found a rise in teacher-rated bullying/victimization among girls (but not boys) aged 8 years between 1989 and 2005 (Ilola & Sourander, 2013), evidence of unchanged or increasing rates in the United Kingdom (Molcho et al., 2009), and a substantial rise in reported incidents of cyber-bullying (Jones, Mitchell, & Finkelhor, 2012).

Other research has examined the possibility that educational experiences have become more stressful

for young people (West & Sweeting, 2003). Worries about school performance and school disengagement increased over time in Scotland, and these factors may have contributed to cross-cohort differences in psychological distress, especially among girls (Sweeting et al., 2010; West & Sweeting, 2003). More detailed examination of temporal variation within successive cohorts also showed that proximity of data collection to school exams was associated with greater differences in depressive symptoms between earlier and later cohorts (West & Sweeting, 2003).

Broader socioeconomic and cultural influences

Finally, broader socioeconomic and cultural factors are relevant for understanding mental health trends. There are vast global inequalities affecting children's health, development and education (Ortiz, Daniels, & Engilbertsdóttir, 2012), and the reduction in health inequalities is also an important policy priority within high-income countries (Marmot, 2010; Wilkinson & Pickett, 2010). Many studies have established strong links between poverty and child and adolescent mental health, and the mechanisms that mediate effects of poverty on child mental health are now better understood (Bradley & Corwyn, 2002; Costello, Compton, Keeler, & Angold, 2003; Lund et al., 2010; Yoshikawa, Aber, & Beardslee, 2012). Some cross-cohort comparisons suggest that mental health inequalities have become more marked over time, particularly with respect to adolescent emotional problems (Gore Langton et al., 2011; Torikka et al., 2014). For example, Gore Langton et al. (2011) found that the disparity in rates of emotional problems between low- and middle/high-income families increased fourfold over the last 25 years of the 20th Century. Reasons behind emerging inequalities in adolescent emotional problems are likely to include a greater impact of social adversity on proximal family factors including maternal distress, exposure to stressful life events and family discord (Gore Langton et al., 2011). In addition to social inequality, it has been suggested that increasingly consumerist and individualistic values and attitudes have contributed to increasing levels of psychological distress among young people (Eckersley, 2006), though these possibilities have been difficult to test empirically with the data currently available.

Finally, increased professional recognition of child mental health problems, as well as developments in the areas of early intervention and prevention, may have resulted in better outcomes for children than would otherwise have been seen. However, while it is true that more young people are in contact with mental health services than in the past, many young people with psychiatric problems still do not receive professional help. Furthermore, recent austerity measures in many countries are placing considerable strains on social, health and mental

health services for young people; it will take time to evaluate the impact of this on trends in mental health.

Explaining mental health trends

It is clear that multifactorial models are needed to account for mental health trends. Psychiatric diseases represent complex phenotypes with multifactorial underpinnings. Trends in mental health are likely attributable to a variety of countervailing social trends that have impacted on children's risk for mental health problems in diverse ways, some for the better and others for the worse. There are a number of priorities for future research. First, there is a need for high-quality data to address basic questions about whether the prevalence of well-established causal risk factors has changed. Second, linked data on hypothesized explanatory factors and youth mental health across successive cohorts are required in order to assess changes in prevalence and 'impact' of risk factors, and to be able to use statistical models to estimate the degree to which trends in mental health might be attributable to changes in risk factors. Most studies to date have focused on broad-based sociodemographic risk markers (e.g. social class, family type), rather than on proximal mechanisms (e.g. quality of parent-child relationships). This is because few existing cross-cohort comparisons of child mental health also include comparable information on relevant explanatory factors. Measurement harmonization with a view to enabling cross-cohort comparisons is an urgent priority for future data collection in population cohorts, along with dedicated replications of earlier cohorts encompassing measures of mental health and explanatory factors of interest. Finally, progress in understanding trends in psychopathology requires a better handle on testing causal explanations. This is a particular challenge for time trends studies.

What can time trends studies tell us about the aetiology of child psychopathology?

Studies of secular change provide an important complement to studies of within-population variation, and can also provide valuable information about aetiological factors involved in child psychopathology.

First, it is now clear that the prevalence, patterning and 'meaning' of many risk factors has changed radically over time. An appreciation that the social context of children's lives is changing is also important to identify new or emerging risks for child psychopathology, including for example developments in online and mobile technology (Livingstone & Smith, 2014).

Second, cross-cohort comparisons are required to understand secular changes in other aspects of child

development that are related in important ways to children's mental health. These include well-documented secular gains in intelligence (the 'Flynn effect'; Dickens & Flynn, 2001; Williams, 2013), changes in pubertal timing (Sorensen et al., 2012), and changes in physical health (Frederick, Snellman, & Putnam, 2014).

Third, it is now clear that different explanatory frameworks are sometimes needed to account for individual differences *within* populations and for differences *between* populations. One example concerns secular changes in height. Individual differences in height are highly heritable (Silventoinen et al., 2003), but the average height of the population increased substantially over the 19th and 20th centuries, most probably due to better nutrition and improved health care early in life (Fredriks et al., 2000). Different types of explanation may also be needed to understand population trends in mental health. For example, progress has been made in understanding biological and psychosocial mechanisms underlying cigarette addiction and suicide. However, cultural norms and legislative changes are probably more relevant for understanding the substantial changes in smoking prevalence seen over recent decades, while population-wide efforts to reduce access to commonly used methods of suicide have been an important factor in reducing suicide rates. Cross-cohort comparisons have also been important in highlighting potential broader cultural influences on mental health (Eckersley, 2006; Wilkinson & Pickett, 2010), and for developing theoretical models of secular change, for example social multiplier effects to account for increases in intelligence test scores (Dickens & Flynn, 2001).

Fourth, cross-cohort comparisons of populations affected and unaffected by a universal change in risk can overcome the problem of selection effects, and therefore sometimes provide conditions approximating a 'natural experiment' (Costello et al., 2003; Shadish, Cook, & Campbell, 2002; Thapar & Rutter, 2015). Causal inferences are stronger where there are multiple populations or subpopulations who experienced a clearly defined change in an environmental condition at different times, or where there otherwise equivalent affected and unaffected groups (Shadish et al., 2002). Recent concerns about a link between the MMR vaccine and the secular increase in autism diagnosis have now been dispelled using a wide variety of scientific evidence (Rutter, 2005). One study showed that when the MMR vaccine was discontinued in Japan in 1993 the rate of autistic spectrum disorder diagnoses did not reduce (Honda, Simizu, & Rutter, 2005). In fact, the annual rate of increase in the incidence of ASD diagnoses was as great or greater than before the MMR vaccine was discontinued, and also greater than in many other countries in which MMR continued to be used. A second example concerns possible links between

economic factors such as unemployment and suicide. These are typically hard to interpret because individuals who commit suicide often have a range of mental health problems which might also impact on performance in the labour market. However, as highlighted above, there is now well-replicated evidence that suicide rates increase at times of economic recession, and one recent study showed that the impact of the 2008 recession on suicide trends varied between geographical regions within the United Kingdom according to the extent to which unemployment rates increased in each region (Barr et al., 2012). This combination of temporal and spatial data strengthens the interpretation of a causal effect of economic recession on suicide risk. Finally, perhaps the clearest example of a cohort effect on risk for mental illness comes from studies showing increased risk for schizophrenia in populations exposed to famine in utero (St Clair et al., 2005; Susser, Hoek, & Brown, 1998). Findings of these studies are convincing because exposure to famine was brief but severe, and so otherwise equivalent cohorts of individuals who were or were not exposed during gestation could be compared.

Typically, however, population-level changes in environmental conditions do not occur suddenly, and there may often be a long lag between the environmental exposure and health outcome of interest. It is important to consider possible confounding factors that may differentiate those affected and unaffected by population-level environmental change. It is also clear that individuals differ in how they respond to environmental stress. For all these reasons, robust conclusions about causal risk factors require convergent data using a variety of different study designs (Thapar & Rutter, 2015).

Conclusions

An accurate understanding of trends in child and adolescent psychopathology is essential for planning population health priorities. It is also important for gauging our success in addressing the burden of childhood psychiatric illness. Findings on trends in child and adolescent mental health are complex. It is clear that marked increases in help-seeking and treatment for many disorders likely reflect changes in diagnostic thresholds, and better public and professional awareness. In addition, however, there is now convincing evidence from cross-cohort com-

parisons of epidemiological samples undertaken in high-income countries that underlying rates of mental health problems have also changed. More such studies are now needed, particularly in low- and middle-income countries which often experience particularly rapid social change. Where they have been undertaken, cross-cohort comparisons have not only helped address whether the prevalence of mental health problems is changing, but have also provided novel insights on the role of environmental influences on mental health. Reasons for population mental health trends are complex and multifaceted, but studies are beginning to evaluate potential explanations for trends in mental health. Evidence of secular trends in mental health highlights that the burden of child psychopathology may be amenable to change through public health interventions. Indeed, one important conclusion is that changes in policy or legislation can often lead to substantial health benefits in the population, even when individual-level aetiological pathways remain poorly understood.

Supporting information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Search strategy.

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Key points

- Substantial increases in diagnosis and treatment of child psychiatric disorders in clinical practice do not necessarily reflect changes in population prevalence. Like-for-like comparisons using unselected cohorts are required to test mental health trends.
- Epidemiological evidence of this kind does not indicate any major change in prevalence of neurodevelopmental disorders, though evidence with respect to autism spectrum disorders remains very sparse.
- There are important long-term trends affecting adolescent emotional problems and antisocial behaviour, and suicide in adolescents and young adults.
- Cross-cohort comparisons of child and adolescent mental health are of particular relevance in low- and middle-income countries given the often rapid pace of social change, but few such studies have been undertaken.
- Testing explanations for trends in mental health is challenging, and mechanisms underlying secular change remain poorly understood.
- Studies of secular change complement studies of individual differences within populations, but involve additional methodological challenges.

References

- Achenbach, T.M., Dumenci, L., & Rescorla, L.A. (2002a). Ten-year comparisons of problems and competencies for national samples of youth: Self, parent and teacher reports. *Journal of Emotional and Behavioral Disorders*, 10, 194–203.
- Achenbach, T.M., Dumenci, L., & Rescorla, L.A. (2002b). Is American student behaviour getting worse? Teacher-ratings over an 18-year period. *School Psychology Review*, 31, 428–442.
- Achenbach, T.M., Dumenci, L., & Rescorla, L.A. (2003). Are American children's problems still getting worse? A 23-year comparison. *Journal of Abnormal Child Psychology*, 31, 1–11.
- Amato, P.R. (2001). Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology*, 15, 355–370.
- Amato, P.R., & Keith, B. (1991). Parental divorce and the well-being of children – a meta-analysis. *Psychological Bulletin*, 110, 26–46.
- Arsenault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'Much ado about nothing'? *Psychological Medicine*, 40, 717–729.
- Atladdottir, H.O., Gyllenberg, D., Langridge, A., Sandin, S., Hansen, S.N., Leonard, H., ... & Leonard, H. (2014). The increasing prevalence of reported diagnoses of childhood psychiatric disorders: A descriptive multinational comparison. *European Child and Adolescent Psychiatry*, published online May 2014 [Epub ahead of print].
- Backman, O., Estrada, F., Nilsson, A., & Shannon, D. (2014). The life course of male and female offenders. *British Journal of Criminology*, 54, 393–410.
- Baird, G., Simonoff, E., Pickles, A., Chandler, S., Loucas, T., Meldrum, D., & Charman, T. (2006). Prevalence of disorders of the autism spectrum in a population cohort of children in South Thames: The Special Needs and Autism Project (SNAP). *Lancet*, 368, 210–215.
- Barnard, J., Potter, D., Broach, S., & Prior, A. (2002). *Autism in schools: crisis or challenge?* London: National Autistic Society.
- Barr, B., Taylor-Robinson, D., Scott-Samuel, A., McKee, M., & Stuckler, D. (2012). Suicides associated with the 2008–10 economic recession in England: time trend analysis. *British Medical Journal*, 345, e5142.
- Birmaher, B., Williamson, D.E., Dahl, R.E., Axelson, D.A., Kaufman, J., Dorn, L.D., & Ryan, N.D. (2004). Clinical presentation and course of depression in youth: Does onset in childhood differ from onset in adolescence? *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 63–70.
- Boyle, C.A., Boulet, S., Schieve, L.A., Cohen, R.A., Blumberg, S.J., Yeargin-Allsopp, M., ... & Kogan, M.D. (2011). Trends in the prevalence of developmental disabilities in US children, 1997–2008. *Pediatrics*, 127, 1034–1042.
- Bradley, R.H., & Corwyn, R.F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, 53, 371–399.
- Burke, K.C., Burke, J.D., Rae, D.A., & Regier, D.A. (1991). Comparing age at onset of major depression in five US community populations. *Archives of General Psychiatry*, 48, 789–795.
- Centres for Disease Control and Prevention (2012). Prevalence of autism spectrum disorders – autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity and Mortality Weekly Report*, 61, 1–19.
- Chang, S., Stuckler, D., Yip, P., & Gunnell, D. (2013). Impact of 2008 global economic crisis on suicide: time trend study in 54 countries. *British Medical Journal*, 347, f5239.
- Cluver, L., Gardner, F., & Operario, D. (2007). Psychological distress amongst AIDS-orphaned children in urban South Africa. *Journal of Child Psychology and Psychiatry*, 48, 755–763.
- Collishaw, S., Gardner, F., Maughan, B., Scott, J., & Pickles, A. (2012). Do historical changes in parent-child relationships explain increases in youth conduct problems? *Journal of Abnormal Child Psychology*, 40, 119–132.
- Collishaw, S., Goodman, R., Ford, T., Rabe-Hesketh, S., & Pickles, A. (2009). How far are associations between child, family, and community factors and child psychopathology informant-specific and informant-general? *Journal of Child Psychology and Psychiatry*, 50, 571–580.
- Collishaw, S., Goodman, R., Pickles, A., & Maughan, B. (2007). Modelling the contribution of changes in family life to time trends in adolescent conduct problems. *Social Science and Medicine*, 65, 2576–2587.
- Collishaw, S., Maughan, B., Goodman, R., & Pickles, A. (2004). Time trends in adolescent mental health. *Journal of Child Psychology and Psychiatry*, 45, 1350–1362.
- Collishaw, S., Maughan, B., Natarajan, L., & Pickles, A. (2010). Trends in adolescent emotional problems in England: A comparison of two national cohorts twenty years apart. *Journal of Child Psychology and Psychiatry*, 51, 885–894.

- Costello, E.J., Compton, S.N., Keeler, G., & Angold, A. (2003). Relationships between poverty and psychopathology. A natural experiment. *JAMA*, 290, 2023–2029.
- Costello, E.J., Erkanli, A., & Angold, A. (2006). Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*, 47, 1263–1271.
- Crijnen, A.A.M., Achenbach, T.M., & Verhulst, F.C. (1997). Comparisons of problems reported by parents of children in 12 cultures: Total problems, externalizing and internalizing. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1269–1277.
- Cross-National Collaborative Group (1992). The changing rate of major depression. *Journal of the American Medical Association*, 268, 3098–3105.
- Cuijpers, P., & Smit, F. (2002). Excess mortality in depression: A meta-analysis of community studies. *Journal of Affective Disorders*, 72, 227–236.
- Dickens, W.T., & Flynn, J.R. (2001). Heritability estimates versus large environmental effects: The IQ paradox resolved. *Psychological Review*, 108, 346–369.
- Dowrick, C., & Frances, A. (2013). Medicalising unhappiness: New classification of depression risks more patients being put on a drug treatment from which they will not benefit. *British Medical Journal*, 347, f7140.
- Eckersley, R. (2006). Is modern Western culture a health hazard? *International Journal of Epidemiology*, 35, 252–258.
- Eklblad, M., Gissler, M., Korkeila, J., & Lehtonen, L. (2014). Trends and risk groups for smoking during pregnancy in Finland and other Nordic countries. *European Journal of Public Health*, 24, 544–551.
- Elsabbagh, M., Divan, G., Koh, Y.J., Kim, Y.S., Kauchali, S., Marcin, C., ... & Fombonne, E. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research*, 5, 160–179.
- Estrada, F., Petterson, T., & Shannon, D. (2012). Crime and criminology in Sweden. *European Journal of Criminology*, 9, 668–688.
- Farrington, D.P., & West, D.J. (1993). Criminal, penal and life histories of chronic offenders: Risk and protective factors and early identification. *Criminal Behaviour and Mental Health*, 3, 492–523.
- FDA Center for Drug Evaluation and Research (2004). Background on suicidality associated with antidepressant drug treatment (memorandum). www.fda.gov/ohrms/dockets/ac/04/briefing/4006B1_03_Background%20Memo%2001-05-04.htm.
- Federal Bureau of Investigation. Crime in the United States (2009). Available from: http://www2.fbi.gov/ucr/cius2009/data/table_01.html [last accessed 29 November 2014].
- Ferri, E., Bynner, J., & Wadsworth, M. (2003). *Changing Britain, changing lives*. London: Institute of Education.
- Fichter, M.M., Quadflieg, N., Georgopoulou, E., Xepapadakis, F., & Fthenakis, E.W. (2005). Time trends in eating disturbances in young Greek migrants. *International Journal of Eating Disorders*, 38, 310–322.
- Fichter, M.M., Xepapadakis, F., Quadflieg, N., Georgopoulou, E., & Fthenakis, W.E. (2004). A comparative study of psychopathology in Greek adolescents in Germany and in Greece in 1980 and 1998–18 years apart. *European Archives of Psychiatry and Clinical Neuroscience*, 254, 27–35.
- Finkelhor, D. (2013). Trends in bullying and peer victimization. Crimes against Children Research Center bulletin. Available from: http://cola.unh.edu/sites/cola.unh.edu/files/CV280_Bullying_Peer_Victimization_Bulletin_1-23-13_with_toby_edits.pdf [last accessed October 2014].
- Finkelhor, D., Turner, H., Ormrod, R., & Hamby, S.L. (2010). Trends in childhood violence and abuse exposure: Evidence from 2 national surveys. *Archives of Paediatric and Adolescent Medicine*, 164, 238–242.
- Fleming, T.M., Clark, T., Denny, S., Bullen, P., Crengle, S., Peiris-John, R., ... & Lucassen, M. (2014). Stability and change in the mental health of New Zealand secondary school students 2007–2012: Results from the national adolescent health surveys. *Australian and New Zealand Journal of Psychiatry*, 48, 472–480.
- Fombonne, E. (1998). Increased rates of psychosocial disorders in youth. *European Archives of Psychiatry and Clinical Neuroscience*, 248, 14–21.
- Fombonne, E. (2009). Epidemiology of pervasive developmental disorders. *Pediatric Research*, 65, 591–598.
- Ford, T., Hamilton, H., Meltzer, H., & Goodman, R. (2007). Child mental health is everybody's business: The prevalence of contact with public sector services by type of disorder among British school children in a three-year period. *Child and Adolescent Mental Health*, 12, 13–20.
- Frans, E.M., Sandin, S., Reichenberg, A., Langstrom, N., Lichtenstein, P., McGrath, J.J., & Hultman, C.M. (2013). Autism risk across generations. A population-based study of advancing grandpaternal and paternal age. *JAMA Psychiatry*, 70, 516–521.
- Frederick, C.B., Snellman, K., & Putnam, R.D. (2014). Increasing socioeconomic disparities in adolescent obesity. *Proceedings of the National Academy of Sciences of the United States of America*, 111, 1338–1342.
- Fredriks, A.M., Van Buuren, S., Burgmeijer, R.J.F., Meulmeester, J., Beuker, R.J., Brugman, E., ... & Wit, J.M. (2000). Continuing secular growth change in the Netherlands 1955–1997. *Pediatric Research*, 47, 316–323.
- Getahun, D., Jacobsen, S.J., Fasset, M.J., Chen, W., Demissie, K., & Rhoads, G.G. (2013). Recent trends in childhood attention-deficit/hyperactivity disorder. *Journal of the American Medical Association Pediatrics*, 167, 282–288.
- Golub, M.S., Collman, G.W., Foster, P.M.D., Kimmel, C.A., Rajpert-De Meyts, E., Reiter, E.O., ... & Toppari, J. (2008). Public health implications of altered pubertal timing. *Pediatrics*, 2008, S218.
- Goodman, A., Heiervang, E., Fleitlich-Bilyk, B., Alyari, A., Patel, V., Mullick, M.S., ... & Goodman, R. (2012). Cross-national differences in questionnaires do not necessarily reflect comparable differences in disorder prevalence. *Social Psychiatry and Psychiatric Epidemiology*, 47, 1321–1331.
- Goodman, R., Iervolino, A.C., Collishaw, S., Pickles, A., & Maughan, B. (2007). Seemingly minor changes to a questionnaire can make a big difference to mean scores: A cautionary tale. *Social Psychiatry and Psychiatric Epidemiology*, 42, 322–327.
- Gore Langton, E., Collishaw, S., Goodman, R., Pickles, A., & Maughan, B. (2011). An emerging income differential for adolescent emotional problems. *Journal of Child Psychology and Psychiatry*, 52, 1081–1088.
- Gottfredson, M., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Green, H., McGinnity, A., Meltzer, H., Ford, T., & Goodman, R. (2005). *Mental health of children and young people in Great Britain, 2004*. London: Palgrave Macmillan.
- Gunnell, D., Middleton, N., & Frankel, S. (2000). Method availability and the prevention of suicide: A re-analysis of secular trends in England and Wales 1950–1975. *Social Psychiatry and Psychiatric Epidemiology*, 35, 437–443.
- Hagell, A. (2012). *Changing adolescence: Social trends and mental health*. Bristol: Policy Press.
- Hawton, K., Hall, S., Simkin, S., Bale, L., Bond, A., Codd, S., & Stewart, A. (2003). Deliberate self-harm in adolescents: A study of characteristics and trends in Oxford, 1990–2000. *Journal of Child Psychology and Psychiatry*, 44, 1191–1198.
- Hawton, K., Saunders, K.E.A., & O'Connor, R.O. (2012). Self-harm and suicide in adolescents. *The Lancet*, 379, 2373–2382.

- Hawton, K., Simkin, S., Deeks, J., Cooper, J., Johnston, A., Waters, K., ... & Simpson, K. (2004). UK legislation on analgesic packs: Before and after study of long term effect on poisonings. *British Medical Journal*, 329, 1076.
- Heiervang, E., Goodman, A., & Goodman, R. (2008). The Nordic advantage in child mental health: Separating health differences from reporting style in a crosscultural comparison of psychopathology. *Journal of Child Psychology and Psychiatry*, 49, 678–685.
- Hirschi, T., & Gottfredson, M. (1983). Age and the explanation of crime. *The American Journal of Sociology*, 89, 552–584.
- Hölling, H., Schlack, R., Petermann, F., Ravens-Sieberer, U., Mauz, E., & KiGGS Study Group. (2014). Psychopathological problems and psychosocial impairment in children and adolescents aged 3–17 years in the German population: prevalence and time trends at two measurement points (2003–2006 and 2009–2012). Results of the KiGGS study: First follow-up (KiGGS Wave 1). *Bundesgesundheitsblatt*, 57, 807–819.
- Home Office (2008). *Young people and crime: Findings from the 2006 Offending, Crime and Justice Survey*. Colchester: Home Office Statistical Bulletin.
- Honda, H., Simizu, Y., & Rutter, M. (2005). No effect of MMR withdrawal on the incidence of autism: A total population study. *Journal of Child Psychology and Psychiatry*, 46, 572–579.
- Hsia, Y., & MacLennan, K. (2009). Rise in psychotropic drug prescribing in children and adolescents during 1992–2001: A population-based study in the UK. *European Journal of Epidemiology*, 24, 211–216.
- Idring, S., Raj, D., Dal, H., Dalman, C., Sturm, H., Zander, E., ... & Magnusson, C. (2012). Autism spectrum disorders in the Stockholm Youth Cohort: design, prevalence, and validity. *PLoS ONE*, 7, e41280.
- Iloa, A.M., & Sourander, A. (2013). Bullying and victimization among 8-year old children: A 16-year population-based time-trend study. *Nordic Journal of Psychiatry*, 67, 171–176.
- Institute of Medicine (2009). *Preventing mental, emotional and behavioral disorders among young people: progress and possibilities*. Washington DC: National Academies Press.
- Jaffee, S.R., Strait, L.B., & Odgers, C.L. (2012). From correlates to causes: Can quasi-experimental studies and statistical innovations bring us closer to identifying the causes of antisocial behaviour? *Psychological Bulletin*, 138, 272–295.
- Jokela, M., Ferrie, J., & Kivimäki, M. (2009). Childhood problem behaviors and death by midlife: The British National Child Development Study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48, 19–24.
- Jones, L.M., Mitchell, K.J., & Finkelhor, D. (2012). Trends in youth internet victimization: Findings from three youth internet safety surveys 2000–2010. *Journal of Adolescent Health*, 50, 179–186.
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., & Walters, E.E. (2005). Lifetime prevalence and age-at-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 593–602.
- Keyes, K.M., Nicholson, R., Kinley, J., Raposo, S., Stein, M.B., Goldner, E.M., & Sareen, J. (2014). Age, period, and cohort effects in psychological distress in the United States and Canada. *American Journal of Epidemiology*, 179, 1216–1227.
- Kieling, C., Baker-Henningham, H., Belfer, M., Conti, G., Ertem, I., Omigbodun, O., ... & Rahman, A. (2011). Child and adolescent mental health worldwide: Evidence for action. *Lancet*, 378, 1515–1525.
- Kim-Cohen, J., Caspi, A., Moffitt, T.E., Harrington, H., Milne, B.J., & Poulton, R. (2003). Prior juvenile diagnoses in adults with mental disorder: Developmental follow-back of a prospective-longitudinal cohort. *Archives of General Psychiatry*, 60, 709–717.
- King, G., Murray, C.J.L., Salomon, J.A., & Tandon, A. (2004). Enhancing the validity and cross-cultural comparability of measurement in survey research. *American Political Science Review*, 98, 191–207.
- Kosidou, K., Magnusson, C., Mittendorfer-Rutz, E., Hallqvist, J., Hellner Gumpert, C., Idrizbegovic, S., ... & Dalman, C. (2010). Recent trends in levels of self-reported anxiety, mental health service use and suicidal behaviour in Stockholm. *Acta Psychiatrica Scandinavica*, 22, 47–55.
- Kulage, K.M., Smaldone, A.M., & Cohn, E.G. (2014). How will DSM-5 affect autism diagnosis? A systematic review and meta-analysis. *Journal of Autism and Developmental Disorders*, 44, 1918–1932.
- Lampi, K.M., Lehtonen, L., Lien Tran, P., Suominen, A., Lehti, V., Banerjee, P.N., ... & Sourander, A. (2012). Risk of autism spectrum disorders in low birth weight and small for gestational age infants. *Journal of Pediatrics*, 161, 830–836.
- Le, M.T.H., Nguyen, H.T., Tran, T.D., & Fisher, J.R. (2012). Experience of low mood and suicidal behaviors among adolescents in Vietnam: findings from two national population-based surveys. *Journal of Adolescent Health*, 51, 339–348.
- Lin, H., & Wang, Y. (2007). Child behavioural problems: Comparative follow-up study two decades – socio-cultural comments. *World Cultural Psychiatry Research Review*, Oct 2007, 2, 128–132.
- Livingstone, S., & Smith, P.K. (2014). Annual research review: Harms experienced by child users of online and mobile technologies: the nature, prevalence and management of sexual and aggressive risks in the digital age. *Journal of Child Psychology and Psychiatry*, 55, 635–654.
- Lotter, V. (1966). Epidemiology of autistic conditions in young children. *Social Psychiatry*, 1, 124–135.
- Lund, C., Breen, A., Flisher, A.J., Kakuma, R., Corrigal, J., Joska, J.A., ... & Patel, V. (2010). Poverty and common mental disorders in low income countries: A systematic review. *Social Science and Medicine*, 71, 517–528.
- Luntamo, T., Sourander, A., Santalahti, P., Aromaa, M., & Helenius, H. (2012). Prevalence changes of pain, sleep problems and fatigue among 8-year old children: Years 1989, 1999, and 2005. *Journal of Paediatric Psychology*, 37, 307–318.
- Ma, J., Lee, K.V., & Stafford, R.S. (2005). Depression treatment during outpatient visits by US children and adolescents. *Journal of Adolescent Health*, 37, 434–442.
- Man, K.K.C., Ip, P., Hsia, Y., Chan, E.W., Chui, C.S.L., Lam, M.P., ... & Wong, I.C. (2014). ADHD drug prescribing trend is increasing among children and adolescents in Hong Kong. *Journal of Attention Disorders*. Advance online publication. doi: 10.1177/1087054714536047.
- Marmot, M. (2010). *Fair society, healthy lives: The marmot review. Strategic review of health inequalities in England post-2010*. London: The Marmot Review.
- Matijasevich, A., Murray, E., Stein, A., Anselmi, L., Menezes, A.M., Santos, I.S., ... & Victora, C.G. (2014). Increase in child behaviour problems among urban Brazilian four-year-olds: 1993 and 2004 Pelotas Birth Cohorts. *Journal of Child Psychology and Psychiatry*, 55, 1125–1134.
- Matricciani, L., Olds, T., & Petkov, J. (2012). In search of lost sleep: secular trends in the sleep time of school-aged children and adolescents. *Sleep Medicine Reviews*, 16, 203–211.
- Maughan, B., & Collishaw, S. (2015). Development and psychopathology: A lifecourse perspective. In A. Thapar, D. Pine, J.F. Leckman, S. Scott, M.J. Snowling & E. Taylor (Eds.), *Rutter's child and adolescent psychiatry* (6th edn), Chichester: John Wiley and Sons.

- Maughan, B., Collishaw, S., Meltzer, H., & Goodman, R. (2008). Recent trends in UK child and adolescent mental health. *Social Psychiatry and Psychiatric Epidemiology*, 43, 305–310.
- Maughan, B., Collishaw, S., & Stringaris, A. (2013). Depression in childhood and adolescence. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 22, 35–40.
- Maughan, B., Stafford, M., Shah, I., & Kuh, D. (2014). Adolescent conduct problems and premature mortality: Follow-up to age 65 years in a national birth cohort. *Psychological Medicine*, 44, 1077–1086.
- McArdle, P., Prosser, J., Dickinson, H., & Kolvin, I. (2003). Secular trends in the mental health of primary school children. *Irish Journal of Psychological Medicine*, 20, 56–58.
- McCarthy, S., Wilton, L., Murray, M.L., Hodgkins, P., Asherson, P., & Wong, I.C.K. (2012). The epidemiology of pharmacologically treated attention deficit hyperactivity disorder (ADHD) in children, adolescents and adults in UK primary care. *BMC Pediatric*, 12, 1–11.
- McKeown, R.E., Cuffe, S.P., & Schulz, R.M. (2006). US suicide rates by age group, 1970–2002: An examination of recent trends. *American Journal of Public Health*, 96, 1744–1751.
- Meltzer, H., Gatward, R., Goodman, R., & Ford, T. (2000). *The mental health of children and adolescents in Great Britain: summary report*. London: The Stationary Office.
- Mittendorfer-Rutz, E., & Wasserman, D. (2004). Trends in adolescent suicide mortality in the WHO European Region 2004. *European Child and Adolescent Psychiatry*, 13, 321–331.
- Moffitt, T.E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701.
- Mohler, B., & Earls, F. (2001). Trends in adolescent suicide: Misclassification bias? *American Journal of Public Health*, 91, 150–153.
- Molcho, M., Craig, W., Due, P., Pickett, W., Harel-Fisch, Y., Overpeck, M., & HBSC Bullying Writing Group. (2009). Cross-national time trends in bullying behaviour 1994–2006: Findings from Europe and North America. *International Journal of Public Health*, 54, S225–S234.
- Murray, J., de Castro Cerqueira, DR., & Kahn, T. (2013). Crime and violence in Brazil: Systematic review of time trends, prevalence rates and risk factors. *Aggression and Violent Behavior*, 18, 471–483.
- Murray, C.J., Vos, T., Lozano, R., Naghavi, M., Flaxman, A.D., Michaud, C., ... & Memish, Z.A. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: A systematic analysis for the Global Burden of Diseases Study 2010. *Lancet*, 380, 2197–2223.
- Office for National Statistics (2014). Crime in England and Wales, Year ending September 2013. Statistical Bulletin. Available from: http://www.ons.gov.uk/ons/dcp171778_349849.pdf [last accessed 29 November 2014].
- Olfson, M., Blanco, C., Wang, S., Laje, G., & Correll, C.U. (2014). National trends in the mental health care of children, adolescents, and adults by office-based physicians. *JAMA Psychiatry*, 71, 81–90.
- Olfson, M., Gameroff, M.J., Marcus, S.C., & Jensen, P.S. (2003). National trends in the treatment of attention deficit hyperactivity disorder. *American Journal of Psychiatry*, 160, 1071–1077.
- Ortiz, I., Daniels, L.M., & Engilbertsdóttir, S. (2012). *Child poverty and inequality. New perspectives and challenges*. New York: United Nations Children's Fund.
- Pallesen, S., Hetland, J., Sivertsen, B., Samdal, O., Torsheim, T., & Nordhus, I.H. (2008). Time trends in sleep-onset difficulties among Norwegian adolescents: 1983–2005. *Scandinavian Journal of Public Health*, 36, 889–895.
- Pinker, S. (2011). *The better angels of our nature: why violence has declined*. London: Penguin Books.
- Polanczyk, G.V., Willcutt, E.G., Salum, G.A., Kielsing, C., & Rohde, L.A. (2014). ADHD prevalence estimates across three decades: An updated systematic review and meta-regression analysis. *International Journal of Epidemiology*, 43, 434–442.
- Pottegård, A., Zoëga, H., Hallas, J., & Damkier, P. (2014). Use of SSRIs among Danish children: A nationwide study. *European Child and Adolescent Psychiatry*, 23, 1211–1218.
- Potter, R., Mars, B., Eyre, O., Legge, S., Ford, T., Sellers, R., ... & Thapar, A.K. (2012). Missed opportunities: Mental disorder in children of parents with depression. *British Journal of General Practice*, 62, e487–e493.
- Raj, D., Lee, B.K., Dalman, C., Golding, J., Lewis, G., & Magnusson, C. (2013). Parental depression, maternal antidepressant use during pregnancy, and risk of autism spectrum disorders: Population case-control study. *British Medical Journal*, 346, f2059.
- Reiss, A.J., & Farrington, D.P. (1991). Advancing knowledge about co-offending: Results from a prospective longitudinal survey of London males. *Journal of Criminal Law and Criminology*, 82, 360–395.
- Rigby, K., & Smith, P.K. (2011). Is school bullying really on the rise? *Social Psychology of Education*, 14, 441–455.
- Robertson, C., & Boyle, P. (1998). Age-period-cohort analysis of chronic disease rates. I: modelling approach. *Statistics in Medicine*, 17, 1305–1323.
- Robins, L.N., & Regier, D.A. (1991). *Psychiatric disorders in America: The epidemiologic catchment area study*. New York: John Wiley and Sons.
- Robinson, W.S. (1950). Ecological correlations and the behavior of individuals. *American Sociological Review*, 15, 351–357.
- Russell, G., Kelly, S., & Golding, J. (2010). A qualitative analysis of lay beliefs about the aetiology and prevalence of autistic spectrum disorders. *Child Care Health and Development*, 36, 431–436.
- Russell, G., Rodgers, L.R., Ukoumunne, O.C., & Ford, T. (2014). Prevalence of parent-reported ASD and ADHD in the UK: findings from the Millennium Cohort Study. *Journal of Autism and Developmental Disorders*, 44, 1–10.
- Rutter, M. (2005). Incidence of autism spectrum disorders: Changes over time and their meaning. *Acta Paediatrica*, 94, 2–15.
- Rutter, M. (2013). Annual research review: Resilience – clinical implications. *Journal of Child Psychology and Psychiatry*, 54, 474–487.
- Rutter, M., & Smith, D. (1995). *Psychosocial disorders in young people: time trends and their causes*. Chichester: John Wiley and Sons.
- Rutter, M., & Solantaus, T. (2014). Translation gone awry: Differences between common sense and science. *European Child and Adolescent Psychiatry*, 23, 247–255.
- Salomon, J.A., Tandon, A., & Murray, C.J.L. (2004). Comparability of self rated health: Cross sectional multi-country survey using anchoring vignettes. *British Medical Journal*, 328, 258.
- Santalahti, P., Aromaa, M., Sourander, A., Helenius, H., & Piha, J. (2005). Have there been changes in children's psychosomatic symptoms? A 10-year comparison from Finland. *Pediatrics*, 115, e434–e442.
- Santalahti, P., Sourander, A., Aromaa, M., Helenius, H., Ikäheimo, K., & Piha, J. (2008). Victimization and bullying among 8-year-old children. A 10-year comparison of rates. *European Child and Adolescent Psychiatry*, 17, 463–472.
- Scheffler, R.M., Hinshaw, S.P., Modrek, S., & Levine, P. (2007). The global market for ADHD medications. *Health Affairs*, 26, 450–457.
- Schepman, K., Collishaw, S., Gardner, F., Maughan, B., Scott, J., & Pickles, A. (2011). Do changes in parent mental health

- explain trends in youth emotional problems? *Social Science and Medicine*, 73, 293–300.
- Sellers, R., Maughan, B., Pickles, A., Thapar, A., & Collishaw, S. (2015). Trends in parent- and teacher-rated emotional, conduct and ADHD problems and their impact in pre-pubertal children in Great Britain: 1999–2008. *Journal of Child Psychology and Psychiatry*, 56, 49–57.
- Shadish, W.R., Cook, T.D., & Campbell, D.T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.
- Sigfusdottir, I.D., Asgeirsdottir, B.B., Sigurdsson, J.F., & Gudjonsson, G.H. (2008). Trends in depressive symptoms, anxiety symptoms and visits to healthcare specialists: A national study among Icelandic adolescents. *Scandinavian Journal of Public Health*, 36, 361–368.
- Silventoinen, K., Sammalisto, S., Perola, M., Boomsma, D.I., Cornes, B.K., Davis, C., ... & Kaprio, J. (2003). Heritability of adult body height: A comparative study of twin studies in eight countries. *Twin Research*, 6, 399–408.
- Smith, R.P., Larkin, G.L., & Southwick, S.M. (2008). Trends in US emergency department visits for anxiety-related mental health conditions, 1992–2001. *Journal of Clinical Psychiatry*, 69, 286–294.
- Sorensen, K., Mouritsen, A., Aksglaede, L., Hagen, C.P., Mogensen, S.S., & Juul, A. (2012). Recent secular trends in pubertal timing: Implications for evaluation and diagnosis of precocious puberty. *Hormone Research in Paediatrics*, 77, 137–145.
- Sourander, A., Koskelainen, M., Niemelä, S., Rihko, M., Ristkari, T., & Lindroos, J. (2012). Changes in adolescents mental health and use of alcohol and tobacco: A 10-year time-trend study of Finnish adolescents. *European Child and Adolescent Psychiatry*, 21, 665–671.
- Sourander, A., Niemelä, S., Santalahti, P., Helenius, H., & Piha, J. (2008). Changes in psychiatric problems and service use among 8-year old children: A 16-year population-based time-trend study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 317–327.
- Sourander, A., Santalahti, P., Haavisto, A., Piha, J., Ikäheimo, K., & Helenius, H. (2004). Have there been changes in children's psychiatric symptoms and mental health service use? A ten-year comparison from Finland. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 1134–1145.
- St Clair, D., Xu, M., Wang, P., Yu, Y., Fang, Y., Zhang, F., ... & He, L. (2005). Rates of adult schizophrenia following prenatal exposure to the Chinese famine of 1959–1961. *Journal of the American Medical Association*, 294, 557–562.
- Stephenson, C.P., Karanges, E., & McGregor, I.S. (2013). Trends in the utilisation of psychotropic medications in Australia from 2000 to 2011. *Australia and New Zealand Journal of Psychiatry*, 47, 74–87.
- Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., & McKee, M. (2009). The public health effect of economic crises and alternative policy responses in Europe: An empirical analysis. *Lancet*, 374, 315–323.
- Susser, E., Hoek, H.W., & Brown, A. (1998). Neurodevelopmental disorders after prenatal famine. The story of the Dutch Famine Study. *American Journal of Epidemiology*, 147, 213–216.
- Sweeting, H., West, P., Young, R., & Der, G. (2010). Can we explain increases in young people's psychological distress over time? *Social Science and Medicine*, 71, 1819–1830.
- Sweeting, H., Young, R., & West, P. (2009). GHQ increases among Scottish 15 year olds 1987–2006. *Social Psychiatry and Psychiatric Epidemiology*, 44, 579–586.
- Taylor, B., Jick, H., & MacLaughlin, D. (2013). Prevalence and incidence rates of autism in the UK: Time trend from 2004–2010 in children aged 8 years. *BMJ Open*, 3, e003219.
- Thapar, A., Collishaw, S., Pine, D.S., & Thapar, A.K. (2012). Depression in adolescence. *The Lancet*, 379, 1056–1067.
- Thapar, A., & Rutter, M. (2009). Do prenatal risk factors cause psychiatric disorder? Be wary of causal claims. *British Journal of Psychiatry*, 195, 100–101.
- Thapar, A., & Rutter, M. (2015). Using natural experiments and animal models to study causal hypotheses in relation to child mental health problems. In A. Thapar, D. Pine, J.F. Leckman, S. Scott, M.J. Snowling & E. Taylor (Eds.), *Rutter's child and adolescent psychiatry* (6th edn), Chichester: John Wiley and Sons.
- Tick, N.T., van der Ende, M.S., Koot, H.S., & Verhulst, F.C. (2007). 14-year changes in emotional and behavioral problems of very young Dutch children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 1333–1340.
- Tick, N.T., van der Ende, J., & Verhulst, F.C. (2007). Twenty-year trends in emotional and behavioural problems in Dutch children in a changing society. *Acta Psychiatrica Scandinavica*, 116, 473–482.
- Tick, N.T., van der Ende, J., & Verhulst, F.C. (2008). Ten-year trends in self-reported emotional and behavioural problems of Dutch adolescents. *Social Psychiatry and Psychiatric Epidemiology*, 43, 349–355.
- Toh, S. (2006). Trends in ADHD and stimulant use among children, 1993–2003. *Psychiatric Services*, 57, 1091.
- Torikka, A., Kaltiala-Heino, R., Rimpelä, A., Marttunen, M., Luukkaala, T., & Rimpelä, M. (2014). Self-reported depression is increasing among socio-economically disadvantaged adolescents – repeated cross-sectional surveys from Finland from 2000 to 2011. *BMC Public Health*, 14, 408.
- Twenge, J.M. (2011). Generational differences in mental health: Are children and adolescents suffering more, or less? *American Journal of Orthopsychiatry*, 81, 469–472.
- UK Statistics Authority. (2014). Assessment of compliance with the Code of Practice for Official Statistics. Statistics on crime in England and Wales (produced by the Office for National Statistics). Assessment Report 268.
- United Nations Children's Fund (2013). Towards an AIDS-free generation: Children and AIDS sixth stock-taking report. UNICEF.
- United Nations Economic and Social Council. (2014). World Crime Trends and emerging issues and responses in the field of crime prevention and criminal justice. Available from: http://www.unodc.org/documents/data-and-analysis/statistics/crime/ECN.1520145_EN.pdf [last accessed October 2014].
- Van Dijk, J., Tseloni, A., & Farrell, G. (2012). *The international crime drop: New directions in research*. Basingstoke: Palgrave Macmillan.
- Van Dijk, J.J.M., van Kesteren, J.N., & Smit, P. (2008). *Criminal victimisation in International Perspective, key findings from the 2004–2005 ICVS and EU ICS*. The Hague: Boom Legal Publishers.
- Värnik, A., Kõlves, K., Allik, J., Arensman, E., Aromaa, E., van Audehove, C., ... & Hegerl, U. (2009). Gender issues in suicide rates, trends and methods among youths aged 15–24 in 15 European countries. *Journal of Affective Disorders*, 113, 216–226.
- von Soest, T., & Wichstrøm, L. (2014). Secular trends in depressive symptoms among Norwegian adolescents from 1992 to 2010. *Journal of Abnormal Child Psychology*, 42, 403–415.
- Wångby, M., Magnusson, D., & Stattin, H. (2005). Time trends in the adjustment of Swedish Teenage Girls: A 26-year comparison of 15-year-olds. *Scandinavian Journal of Psychology*, 46, 145–156.
- West, P., & Sweeting, H. (2003). Fifteen, female and stressed: Changing patterns of psychological distress over time. *Journal of Child Psychology and Psychiatry*, 44, 399–411.
- Whittington, C.J., Kendall, T., Fonagy, P., Cottrell, D., Cotgrove, A., & Boddington, E. (2004). Selective serotonin reuptake inhibitors in childhood depression: Systematic

- review of published versus unpublished data. *Lancet*, 363, 1341–1345.
- Wilkinson, R., & Pickett, K. (2010). *The spirit level*. London: Penguin.
- Williams, R.L. (2013). Overview of the Flynn effect. *Intelligence*, 41, 753–764.
- Windfuhr, K., While, D., Hunt, I., Turnbull, P., Lowe, R., Burns, J., ... & Kapur, N. (2008). Suicide in juveniles and adolescents in the United Kingdom. *Journal of Child Psychology and Psychiatry*, 49, 1155–1165.
- Wong, I.C.K., Murray, M.L., Novak-Camilleri, D., & Stephens, P. (2004). Increased prescribing trends of paediatric psychotropic medications. *Archives of Disease in Childhood*, 89, 1131–1132.
- Yoshikawa, H., Aber, J.L., & Beardslee, W. (2012). The effects of poverty on the mental, emotional, and behavioral health of children and youth: implications for prevention. *American Psychologist*, 67, 272–284.

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