Childhood mental health and life chances in post-war Britain

Insights from three national birth cohort studies

A report by Marcus Richards and Rosemary Abbott, in conjunction with Guy Collis, Paul Hackett, Matthew Hotopf, Diana Kuh, Peter Jones, Barbara Maughan and Michael Parsonage

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1.1 Foreword

Childhood and adolescent mental ill health is one of the least explored yet critical influences on our chances in life. Levels of mental distress in children of all ages are now known to be significant, and escalating. Yet the impact of those experiences on children and young people's future prospects is poorly understood.

Mental ill health affects us unequally. We know that the poorest and most excluded in society are the most likely to experience mental health problems. And we know that adults with mental health problems are more likely than most to be poor, isolated and excluded. What we did not know until now is the extent to which our experiences of emotional and conduct problems as children and teenagers affect us throughout our lives. It is this inter-generational dimension and the associations between early life and adult outcomes which is highlighted in this report, with major cost implications for government and society.

This new report draws on a data source that has been surprisingly little used to understand the impact of our mental health on our lives. It comes from the three major national UK birth cohorts: groups of people born in 1946, 1958 and 1970 respectively whose lives are studied at regular intervals to track what happens to them over time. It is therefore the best possible source of longitudinal data over time and gives rich and insightful information about the life histories of people who are now well into adulthood.

We are delighted to have co-sponsored this important study with Unison and the Medical Research Council (MRC). Without their support, this work would never have been possible.

We are extremely grateful to Marcus Richards from the MRC Unit for Lifelong Health and Ageing and Rosemary Abbott from the Department of Psychiatry, Cambridge University, for undertaking the study, supported by a steering group which also included Guy Collis (Unison), Matthew Hotopf (Institute of Psychiatry, King's College London), Diana Kuh (MRC Unit for Lifelong Health and Ageing), Peter Jones (Department of Psychiatry, Cambridge University), Barbara Maughan (Institute of Psychiatry, King's College London) and Michael Parsonage (Sainsbury Centre for Mental Health). We also thank the many people who attended the workshops that informed the work as it progressed.

We very much hope that this study will bring new light to public policy thinking. Its ramifications for the way we support children and young people experiencing or at risk of mental distress are considerable. It indicates that prevention and management of conduct problems in particular should be a priority for all children's services. And it shows the importance of offering ongoing support to all who experience mental distress in childhood and early adulthood to put right the damage it can do to the rest of their lives.

Above all, we hope this study will bring a new level of understanding about the importance of mental health as a public policy issue and how it impacts on all of our lives. The consequences of mental distress are profound and far-reaching, both for individuals and their families and for society as a whole. It is time to take them seriously and to begin to put this right.

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1.2 Executive summary

Mental health problems in childhood and adolescence are common and they cast a long shadow over our lives. They affect not only our mental health as adults but also our chances of doing well at school and in work, of forming strong families and of becoming good citizens.

We examined the long-term consequences of childhood and adolescent mental health problems, not just for adult mental health but for a wide range of economic and social outcomes. We used a unique resource: three national birth cohorts that have been tracking large representative samples of people born in the UK in 1946, 1958 and 1970.

We found that conduct problems in childhood are strongly associated with a wide range of adverse outcomes in adult life, and more so for severe than for mild problems. Most of these effects could not be accounted for by either socio-economic background or childhood IQ.

- People with mild conduct problems were twice as likely to have no educational qualifications in early adulthood. For those with severe conduct problems, the odds were up to four times.

- Both mild and severe adolescent conduct problems were associated with significantly elevated odds of chronic economic inactivity. And those in work earned up to 30% less.

- Adolescent conduct problems were strongly associated with never marrying (in women), with divorce and with teenage parenthood.

- People with adolescent conduct problems were up to four times more likely to have been arrested in early adulthood and were up to three and a half times more likely to have a court conviction.

People with emotional problems in childhood and adolescence were much more likely also to have emotional problems in adult life. But for other outcomes the long-term effects of early emotional problems were generally less pronounced than those for conduct problems. In some cases, in fact, adolescent emotional problems were associated with better adult life outcomes.

The strength, pervasiveness and persistence of the damaging consequences of conduct problems make a powerful case for early intervention. There is good evidence that many early intervention programmes for childhood conduct and emotional problems are highly effective and more than pay for themselves over the long term. We should invest in them as a matter of urgency.

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2.0 Background

Nearly 10% of children aged 5-16 years have a clinically diagnosable mental health problem (Green et al., 2005). The prevalence of these problems increased between the 1970s and the 1990s (Collishaw et al., 2004) and there is a high degree of persistence of these problems into adult life (Rutter et al., 2006). Evidence already suggests that these problems have a serious impact on life chances (e.g. Fergusson et al., 2005; Colman et al., 2009) and even on life expectancy (Jokela et al., 2009). Identifying and quantifying the lifetime effects of childhood and adolescent mental health problems is therefore an important public health goal, with strong implications for prevention and treatment.

This report summarises the main findings of a research project commissioned by Sainsbury Centre for Mental Health, the Smith Institute and UNISON, and supported by the UK Medical Research Council (MRC). The project analysed the long-term consequences of mental health problems that arise in childhood and adolescence using longitudinal data.

Detailed work on the project was undertaken by Marcus Richards and Rosemary Abbott, supported by a steering group consisting of Guy Collis, Paul Hackett, Matthew Hotopf, Peter Jones, Diana Kuh, Barbara Maughan and Michael Parsonage. This work also benefited from wider discussion at two expert workshops, hosted by Sainsbury Centre in 2008, on the main topics of this project, and the best use of the UK birth cohorts to address these.

This report will centre on the British birth cohorts and the unique opportunity they provide to track the long-term consequences of childhood and adolescent mental health and disorder on life chances. These life chances are grouped into three categories; first, adult mental health; second, education, skills and labour market attachment and returns; third, social function in terms of partnership, family formation, and citizenship. We review evidence on these topics already gained from these cohorts and from those of broadly similar structure in other countries; then, where significant gaps are identified, we present new findings from the UK resource. Finally we review the policy implications of these findings.

2.1 The problem of childhood and adolescent mental ill-health I: trends and life course continuities

A broad distinction is often drawn between childhood and adolescent conduct and emotional problems, as organised, for example in the 2004 ONS survey (Green et al., 2005); these two entities and their consequences are the core subject matter of this report. However, it should be noted here that the term ‘problem’ is not interchangeable with that of ‘disorder’; the latter requires, or at least implies, a clinical diagnosis - for example oppositional defiant disorder in the case of conduct, or separation anxiety in the case of emotional disorder. Previous literature cited in this report may refer to one or more of these disorders, but the report as a whole concerns ‘problems’. This is a wider category that encompasses mild symptoms and behaviours that can be rated by lay observers such as parents or teachers, as well as those of a more severe nature that are of probable clinical significance.

Of obvious relevance to a life course perspective, conduct and emotional problems show continuities with adult problems, as reviewed by Rutter et al. (2006). In regard to conduct problems, Moffitt (1993) distinguished a relatively small group, mostly male, with severe problems that begin in early childhood, severe adverse experiences, evidence of neurodevelopmental difficulties, and poor adult mental health. In contrast, there is a larger group with conduct problems that emerge during adolescence. These are largely associated with 'maturity gap' frustrations and social mimicry, are more open to benefit from turning points such as partnership and labour market attachment, and are associated with milder mental health problems in adulthood. There are important exceptions to this picture; for example a small proportion of those with early-onset problems show good adaptation in adulthood, whereas a small proportion of this group show problems in adulthood marked by social isolation and emotional disturbance rather than antisocial behaviour. Nevertheless, continuities of antisocial behaviour from childhood to early adulthood have been demonstrated in the Dunedin Multidisciplinary Health and Development Study by Odgers et al. (2008), who distinguished four profiles: persistently few problems (approximately half of those in the model), problems in childhood that diminish over time (approximately 20%), problems that begin in adolescence (12-20%), and problems beginning in early childhood that persist (slightly below 10%).

Emotional problems in adolescence also show continuity with emotional problems in adulthood (Rutter et al, 2006). These authors estimated that depressed adolescents have 2-7 times the odds of being depressed in adulthood, with 40-70% showing major depressive disorder (MDD) during this phase of the life course. As with conduct problems there are important qualifications to this. For example, depression emerging before puberty does not show such continuity with adult depression as post-pubertal adolescent depression, suggesting that childhood onset and adolescent onset emotional problems may be distinct entities; relevant data have been based on clinical samples as well as in the general population, but more information is required at the latter level (Rutter et al., 2006).

Against a background of rising inter-continental prevalence of depression (Cross-National Collaborative Group, 1992), work based on the British birth cohorts and the British Child and Adolescent Mental Health Survey indicates a rise in adolescent emotional problems and a substantial increase in adolescent conduct disorder from the mid 1970s to the turn of the 21st century (Collishaw et al. 2004). Reasons for this rise are currently the subject of a research program funded by the Nuffield Foundation (for further details see www.nuffieldfoundation) and are beyond the remit of this report. However, if the increase is likely to be associated with a corresponding rise in individual and societal costs then clearly there is a pressing need to identify strategic targets for intervention.

2.2 The problem of childhood and adolescent mental ill-health II: adult life chances

Childhood and adolescent mental health problems have a significant impact on adult life chances, with major cost implications for individuals, for government, and for society. To put this into perspective Scott and colleagues at the Institute of Psychiatry estimated that cost to public services for individuals with conduct disorders, over and above basic universal provision, were ten

times higher than for those with no problems (Scott et al., 2001). By far the largest proportion of this elevation was accounted for by the cost of crime. In fact a recent report commissioned by the Northern Ireland Association for Mental Health estimates that the saving in lifetime costs through early intervention to prevent conduct disorder would be approximately £230,000 per case; again, 71% of this saving would be in costs related to crime (Friedli & Parsonage, 2007). These estimates are consistent with evidence from the USA, for example from long term follow-up of the Perry Preschool Program for disadvantaged children, where the ratio of economic and other benefits per dollar investment were over eight to one; by far the largest benefit, once again, was from offsetting the cost of crime (Schweinhart et al., 2005). Yet the spectrum of mental health problems during development obviously extends beyond conduct and includes other problems such as those of emotion; and the burden of their effects is not only carried by the criminal justice system and the victims of crime but by strain on clinical and social services, by wider losses to a society's skills base, economy and cohesion, and of course by the suffering of individuals themselves.

Considerable information about life chances in relation to childhood and adolescent mental health at the population level has emerged from longitudinal studies based in New Zealand, in particular the Christchurch Health and Development Study (CHDS) and the Dunedin cohort referred to in 2.1. Using the former Fergusson et al. (2005a) divided childhood conduct problems, as reported by parents and teachers, into four groups, lowest (50^{th} percentile or less) to highest (top $5^{\%}$). They found a striking increase across these groups in the proportion with no or vocational only educational qualifications (ranging from 5.8% in the lowest group to 52% in the highest group. There were corresponding increases in odds of unemployment and welfare dependency in early adulthood, and a corresponding decrease in mean gross income at this stage of the life course. These gradients, particularly those of unemployment and income, were noticeably flattened by controlling for various sources of disadvantage such as early adversity, and for IQ. However, these authors showed that conduct problems were also associated with offending, substance use (smoking and illicit drugs), multiple sexual partners, teenage pregnancy and parenthood, and inter-partner violence; these adverse outcomes were not explained by early adversity and IQ.

The same group also examined a range of outcomes in relation to adolescent depression. This was associated with poor educational attainment, prolonged unemployment, early parenthood, nicotine dependence, and alcohol abuse (Fergusson & Woodward, 2002). All of these effects were accounted for by a range of other factors: socio-economic background, early adversity (sexual abuse and parental separation or divorce), adolescent neuroticism, and association with delinquent or substance-abusing peers.

Data from the Dunedin cohort corroborate many of these findings, as well as test Moffitt's categorisation of conduct problems (see 2.1). More than one quarter of men in this cohort who showed stable, pervasive, and extreme antisocial problems in childhood but only moderate levels of delinquency in adolescence offended as adults (Moffitt et al., 2002). In addition, this group were at high risk of emotional disorders, possible personality disorders, and social isolation. Worse, men with extreme antisocial problems in childhood and adolescence were at high risk of offending, and were more likely to commit violent crimes such as assault and robbery. They also had lacked educational qualifications, were likely to be in unskilled employment, and to engage in substance abuse. In contrast men in this cohort who showed delinquent behaviour emerging in

adolescence were more likely than those with early onset persistent conduct problems to benefit from the reforming effects of employment, with higher odds of completing their education and with higher status occupations. However, while this group had average or better scores on factors that predict relationship success there were no significant differences between this group and those with early onset persistent conduct problems in odds of being married or in a relationship.

In a separate analysis in this cohort Ramrakha et al. (2007) found that high levels of childhood antisocial problems were associated with increased odds of sexual intercourse before age 16 years, and with having multiple partners with no or rare condom use. These associations were partly explained by involvement with delinquent peers and poor relationship with parents. On the other hand high levels of anxiety were associated with reduced odds of risky sexual behaviour and sexually transmitted infections.

Similar phenomena are observed in Europe. Probably the best known longitudinal study of delinquency in the UK is the Cambridge Study in Delinquent Development (CSDD; Farrington, 1995), a sample drawn from a disadvantaged inner London borough, as used by Scott et al. (2001) to estimate the cost of conduct disorder (this section, above). Using this study Healey et al. (2004) found that children identified as 'troublesome' at an early age, and who engaged in delinquent behaviours in adolescence, had a significantly higher probability of experiencing long periods out of the work force by age 32 years. Analysis also suggested lower earnings at this age in boys with these problems, an effect that was almost entirely the result of lower workforce participation. Tentative evidence suggests that these relatively poor labour market outcomes were mediated by poor educational achievement and by limitations associated with criminal conviction in early adulthood.

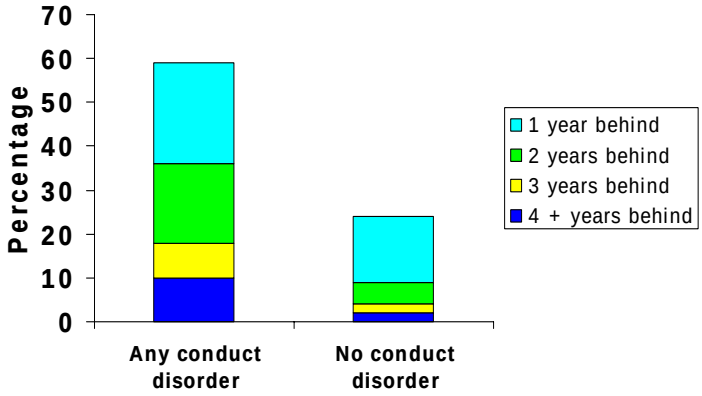
These UK findings labour market outcomes in relation to childhood mental health are also reflected in Finland. Using the Jyväskylä Longitudinal Study of Personality and Social Development, Virtanen et al. (2005) found that hostility and anxiety rated at age eight years by teachers predicted not having a permanent employment contract at 42 years; in the case of hostility this was observed in those of low socio-economic position in particular.

One clear route to poor labour market attachment is via ill-health. Henderson et al. (2009) investigated sickness absence in relation to childhood emotional problems in participants in the Aberdeen Child Development Study (ACDS). Those who had been rated at age 11 years by teachers as having somatic complaints, being miserable or unhappy, tending to be absent for trivial reasons, or tending to be fearful or afraid had significantly increased odds of being 'permanently sick or disabled' in midlife. These effects were not accounted for by socio-economic background or by childhood IQ.

Before we conclude this section the important issue of IQ and literacy and numeracy skills should be addressed. We noted above that the association between childhood conduct problems and education and employment problems in the Christchurch study (Fergusson et al., 2005a) were accounted for by various factors including IQ. This probably reflects the high degree of covariance between literacy and numeracy difficulties and childhood and adolescent mental health problems (Maughan & Carroll, 2006). This is illustrated in Figures 1 and 2, which show that children in the 2004 ONS survey with conduct and emotional problems scored notably lower in tests of scholastic

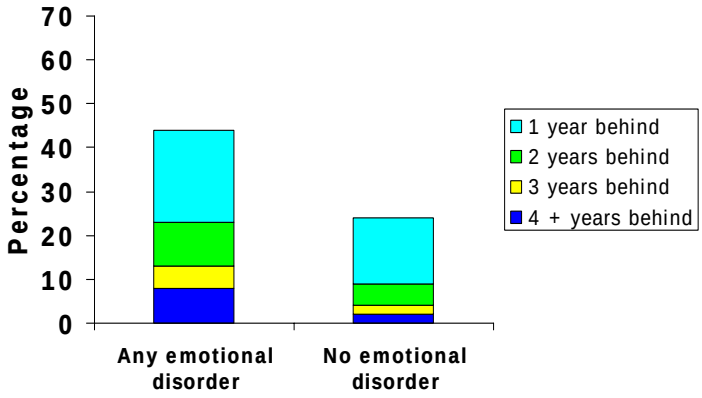
ability than children without these problems. These problems are of course themselves a cause of poor life chances (Bynner, 2004; Fergusson et al., 2005b). Indeed, the UK fairs poorly in literacy and numeracy skills by European standards, with major cost to the national economy; earnings returns to basic skills if government targets that became the 'Skills for Life Strategy' (ABSSU, 2002) were met, were estimated by the London Institute for Fiscal Studies' macroeconomic model of the tax and benefits system (TAXBEN) as £0.44 billion for achievement of the literacy target (Bynner et al., 2001). The figure is even higher for numeracy (£2.54 billion).

Figure 1. Proportions of children with conduct disorder behind in scholastic ability



Source: Green et al., Office of National Statistics, 2005

Figure 2. Proportions of children with emotional disorder behind in scholastic ability



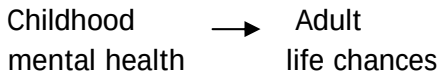
Source: Green et al., Office of National Statistics, 2005

2.3 The UK birth cohorts and the need for longitudinal analysis

It is hardly necessary to emphasise that the study of adult consequences of mental health during development requires a longitudinal design that begins in childhood or earlier. Mental health is then rated or assessed in that phase of the life course, before its consequences are known, and before these consequences bias recall, as they are well known to do (Matt et al., 1992). Some studies are designed very specifically to do this. One example is the follow-up to age 40 of the Perry Preschool Program (*ibid*). However, perhaps most ideal is a prospective study that begins in early life and continually collects a broad range of data into mature adulthood and beyond, including measures with the potential to explain links between mental health and its consequences. Such explanatory measures include early home circumstances and cognitive development. The birth cohorts are the best known and most powerful studies using this design; their sampling frames maximise national representativeness and minimise the confounding effects of age, and their follow-up methods have generally helped to maintain good response rates over time. The UK maintains four such cohorts, born in 1946, 1958, 1970 and 2000, representing people whose ages range from mid childhood to the beginning of the seventh decade. Birth cohorts consist, of course, of samples born in a particular place at a particular time. For example, the UK into which the 1946 cohort were born, with its housing shortage, food rationing and looming fuel crisis following World War II, was a very different environment to the one in which members of the 1958 cohort began their lives only twelve years later. This provides an opportunity that is sometimes overlooked; to investigate how changes, over time or across location, such as in the structure of educational services, labour markets and welfare provision, and in societal norms and values, affect the relationship between capability, vulnerability, and eventual attainment.

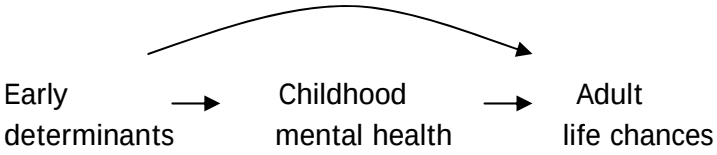
A life course approach to adult life chances in relation to pre-adult mental health may be elaborated as follows:

Figure 3a



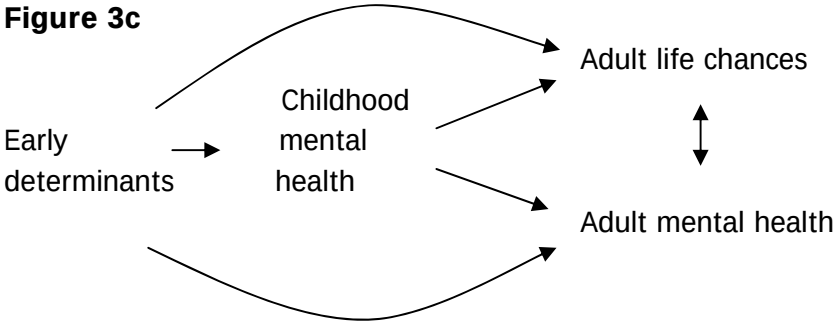
The core subject matter of this project is that childhood or adolescent mental health impacts on adult life chances.

Figure 3b



Pre-adult mental health problems have a variety of determinants, including early disadvantage. However, these can themselves directly impact adult life chances and need to be taken into account if any observed associations between mental health and life chances are to be taken as valid and not merely apparent.

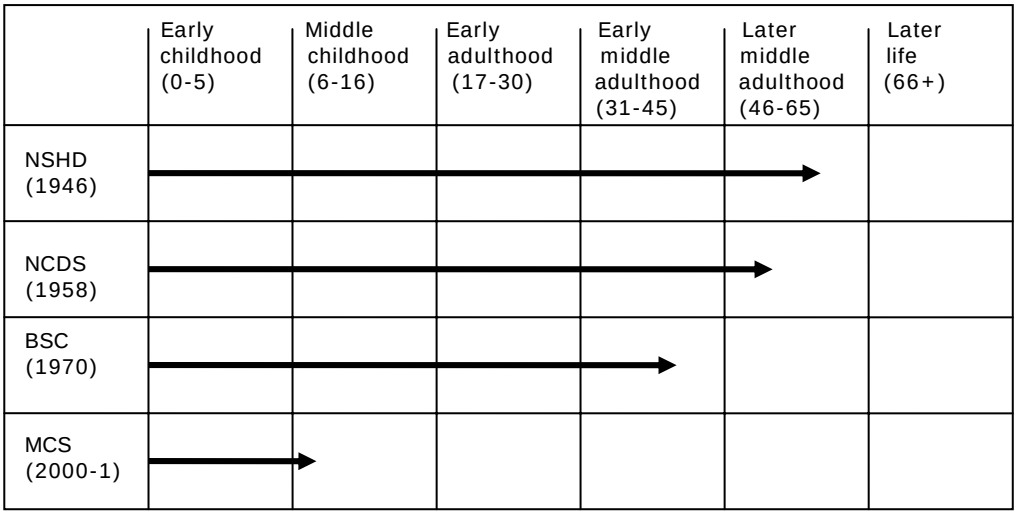
Figure 3c



As already noted, childhood mental health shows strong continuity with adult mental health. Adult mental health in turn has a bi-directional relationship with adult life chances, and so the role of adult mental health in any association between pre-adult mental health and life chances needs to be understood.

2.3.1 The British birth cohorts

Figure 4. The four national UK birth cohorts



The Medical Research Council National Survey of Health and Development (NSHD, henceforth the 1946 cohort) is the oldest of the British birth cohorts (see profile in Wadsworth et al., 2006). This was originally established to investigate the cost of childbirth and the quality of associated care in the immediate post-war years, when birth rates were continuing to fall, and at a time when serious health and social problems, as highlighted in the Beveridge report of 1942, precipitated the development of the modern welfare state. The original maternity survey comprised 13,687 births, 82% of all births occurring in one week of March 1946 in England, Wales and Scotland. Two years later a social class stratified sample of 5,362 of these participants was followed up, comprising all single births within marriage to families of non-manual and agricultural occupation, and a random one in four sample of single births within marriage to families of manual occupation. The over-sampling of non-manual families was designed to ensure that the study was adequately

structured to test the effects of occupational social class, which was found to be such a powerful determinant of ante-natal care quality, and of survey members' health and survival. This sample has been followed a further twenty times, with the major data-sweeps in adulthood conducted at ages 26, 36, 43 and 53 years, when sample size during the latter follow-up was 3,050; the sample is currently being investigated in research clinical facilities in the early years of their sixth decade. All of the adult data collections involved routine updating of socio-demographic and socioeconomic circumstances, including education and training; occupational status and sufficient occupational details to code Registrar General social class; family structure, and social attachments and networks.

The National Child Development Study (NCDS, henceforth the British 1958 birth cohort), began as a study of perinatal mortality, taking as its survey members 17,416 births occurring in one week of March of that year (Power & Elliott, 2005). The first follow-up was in 1965, when survey members were aged seven years, and subsequent follow-ups were conducted at ages 11, 16, 23, 33, 42 and 46 years, with a special biomedical assessment at 43 years. This is also a multidisciplinary study, with a strong focus on socio-demographic circumstances and socioeconomic attainment over the life course.

The British Cohort Study (BCS70, henceforth the British 1970 birth cohort), is the youngest of the adult UK birth cohorts. Survey members initially consisted of 16,571 births occurring during one week of April of that year (Elliott & Shepherd, 2006). The first follow-up was conducted when survey members were aged five years, and subsequent follow-ups occurred at ages 10, 16, 26, 30 and 34 years. As with the older cohorts this is a multidisciplinary study, although a biomedical assessment has not yet been undertaken in adulthood; following the 1958 cohort the study was augmented by immigrants to the UK, to maintain national representativeness.

2.3.2 Social changes in post-war Britain

By way of background it is of interest to review important structural changes of relevance to the outcomes in this project that have occurred in lives of the three adult UK birth cohorts. These are well reviewed by Makepeace et al. (2003) and by Woods et al. (2003). Concerning education, the 1946 cohort were born shortly after the 1944 Education Act, which, at secondary school level, had instituted selection into grammar, secondary modern or technical schools based on performance in a public examination at age 11 years that involved cognitive ability testing. This was brought about with the aim of creating an internationally competitive workforce for the post-war era, by allowing access to a challenging education regardless of social circumstances. However, by the 1960s it had become clear that this aim was not being fully achieved. As James Douglas, who initiated the 1946 cohort showed, those with high cognitive ability test scores but from manual occupational social class families were less likely to stay on at school beyond minimum leaving age, and less likely to achieve qualifications, than those with equally high ability but from non-manual families (Douglas et al., 1968). At around this time comprehensive secondary education was introduced, which aimed to abolish separate schools based on test ability, and which broadened the scope of the curriculum. This barely affected members of the 1946 cohort, but was fully in place during the school years of the 1970 cohort, with members of the 1958 cohort experiencing the transition between these systems. The latter cohort were to benefit from the

raising of the minimum school leaving age from 15 to 16 years, following which there was a dramatic rise in the proportion of people leaving school with qualifications, although there was no further change from the 1958 to the 1970 cohort in this respect. However, all three cohorts also benefitted from the expansion of higher education following the Robbins report, reflected in a systematic rise between 1978 and 2000 in the proportion with tertiary qualifications. Thus the general trend from older to younger cohort was towards increased educational opportunity.

In regard to skills and vocational training, these also underwent important changes during the years that the 1946, 1958 and 1970 cohort members reached employment age. Traditionally this had centred on employer-based apprenticeships for skilled manual workers, although some white-collar jobs also offered structured training on leaving school. However, since the 1964 Industrial Training Act these opportunities increasingly came under central government control, most notably 1978's Youth Opportunity Programme (YOP) and 1983's Youth Training Scheme (YTS). Both aimed at universal provision of training for those not in full-time education or employment, but were widely perceived as little more than an alternative to unemployment, certainly inferior to the older apprenticeship system (Dolton, 1993).

Also to change during the lives of the three UK cohorts was employment opportunity, especially for women, and the structure of the labour market itself. Members of the 1946 cohort came of age during a time of high employment, high job security, and low inflation. By the time members of the 1958 cohort reached employment age inflation had risen, although it was members of the 1970 cohort who experienced the full impact of unemployment following the anti-inflationary policies of the 1980s (Banks et al., 1992). Against a doubling of average earnings in real terms came a rise in earnings inequality, which increased within age and experience groups by 23% between 1979 and 1993 (Machin, 1996). Reasons for this rise are complex, and their full consideration is beyond the scope of this report, but they concern the relative effects of change in demand for occupational skills, and the wage premium placed by employers on these skills (Machin, *ibid*).

Alongside these labour market changes, social roles outside the workplace were also in a state of flux in the lives of these cohorts. As Wadsworth (1991) noted, "When the generation of the (1946 cohort) population become the elderly of the 2020s they are likely to be a fitter elderly population than that of the 1990s ... But the differences which may be brought about by their experience of weaker ties of tradition and family are impossible to anticipate." These social changes include decline in marriage, and the corresponding rise in divorce, cohabiting and serial partnerships. This resulted in an increase in childhood experience of change in the home environment as members of the UK 1946, 1958 and 1970 cohorts (Ferri & Smith, 2003) were growing up. Of these social changes parental divorce is of particular relevance to emerging mental health. As summarised by Maughan and McCarthy (1997), this is a highly salient and complex stressor, with multiple and accumulating components: parental distress and inattention, financial difficulties, social stigma, relocation (if not of own home then that of the father, and often new step-family members to accommodate. Unsurprisingly, children of divorcing parents show increased rates of behavioural and emotional problems (Amato, 1993). The impact of these mental health problems on long-term life chances is the core subject matter of this report, and will be returned to below.

This probable weakening of family ties over modern post-war British life has also been taking place against a backdrop of concern about a wider loss of social capital and its 'bridges' and 'bonds' , particularly in the USA (e.g. Putnam, 2000), and the risks of social exclusion or disenfranchisement as a parallel European concern.

2.3.3 Prior studies of life chances in relation to childhood and adolescent mental health in the British birth cohorts

1946 cohort

While health itself in adulthood is not the focus of this report there is of course no poorer life chance than premature mortality. Survey members in the 1946 cohort with high trait anxiety (neuroticism) in adolescence were found to have lower accident mortality to age 25 years, probably because anxiety is associated with risk aversion; but in the same individuals high adolescent trait anxiety was associated with higher rates of non-accidental mortality in midlife (Lee et al., 2006).

The most comprehensive study of life chances in relation to adolescent conduct problems in the 1946 cohort was recently published by Colman and his colleagues (Colman et al, 2009). Conduct problems were rated by teachers when survey members were aged 13 and 15 years (see 5.4.1); these ratings consisted of disobedience, lying, lack of punctuality, restlessness, truancy, day dreaming in class, and poor response to discipline. Adolescent survey members were grouped into those who scored below the 75th percentile at both these ages, indicating absence of conduct problems; those who scored above the 93rd percentile at either age, indicating severe conduct problems, and all others, who were classified as having mild conduct problems. These cut-points were chosen to replicate the prevalence of these behaviours widely reported in other studies (see 3.1). Colman et al. found that, after controlling for gender, social class of origin, childhood cognitive ability, and emotional problems, those with severe conduct problems had significantly higher odds than those without to have elevated symptoms of anxiety and depression in adulthood, and to self-report a history of 'nervous trouble'. In addition, those with mild and severe conduct problems were significantly more likely than those without to have left school without any qualifications; and, while there was no association between these problems and employment status, those with mild or severe problems were more likely to be in manual occupations, although financial problems were only significantly elevated in those with severe problems. In addition, mild and severe problems were associated with increased odds of parenthood before age 20 years, with unhappiness with family life, and with divorce.

In a previous analysis in this cohort led by Colman, those rated by teachers as having emotional problems in adolescence were significantly more likely than those without these problems to have elevated symptoms of anxiety and depression in adulthood, to self-report a history of 'nervous trouble', and to have been treated for psychiatric disorder during adulthood (Colman et al., 2007a). In a further study led by this author 71% of those with evidence of emotional problems in adulthood also showed evidence of these problems in adolescence; conversely, only 14% of those who showed these problems in adolescence reported no emotional problems in adulthood (Colman et al. 2007b). Regarding the social consequences of these emotional problems, Hatch &

Wadsworth (2008) found that adolescents rated by teachers as ‘anxious’ had fewer social affiliations (e.g. church, local government, trade unions, volunteering) at age 43. ‘Sad’ affect was not associated with the number of social affiliations. However, adolescents rated as ‘sad’ had lower levels of social participation. Those defined as either ‘anxious’ or ‘sad’ had smaller social networks at age 43 years. These models adjusted for gender, educational level, socio-economic status and anxiety and depression in adulthood.

1958 cohort

The most dramatic evidence for long-terms effects of childhood mental health problems in the British in receipt of benefits, being homeless, having had three or more cohabitations, and being a teenage parent (Collishaw et al., 2004). In a more detailed analysis of partnership transitions Maughan & Taylor (2001) reported that adolescent antisocial behaviour was a strong predictor of cohabitation rather than legal marriage, cohabitation in turn being associated with increased risk of relationship breakdown - although there were also direct effects of antisocial problems on relationship breakdown in men. Adolescent emotional problems had no significant influence on rates of partnership formation or breakdown in this cohort.

1970 cohort

In her developmental-contextual model of childhood and adult psychosocial adjustment, developed for the 1958 and 1970 cohorts, Schoon and colleagues showed that adolescent mental health was linked through a dynamic interplay of risk to adult anxiety and depression, and to adult occupational social class (Schoon et al., 2003). Effects were of similar magnitude in these two cohorts. In the 1970 cohort adolescent conduct problems were associated with significantly increased risk of the same negative outcomes at age 29 or 30 years as in the 1958 cohort (see above) although there were no significant differences in the magnitude of these effects between these two cohorts (Collishaw et al. 2004).

3.0 New analyses commissioned for this report

As documented in 2.3.3, previous studies have used these cohorts individually to assess long-term consequences of childhood mental health, but none attempted to conduct a comprehensive study using all three, encompassing a broad range of outcomes.

3.1 Methodological considerations

3.1.1 Measures of adolescent mental health in the British birth cohorts

In all cohorts, identification of conduct and emotional problems was based on questions asked of the children's teachers and parents. The 1958 and 1970 cohorts used the Rutter A scale (Rutter et al., 1970; Elander & Rutter, 1996) to identify emotional and conduct problems, while the 1946 cohort used a forerunner of this.

For the 1946 cohort, teachers were asked questions when the children were 13 and 15. Items for conduct problems referred to unpunctuality, restlessness, truancy, daydreaming, indiscipline, disobedience and lying. Items for emotional problems referred to anxiety, timidity, fearfulness, diffidence and avoidance of attention.

For the 1958 and 1970 cohorts parents were questioned at age 5 (1970 only) and 16. Items for conduct problems referred to destroying belongings, fighting with other children, disobedience, lying and bullying (and in the 1970 cohort only, stealing). Items for emotional problems referred to worries, misery, fearfulness, fussiness and solitariness.

In all cohorts summary measures of conduct and emotional problems were created by deriving global measures for each from factor analysis (using the statistical package Mplus, which allows for item level missing data), then dividing scores for these into absent, mild and severe based on established percentile cuts (Ghodsian et al., 1980; Ghodsian, 1983; Rodgers, 1990; Colman et al., 2009). For conduct problems these were 0-75%, 75-93% and 94% or higher, respectively; and for emotional problems these were 0-50%, 50-87% and 88% or higher, respectively. For both sets of problems the percentile cut for 'severe' was based on epidemiological evidence in order to capture problems of potential clinical significance. However, it is important to emphasise that clinical diagnoses of conduct and emotional disorders were not made in these cohorts. In addition, because distinctions between absent, mild and severe problems were based on percentile cuts in this study, frequencies of these categories do not represent prevalence in terms of 'caseness'; for the same reason changes in prevalence of mental health problems over the cohorts cannot be identified in this study.

Hyperactivity was considered as a potential explanatory covariate (see 3.1.2 below). In the 1958 and 1970 cohorts this was represented by three items based on maternal ratings of lacking concentration, being squirmy or fidgety, and restlessness. For the 1970 cohorts these were first available at age five years, and were also available at age 16 years for both cohorts. A hyperactivity variable was not available for the 1946 cohort.

3.1.2 A note on statistical analysis and the representation of results in this report

Most statistical analysis in this report are based on the Odds Ratio (OR). This represents the odds of having a particular outcome given a particular set of circumstances compared to odds of having that outcome without those circumstances. For example, an OR of 1 signifies that a factor makes no difference to a particular outcome; whereas an OR of 2 would mean that the odds of that outcome are twice as high. We also tested whether any OR above or below 1 represents a statistically significant association by estimating whether there is less than a 5% chance that it fell above or below 1 purely randomly.

For each outcome these logistic regression analyses were performed in two stages. First, ORs were calculated for conduct and emotional problems adjusted for each other. That is, the ORs for conduct problems were adjusted for any effects of emotional problems, and the ORs for emotional problems were adjusted for the effects of conduct problems. This is to highlight the unique effects of each, given that they co-occur to a high degree in individuals. For example, in the 1958 cohort 74% of those who had conduct problems at age 16 years also showed emotional problems at this age; in the 1970 cohort the figure was 62% at age 5 years, and 69% at age 16 years. These mutually-adjusted ORs are represented in nearly all of the graphs that follow, separately for conduct and emotional problems, in men and women.

Second, it was important to assess whether any association between mental health problems and life chances might have ultimately been driven by other factors. Three in particular were considered: socio-economic background, which can simultaneously influence risk of developing childhood mental health problems and achieving poor adult life chances; childhood cognitive ability, which correlates highly with childhood mental health problems (Maughan & Carroll, 2006) and also influences adult life chances; and hyperactivity, which is not only associated with conduct problems, but to some extent predicts life chance outcomes in its own right (Fergusson et al., 1996). For these reasons the ORs were further adjusted for socio-economic background, represented by occupational social class of the father (or mother if this was unknown), childhood cognition, and childhood hyperactivity (1958 and 1970 cohorts only), to remove any possible confounding effects of these factors. These fully adjusted ORs, along with the frequency of each outcome for absent, mild and severe conduct and emotional problems, are shown separately for men and women in each cohort in the Appendix.

Father's occupational social class was classified according to the British Registrar General system, and coded into professional, managerial and intermediate, skilled manual, semi-skilled manual and unskilled. By convention, the first three of these categories are regarded as non-manual occupations, and the latter three manual. Father's social class was taken from mid childhood wherever possible; if this was not known it was taken from early childhood, or then adolescence. If father's social class was unknown mother's social class was substituted if available.

Childhood cognition was measured as follows: In the 1946 cohort five tests administered at age 11 years were used: arithmetic, verbal and nonverbal ability, mechanical reading (word pronunciation), and vocabulary based on the same words used for the reading test. In the 1958

cohort five tests administered at age 11 years were used: mathematics, verbal and nonverbal ability, reading comprehension, and design copying. In the 1970 cohort seven tests were administered at age 10 years: reading, mathematics, vocabulary, word definitions, similarities, matrix reasoning, and digit recall. For each cohort latent trait scores representing overall childhood cognitive ability were calculated in Mplus.

Educational attainment was represented as the highest educational qualification attained by early adulthood (by ages 26, 23 and 26, respectively, in the 1946, 1958 and 1970 cohorts), coded as none, vocational only, ordinary level ('O' level, GCSE or equivalent), advanced ('A' level or equivalent), and higher. Where analyses in this report refer to advanced qualifications this is classified as 'A' level or higher. This is an important distinction because this achievement represents the decision to stay in the educational system beyond statutory leaving age, and because 'A' levels are the principal gateway into tertiary education.

Regression analyses were undertaken in Stata version 10. Because conventional regression analyses rejects individuals with missing data for any of the variables in an analysis, and because missing data is usually disproportionately higher in those who are relatively disadvantaged (e.g. Colman et al., 2009), an additional sensitivity analysis was undertaken in Mplus on key outcomes using full information maximum likelihood (FIML). Since the ORs estimated by this method were not statistically different to those using conventional regression, we use the latter throughout this report.

3.2 Preliminary descriptive information

Table 1 shows the frequency breakdown for conduct and emotional problems in males and females in each cohort, along with their gradients for socio-economic background and childhood cognition. As expected, males showed a higher frequency of conduct problems (with the exception of early childhood, as shown for the 1970 cohort), and females showed a higher frequency of emotional problems, in early childhood and adolescence. In all cohorts conduct problems were more prevalent in survey members of manual socio-economic background, although there was far less of a social gradient in this respect for emotional problems. It can also be seen that mean scores for childhood cognition were lower in those with problems (particularly conduct problems), and lower in those with severe compared to mild problems. All of these differences are statistically significant at conventional levels, with the exception of emotional problems in the 1958 cohort in relation to socio-economic background, and childhood cognition in relation to emotional problems at age five years in the 1970 cohort.

It can be seen that the negative gradient for cognition in relation to conduct problems was of almost identical steepness at ages five and 16 years in the 1970 cohort, whereas the cognitive gradient in relation to emotional problems only appeared to emerge in adolescence.

Table 1: Basic descriptive statistics for adolescent mental health problems

	Conduct problems			Emotional problems		
	Absent	Mild	Severe	Absent	Mild	Severe
1946 cohort (age 13 and 15 years)						
Number	3,162	771	298	2,114	1,566	552
Male (%)	50.2	57.6	58.7	57.8	47.8	42.6
Manual background (%)	57.0	64.7	75.8	58.1	59.5	66.7
Childhood cognition[1]	-	-1.0	-1.4	-	-0.3	-1.0
1958 cohort (age 16 years)						
Number	8,897	1,929	824	5,468	4,606	1,575
Male (%)	50.6	52.4	55.8	58.3	46.2	41.6
Manual background (%)	64.6	75.6	82.0	67.6	67.0	69.1
Childhood cognition[1]	-	-1.1	-1.7	-	-0.2	-0.6
1970 cohort (age 5 years)						
Number	9,643	2,479	909	6,267	5,063	1,702
Male (%)	47.9	60.1	70.9	52.9	51.4	48.9
Manual background (%)	59.4	69.6	78.0	61.6	62.9	65.5
Childhood cognition[1]	-	-1.4	-2.8	-	-0.1	-0.1
1970 cohort (age 16 years)						
Number	6,600	1,598	577	4,111	3,569	1,141
Male (%)	47.6	51.1	58.6	55.1	44.9	39.4
Manual background (%)	56.8	66.5	72.5	58.3	60.2	62.8
Childhood cognition[1]	-	-1.8	-2.8	-	-0.5	-1.4

[1] difference from the mean total score of those without problems

All comparisons are statistically significant except for manual background in those with emotional problems in the 1958 cohort, and childhood cognition in those with emotional problems as age 5 years in the 1970 cohort

3.3 Adult mental health and related behaviours

3.3.1 Adult emotional problems

Mental health in the 1946 cohort was also assessed three times in adulthood. In adulthood survey members undertook a shortened version of the Present State Examination (PSE; Wing *et al.*, 1974) at age 36 years. This is a structured interview to elicit symptoms primarily of depression and anxiety. At age 43 years survey members answered the Psychiatric Symptom Frequency Scale (PSF; Rodgers, 1994), an interview-based scale for symptoms of anxiety and depression. At age 53 years survey members self-completed the 28-item General Health Questionnaire (GHQ-28; Goldberg & Hillier 1979). The GHQ-28 is a self-administered screening questionnaire for detecting common mental disorder in the general population. These measures of mental health in adulthood have been summarised by Colman et al (2007a) as three groups representing the prevalence of adult mental health (no symptoms, mild or moderate symptoms, and severe symptoms).

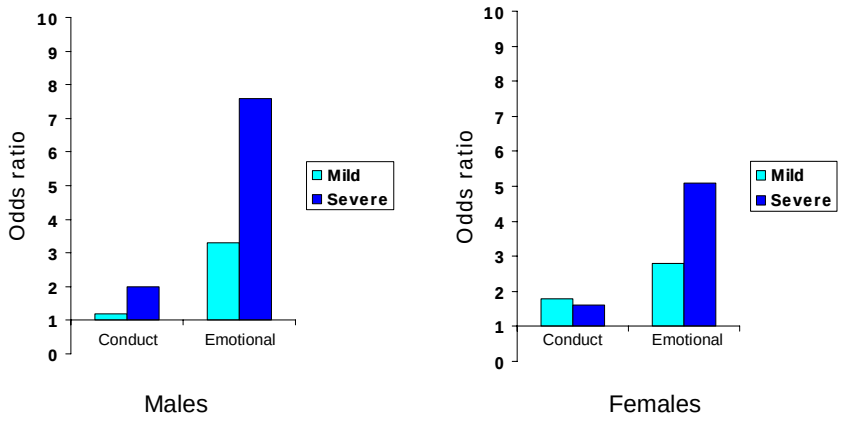
Psychological distress was self-reported in the 1958 cohort at ages 23, 33 and 42 years using the Malaise Inventory (Rutter, 1970), which assesses 24 psychological and somatic symptoms (e.g. Do you often feel miserable or depressed? Do you feel tired most of the time?). For purposes of this study, the 15 psychiatric items were used to define adult mental health problems. Scores on the latent trait were classified into three groups as for adolescent emotional problems, and a latent class analysis undertaken to derive summary variables representing adult mental health.

Adult mental health in the 1970 cohort was self-reported at ages 26, 30 and 34 years using the Malaise Inventory (as for the 1958 cohort).

For the purpose of our study, adult emotional problems in the 1946 cohort were based on longitudinal mental health profiles up to age 53 years defined by Colman et al. (2007b) and re-graded into absent, moderate and severe, and on analogous latent classes representing absent, mild, moderate and severe emotional symptoms over all the ages that these were reported in the 1958 and 1970 cohorts. Figures 5 to 7 show odds of increasing severity of adult emotional problems in relation to adolescent conduct and emotional problems, separately for each cohort and for men and women. In all three cohorts, adolescent conduct and emotional problems were associated with increasing severity of emotional problems in adulthood, although the effects were stronger for adolescent emotional problems than for conduct problems. Note that values for emotional problems are much higher in the 1946 cohort than in the other two cohorts. This is because the longitudinal mental health profiles outcomes in the 1946 cohort include adolescent emotional problems as part of their definition. For this reason the odds ratios for adolescent emotional problems are probably over over-inflated; nevertheless, it should be noted that these mental health profiles incorporate three adult measures of emotional problems, at ages 36, 43 and 53 years, and that the profiles do not include adolescent conduct problems.

With the exception of conduct problems in the 1970 cohort in women associations between adolescent and adult mental health were not accounted for by socio-economic background, childhood cognitive ability, or (where available, childhood hyperactivity).

Figure 5. Odds of increasingly severe adult emotional problems in relation to adolescent mental health problems: 1946 cohort



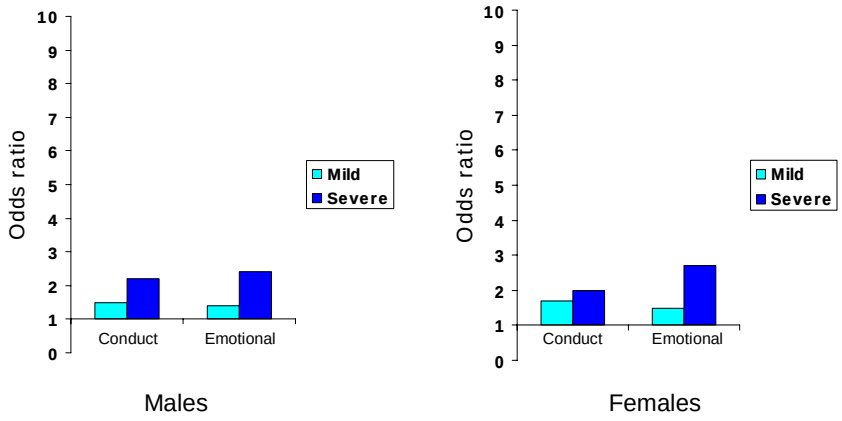
Males

All comparisons statistically significant except for mild conduct problems

Females

All comparisons statistically significant

Figure 6. Odds of increasingly severe adult emotional problems in relation to adolescent mental health problems: 1958 cohort



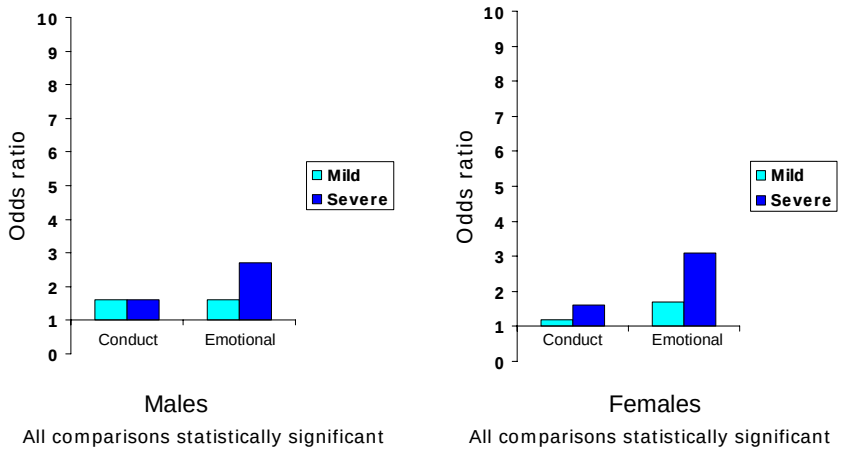
Males

All comparisons statistically significant

Females

All comparisons statistically significant

Figure 7. Odds of increasingly severe adult emotional problems in relation to adolescent mental health problems: 1970 cohort



3.3.2 Alcohol problems

In all cohorts alcohol problems were represented by a score of two or more on the CAGE screen (Ewing, 1984). 'CAGE' is an acronym representing four questions: "Have you ever felt you should **C**ut down on your drinking?", "Have people **A**nnoyed you by criticizing your drinking?", "Have you ever felt bad or **G**uilty about your drinking?", and "Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover (**E**ye opener)?" Outcomes for this study consisted of problems at either 43 or 53 years in the 1946 cohort, at either 33 or 42 years in the 1958, and at either 30 or 34 years in the 1970 cohort.

In all cohorts men with adolescent conduct problems had approximately one and a half times the odds of alcohol problems than those without conduct problems, although in two cohorts this was for mild and not severe problems (data not illustrated). Conduct problems in women were associated with alcohol problems in the 1958 and 1970 cohorts but not in the 1946 cohort. Perhaps surprisingly, associations between adolescent emotional problems and adult alcohol problems were intermittent and inconsistent; women in the 1946 cohort with severe adolescent emotional problems had 80% *lower* odds of alcohol problems, whereas women in the 1958 cohort with severe emotional problems had nearly 50% *higher* odds of alcohol problems. There were no associations between adolescent emotional problems and adult alcohol problems in women in the 1970 cohort, or in men in any of the cohorts.

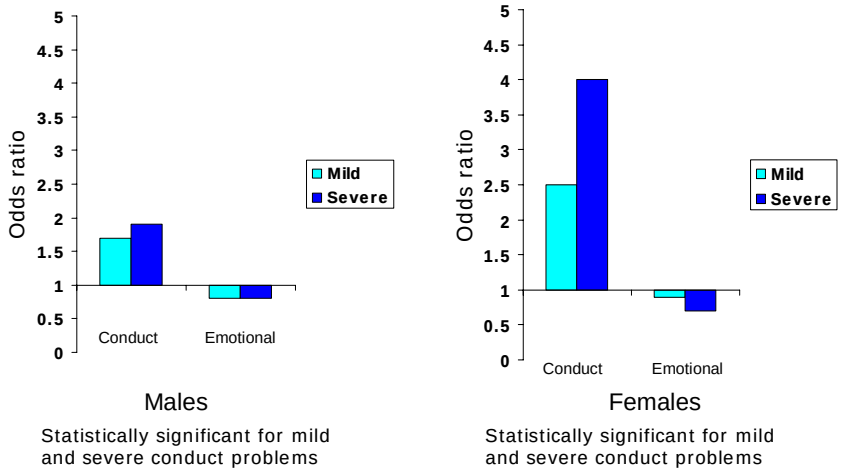
The associations noted above were not accounted for by socio-economic background, or childhood cognitive function or hyperactivity.

3.3.3 Smoking

Smoking is an important behavioural outcome in relation to mental health because it links to mortality risk; Peto et al. (1992) estimated that tobacco causes approximately 30% of all mortality between ages 35-69 years in developed countries, making it the largest single cause of premature death in the industrialised world.

In this study we examined odds of smoking on at least a daily basis in the 1946, 1958 and 1970 cohorts at ages 53, 43 and 34 years, respectively. Since interviews at these ages were relatively closely grouped in terms of calendar years (1999 for the 1946 cohort and 2004 for the 1958 and 1970 cohorts), all respondents were exposed to approximately similar levels of public health information. Thus persistence of smoking at these ages represents risky behaviour in all cohorts. Furthermore, since few people initiate smoking in midlife, smoking at these ages almost certainly represents long-term intake, with particularly serious consequences for the older cohorts.

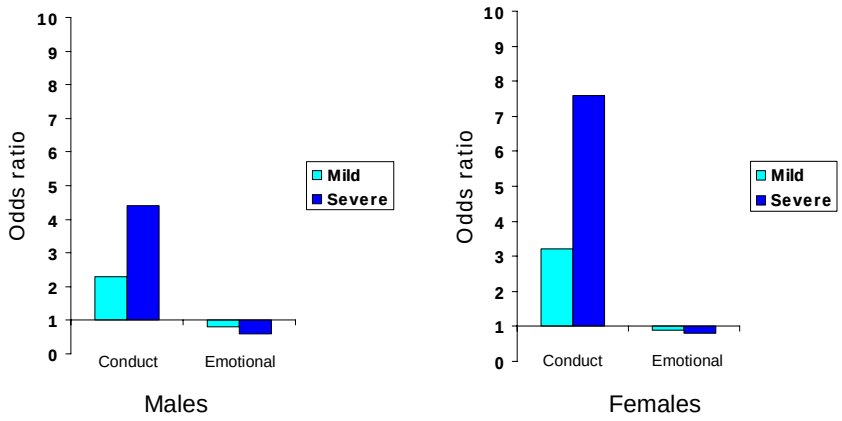
Figure 8. Odds of being a daily smoker at age 53 in relation to adolescent mental health problems: 1946 cohort



Figures 8 to 11 illustrate odds of smoking, as defined above. In all cohorts those with adolescent conduct problems had much higher odds of being a daily smoker than those without these problems, and in all cases the odds are higher for women with conduct problems than for men with these problems. As noted above, this almost certainly represents greater lifetime tobacco consumption in the older cohorts than the younger cohorts, with obvious implications for health and survival.

Adolescent emotional problems were less consistently associated with odds of daily smoking in midlife, although in the 1958 and 1970 these problems were associated with *lower* odds of this outcome. Further work is necessary to determine if this is due to higher odds of cessation or lower odds of initiation.

Figure 9. Odds of being a daily smoker at age 46 in relation to adolescent mental health problems: 1958 cohort

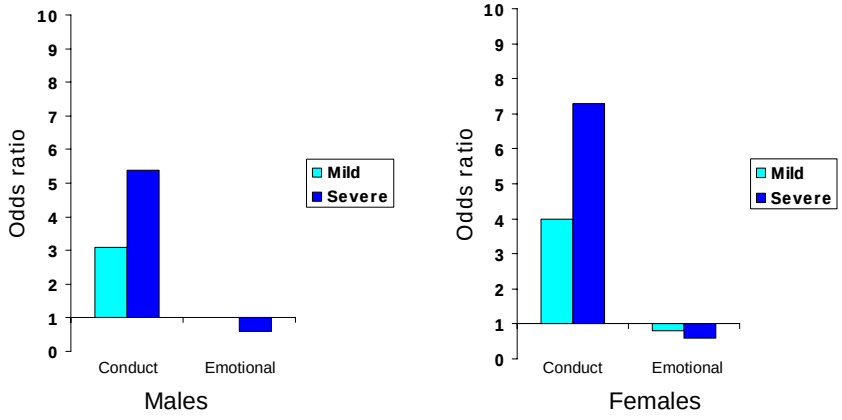


All comparisons statistically significant except for mild emotional problems

Statistically significant for mild and severe conduct problems

In almost no case were associations between adolescent mental health and odds of being a daily smoker accounted for by father's social class, childhood cognition or (where available) childhood hyperactivity. In the worst case women with severe adolescent conduct problems in the 1970 cohort had six times the odds of this outcome compared to women in this cohort without these problems.

Figure 10. Odds of being a daily smoker at age 34 in relation to adolescent mental health problems: 1970 cohort



All comparisons statistically significant except for mild emotional problems

All comparisons statistically significant

Fully adjusted Odds Ratios for adult mental health and related behaviours in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 4, 5, 8, 9, 12 & 13.

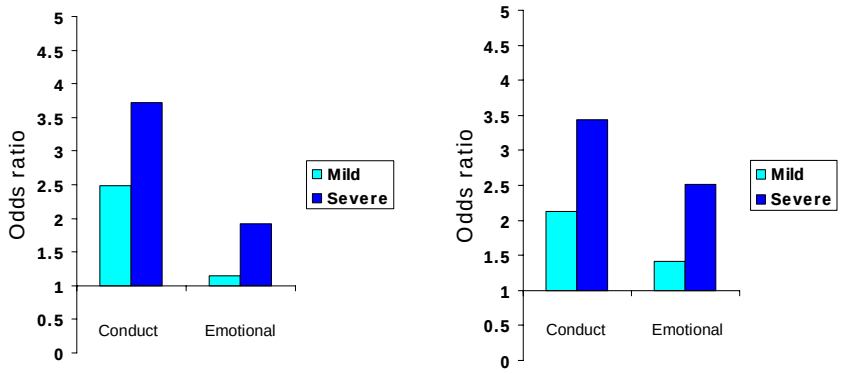
3.4 Education, skills and the labour market

3.4.1 Educational attainment I: having no qualifications

It is scarcely necessary to emphasise the importance of educational achievement for life chances. It is an important determinant of occupational status and income (O'Rand, 2001; Mirowsky & Ross, 2003), and well as subsequent health and health behaviours (Mirowsky & Ross, 2003), including mental health (Dohrenwend et al., 1992).

Figures 11 to 13 show the odds of having no educational qualifications in early adulthood for men and women with childhood conduct and emotional problems compared to those with neither kind of problem.

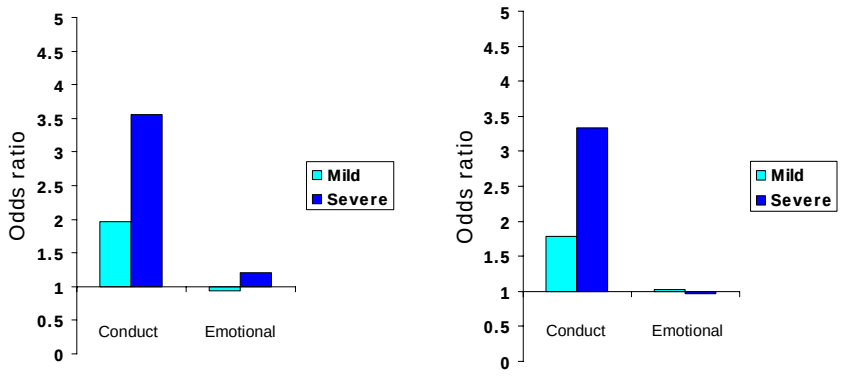
Figure 11. Odds of no educational qualifications in relation to adolescent mental health problems: 1946 cohort



It can clearly be seen that conduct problems are associated with an elevation in risk of having no educational qualifications in all three cohorts, with higher risk in those with severe conduct problems. This risk was still evident after taking additional account of early family circumstances, as represented by occupational social class of the father, and cognitive function in childhood. Following these adjustments those with conduct problems had approximately twice the risk of not achieving qualifications as those without these problems; in the 1958 and 1970 cohorts this was still the case after further adjustment for childhood hyperactivity (not available in the 1946 cohort).

There were no associations between adolescent emotional problems and risk of achieving no educational qualifications, with the exception of severe emotional problems in men and women in the 1946 cohort.

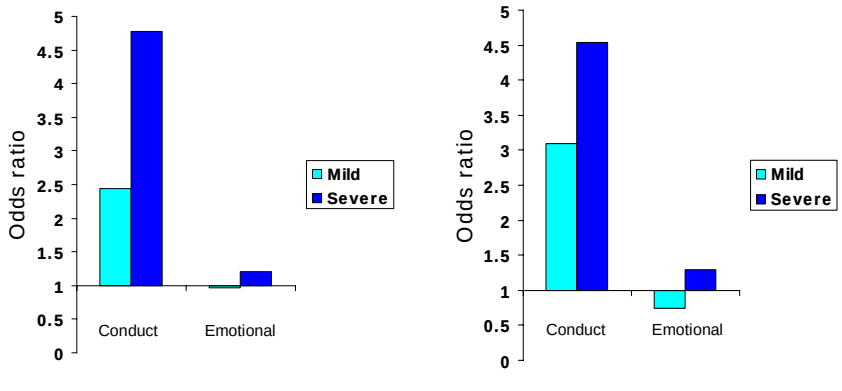
Figure 12. Odds of no educational qualifications in relation to adolescent mental health problems: 1958 cohort



Comparisons statistically significant for mild and severe conduct problems

Comparisons statistically significant for mild and severe conduct problems

Figure 13. Odds of no educational qualifications in relation to adolescent mental health problems: 1970 cohort



Comparisons statistically significant for mild and severe conduct problems

Comparison statistically significant for mild and severe conduct problems

3.4.2 Educational attainment II: obtaining advanced qualifications

Analyses were repeated for advanced qualifications. For all cohorts odds of obtaining advanced qualifications were strongly and significantly lower in those with adolescent conduct problems compared to those with no conduct problems (data not illustrated). These effects were partly accounted for by father's social class, childhood cognition and childhood hyperactivity, although they remained statistically significant at conventional levels. After allowance for these factors those in each cohort with mild conduct problems had approximately one half the odds of obtaining advanced qualifications as those without conduct problems, and in all cases the odds were worse

for severe problems; in the worst case men in the 1946 and 1970 cohorts had an 80% lower chance of attaining advanced qualifications than those without conduct problems.

For adolescent emotional problems the picture was broadly similar to that for conduct problems, if much less pronounced, although women who had had these problems (in the 1946 and 1970 cohorts in particular) still had strikingly lower odds of achieving advanced qualifications.

Fully adjusted ORs for educational attainment in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 2, 3, 6, 7, 10 and 11.

3.4.3 Everyday skills (1958 cohort only)

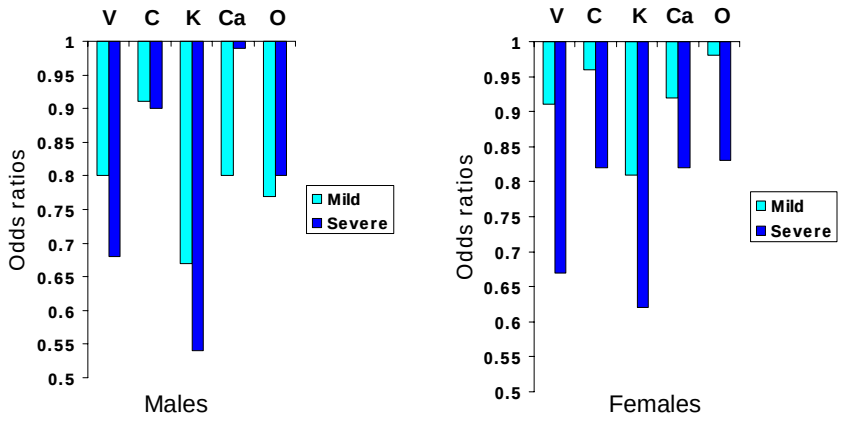
At age 33 years members of the 1958 cohort were asked a series of questions about their levels of everyday workplace skills. From their answers five skill variables were constructed: Verbal, Construction, Keyboard, Caring, and Organisational. Figure 14 shows the reduced odds of men and women with adolescent conduct problems self-reporting these skills as adequate, in relation to those without conduct problems.

Effects appear to be particularly strong for verbal and keyboard skills, but are entirely explained by cognition; that is, when analyses were adjusted for cognition differences were no longer statistically significant at conventional levels. Perhaps surprisingly there were few significant associations between adolescent conduct problems and caring skills.

There were few significant associations between adolescent emotional problems and everyday skills, although men with severe problems had significantly poorer constructional skills, and women with severe problems had significantly poorer organisational skills. The latter effect was not accounted for by father's social class, childhood cognition or hyperactivity.

Figure 14. Odds of adequate skills in relation to adolescent conduct problems (1958 cohort only)

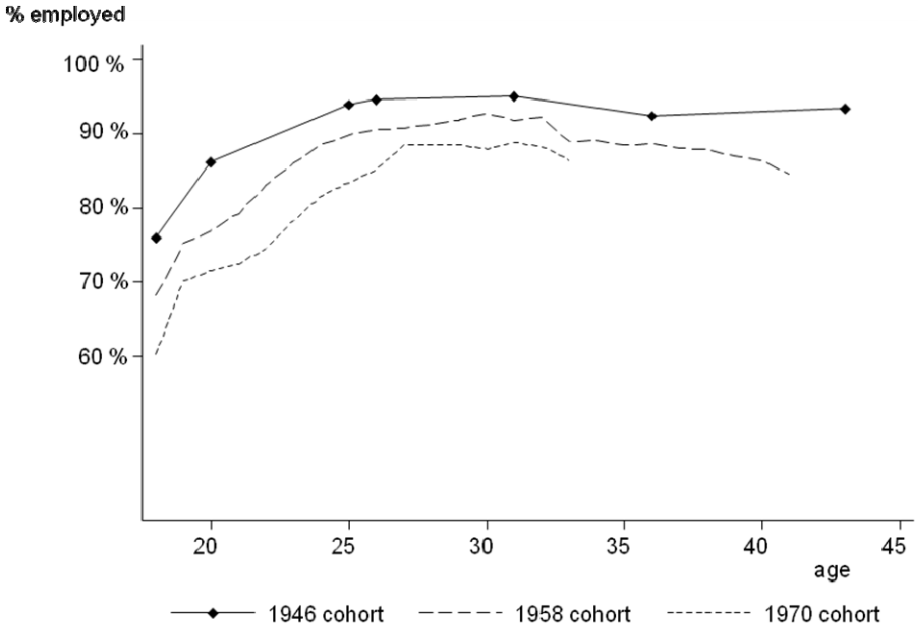
V = verbal, C = construction, K = keyboard, Ca = caring, O = organisation



Members of the 1958 cohort were also asked if they wished to improve their reading, writing and numeracy and mathematics skills. Adolescent conduct and emotional problems were significantly associated with overall wish for improvement in these skills in men and women (data not shown); although with the exception of severe emotional problems these associations were largely accounted for by childhood cognitive ability.

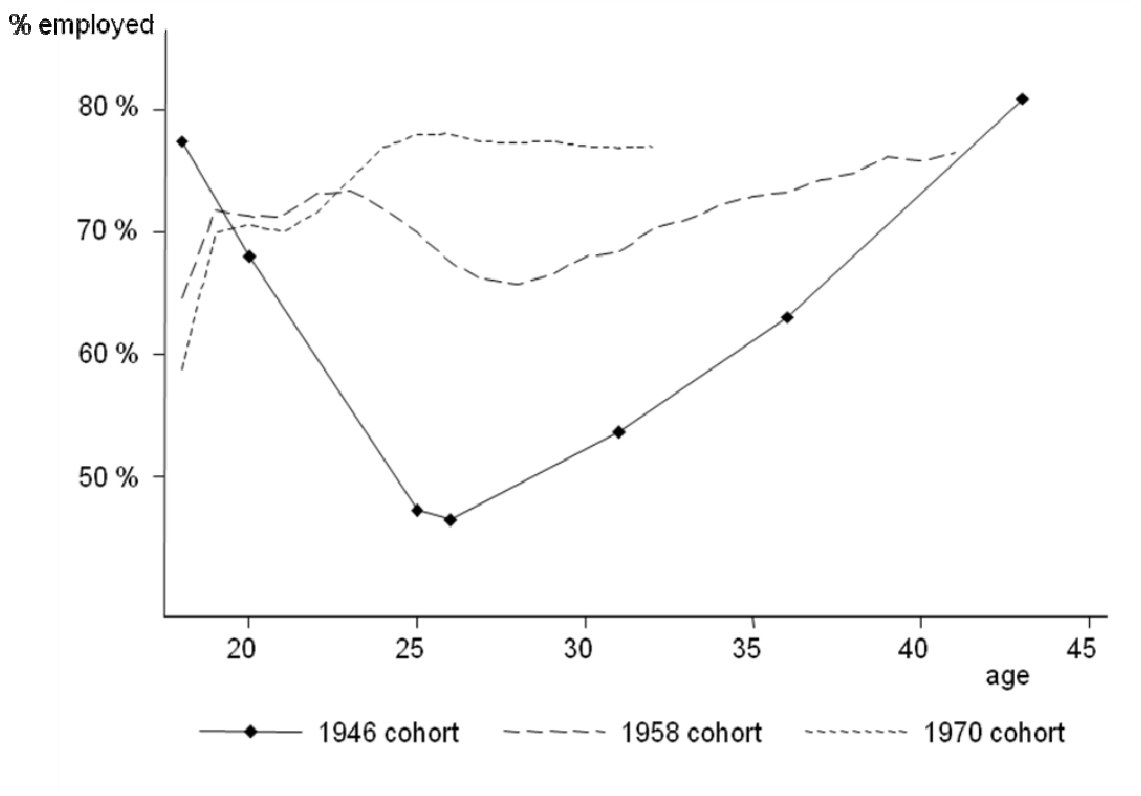
3.4.4 Economic inactivity

Figure 15: Changes in men's employment participation



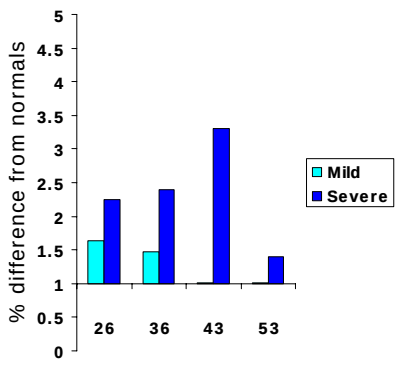
Figures 15 and 16, constructed by Jenny Neuberger (doctoral student, University of London Institute of Education) and reproduced with kind permission of the author, show employment trends in the three cohorts for men and women. It can be seen that trends over time for men are broadly similar in all three cohorts, with progressively lower odds of employment from the 1946 to the 1970 cohorts. For women the trend for the 1946 cohort stands out as dipping in the middle of the age 20 decade, then climbing again, catching up with women in the 1958 cohort by midlife. This dip, almost certainly associated with motherhood, is somewhat echoed in the 1958 cohort but is not evident in the 1970 cohort.

Figure 16: Changes in women's employment participation



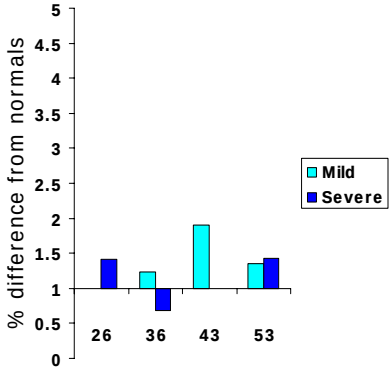
Colman et al. (2009) reported that the odds for those in the 1946 cohort with evidence of conduct problems in adolescence being unemployed at least once at ages 36, 43 or 53 years were no greater than those without these problems. Yet for those who were employed in midlife, conduct problems were associated with around double the odds of this being in a manual occupation. Figures 17 and 18 show odds of being out of the labour force at ages 26, 36, 43, and 53 years in this cohort, for those with emotional as well as conduct problems.

Figure 17. Odds of being out of the labour force in relation to adolescent conduct problems: 1946 cohort



Males

Statistically significant for mild and severe conduct problems except at age 53 years

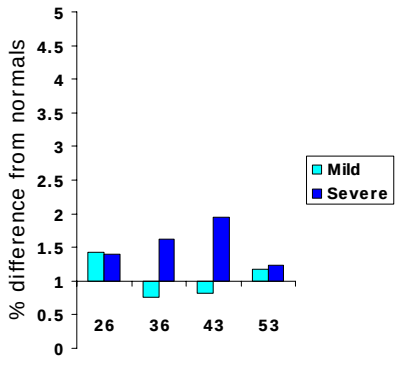


Females

Statistically significant for mild conduct problems at age 43 years

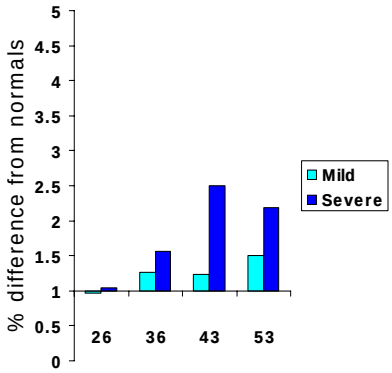
It can be seen that severe adolescent conduct problems in men were strongly associated with risk of economic inactivity at all ages except 53 years, whereas this is more the case for severe adolescent emotional problems in women. For both sets of comparisons these effects were mostly unexplained by father's social class, childhood cognition, and were also not explained by educational attainment. For example, after allowing for these factors men who had been rated with severe adolescent conduct problems still had over double the odds of being inactive at ages 26 and 43 years, and this was also the case on average for women from ages 36 to 53 years who had been rated with severe adolescent emotional problems.

Figure 18. Odds of being out of the labour force in relation to adolescent emotional problems: 1946 cohort



Males

No comparisons statistically significant



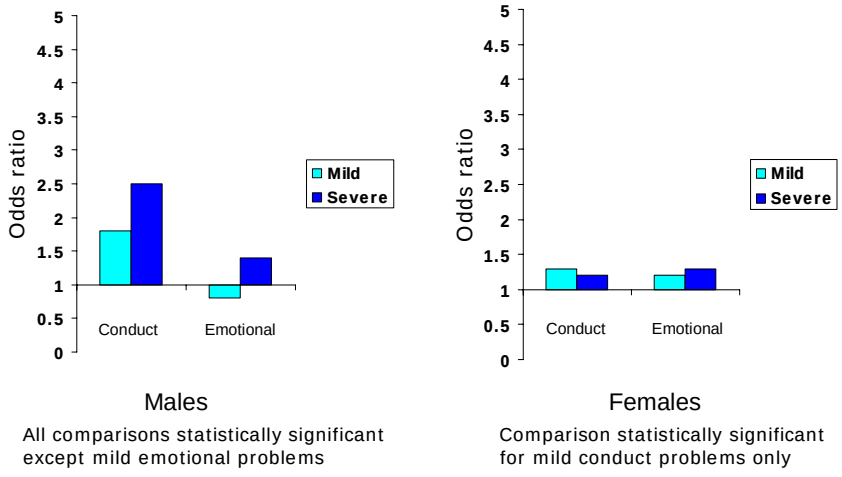
Females

Statistically significant for mild emotional problems at 36 and 53 years, and severe problems at all ages except 26 years

We then revisited this in the 1958 and 1970 cohorts by examining the odds of being among the 10% of the sample with the worst chronic economic inactivity (defined in terms of unemployment, permanent or temporary sick leave, or disability) between ages 16 and 33, and 34 and 46 years for the 1958 cohort, and between ages 16 and 34 years for the 1970 cohort. Those who were looking after the home or in the education system were not classified as economically inactive by this definition. For those who were employed we then examined if their occupation was predominantly manual, then we examined earnings in all three cohorts.

Figures 19 to 21 illustrate the findings. In both cohorts, mild and severe adolescent conduct problems were associated with significantly elevated odds of chronic economic inactivity in comparison to those without these problems. For men in the 1958 cohort and for men and women in the 1970 cohort these odds were at least one and a half times greater in those with mild conduct problems, and at least double in those with severe problems. The only exception to this trend was for inactivity between ages 16 and 34 years in women in the 1958 cohort, where the effects were weaker. Allowing for this exception, few of the effects were explained by socio-economic background or childhood IQ. Nor were they attributable to poor educational attainment, since most residual associations still persisted even after additional adjustment was made for this.

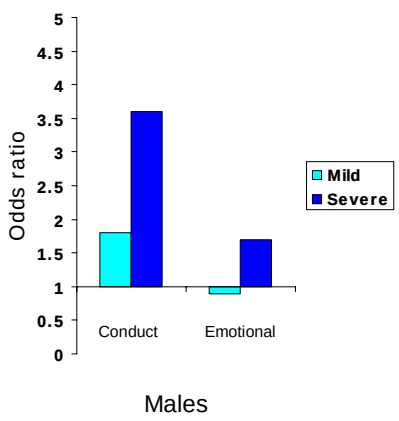
Figure 19. Odds of chronic economic inactivity ages 16-33 in relation to adolescent mental health problems: 1958 cohort



All comparisons statistically significant except mild emotional problems

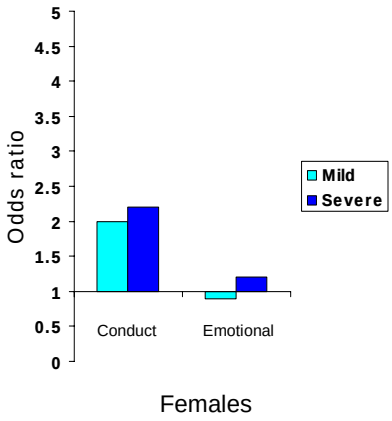
Comparison statistically significant for mild conduct problems only

Figure 20. Odds of chronic economic inactivity ages 34-46 in relation to adolescent mental health problems: 1958 cohort



Males

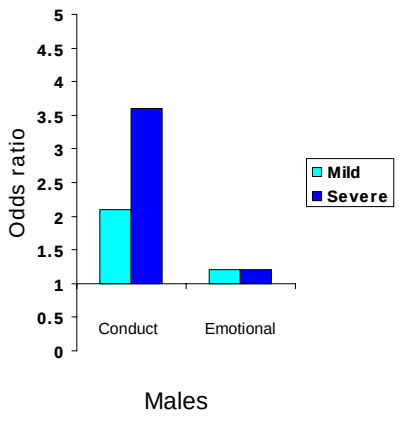
All comparisons statistically significant except mild emotional problems



Females

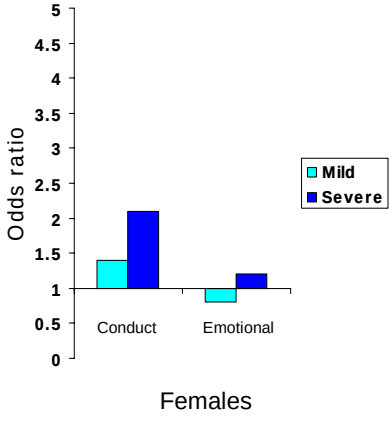
Comparison statistically significant for mild and severe conduct problems

Figure 21. Odds of chronic economic inactivity ages 16-34 in relation to adolescent mental health problems: 1970 cohort



Males

Comparisons statistically significant for mild and severe conduct problems



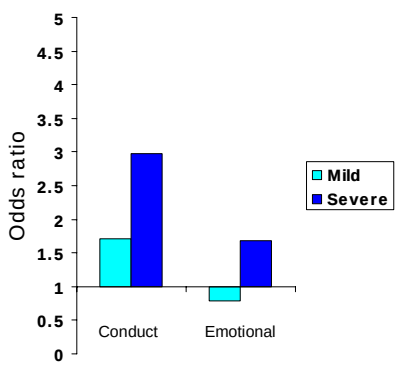
Females

Comparison statistically significant for mild and severe conduct problems

3.4.5 Permanent or temporary sickness and disability (1958 and 1970 cohorts)

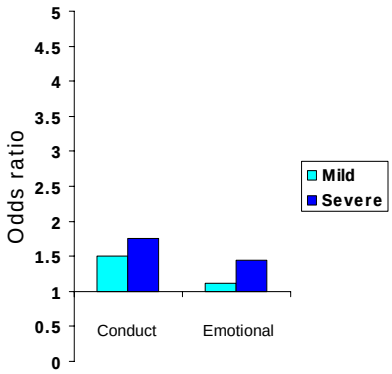
Figures 22 to 24 show odds of cohort members being classified as permanently or temporarily sick or disabled in relation to adolescent conduct and emotional problems. This was observed between ages 16 to 33 years, and between ages 34 to 46 years in the 1958 cohort, and between ages 16 to 34 years in the 1970 cohort.

Figure 22. Odds of permanent or temporary sickness, or disability age 16-33 in relation to adolescent mental health problems: 1958 cohort



Males

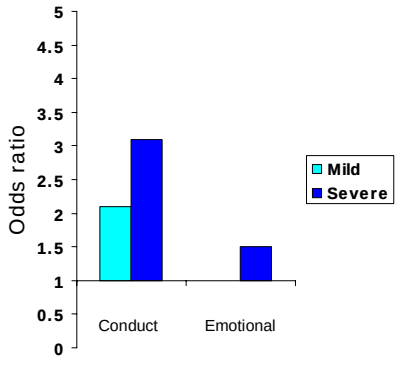
All comparisons statistically significant except for mild emotional



Females

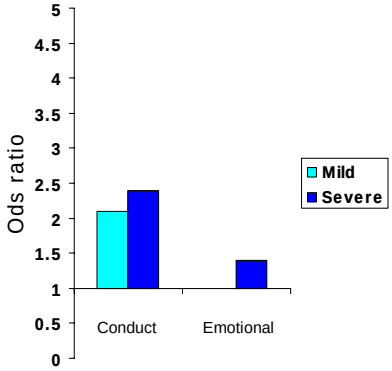
No comparison statistically significant

Figure 23. Odds of permanent or temporary sickness, or disability age 34-46 in relation to adolescent mental health problems: 1958 cohort



Males

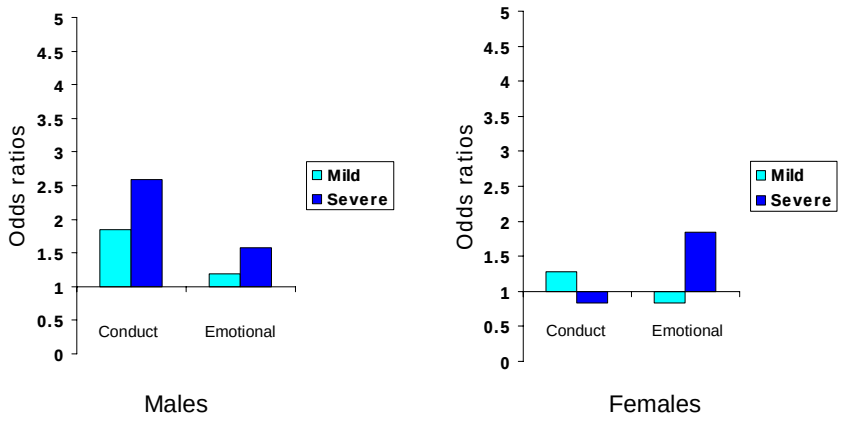
All comparisons statistically significant except for mild emotional



Females

Statistically significant for mild and severe conduct problems

Figure 24. Odds of permanent or temporary sickness, or disability age 16-34 years in relation to adolescent mental health problems: 1970 cohort



Males

All comparisons statistically significant except for mild emotional

Females

No comparison statistically significant except for severe emotional

These figures suggest stronger effects of adolescent conduct problems than of emotional problems on the odds of sickness absence or disability, and stronger effects in men than women. While odds of this outcome were similar in the 1958 cohort between ages 16 and 33 years and between 34 and 43 years in men, adolescent conduct problems in women showed stronger effects in the later period than in the earlier period. These effects were mostly not accounted for by father's social class, childhood cognition or childhood hyperactivity, although they did explain the effects of mild conduct problems in men in the 1970 cohort on this outcome. As can be seen in the graphs, severe adolescent emotional problems were associated with this outcome in all cohorts. These effects only persisted in men in the 1958 cohort between ages 34 and 46 years, and in women in the 1970 cohort after adjusting for father's social class, childhood cognition and childhood hyperactivity. Additional allowance for possible effects of educational attainment made little difference to all effects reported in this section, although the effect of severe adolescent conduct problems in men were no longer statistically significant after this adjustment.

Ongoing work on predictors of Incapacity Benefit receipt (including childhood mental health) in the UK birth cohorts is being conducted by Dr Max Henderson at the Institute of Psychiatry, King's College London.

3.4.6 Those in employment

Occupational social class

Reflecting the findings of Colman et al. (2009) for the 1946 cohort, those in the 1958 and 1970 cohorts in employment with mild adolescent conduct problems had approximately double the odds of being predominantly in a manual occupation (data not shown). For those with severe adolescent conduct problems, the odds were three times greater in the 1958 cohort, and around two and a half times greater in the 1970 cohort. There were no differences between men and

women in these respects, and these effects were not accounted for by socio-economic background, childhood IQ or poor educational attainment.

Earnings

The following analyses are based on self-reported gross hourly earnings and relate to cohort members in employment. These data are reported with kind permission of Jenny Neuberger, who adjusted them for inflation (to 2000 prices) for comparability across the cohorts and. Above-inflation aggregate earnings growth, age or promotion-related increments were not removed by this adjustment. Figures 25 to 30 represent percent difference in earnings in men and women with mild and severe adolescent conduct problems compared to those who did not show evidence of these problems, in all three cohorts. It can be seen that, without exception, conduct problems were associated with relatively lower earnings, across all time points, although not every effect was statistically significant, as noted in each graph.

In the 1946 cohort it appears that men with adolescent conduct problems had increasing lower earnings over time with respect to men without conduct problems. This phenomenon is more pronounced for mild compared to severe problems, although this is an anomalous finding when compared to the other cohorts, and to women in the same cohort. For women themselves, lower earnings in those with mild conduct problems appear to have recovered to some extent over time, and effects for this group were not statistically different in midlife from those without problems; however this is not the case in women with severe conduct problems.

Father's occupational social class, childhood cognition and educational attainment substantially accounted for these effects; after adjusting for these variables the relatively lower earnings in those with conduct problems were no longer statistically significant, with the exception of those in women at age 36 years with severe adolescent problems, still nearly 17% lower than those without problems.

Figure 25. Percent differences in gross hourly earnings in relation to adolescent conduct problems: 1946 cohort

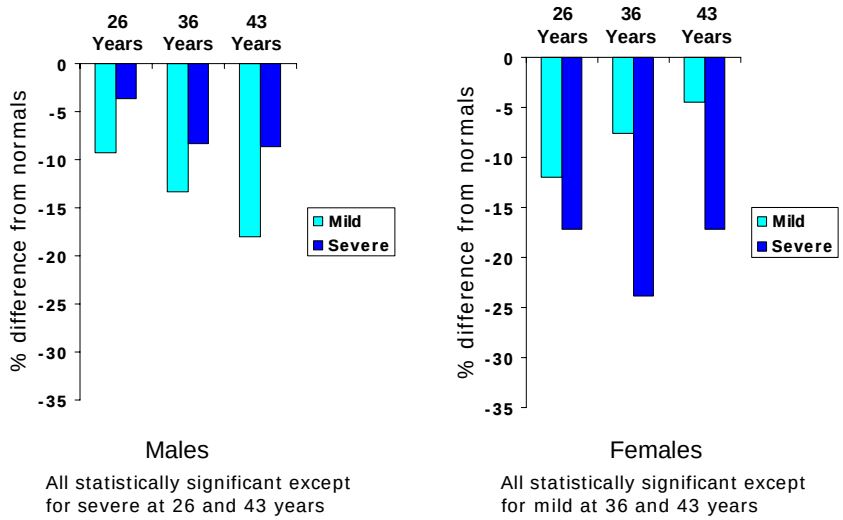
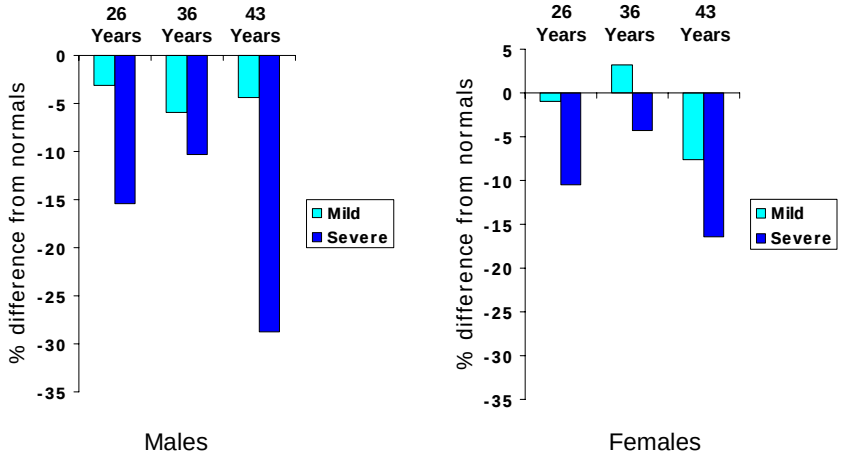


Figure 26. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1946 cohort



Males

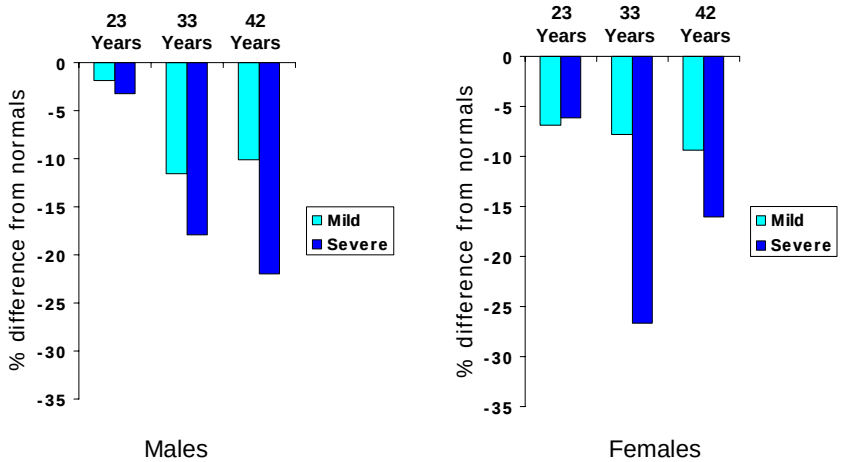
All statistically significant except for mild at 26 and 43 years

Females

Statistically significant for severe at 26 and 43 years

Emotional problems were also associated with relatively lower earnings in the 1946 cohort, especially in men, and these effects were less likely to be accounted for by father's occupational social class, childhood cognition and educational attainment. For example, after these adjustments men who had been rated with severe adolescent emotional problems were still earning more than 16% less at age 43 years than men without adolescent emotional problems.

Figure 27. Percent differences in gross hourly earnings in relation to adolescent conduct problems: 1958 cohort



Males

All statistically significant except for age 23 years

Females

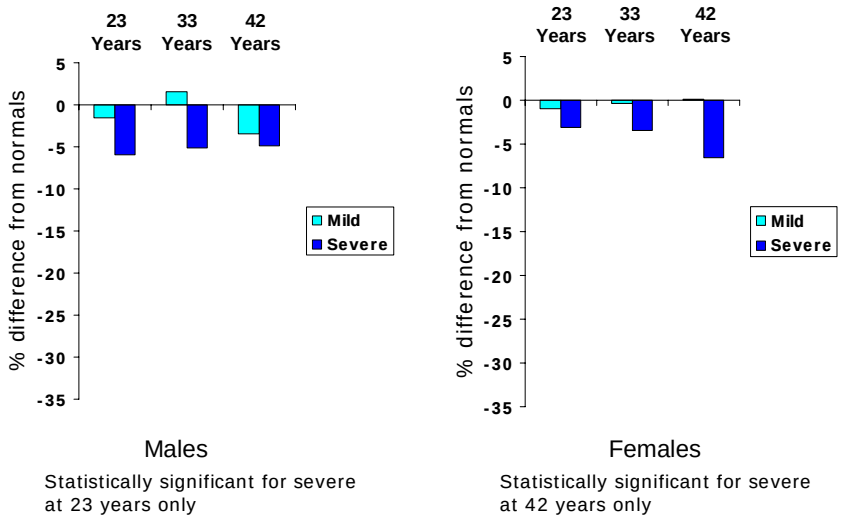
All statistically significant except for severe at age 23 years

In the 1958 cohort men and women with severe adolescent conduct problems had lower earnings than those without these problems. These effects were greatest for men at age 42 years, and for women at 33 years. These effects were again strongly accounted for by father's social class, childhood cognition, childhood hyperactivity, with the exception of men women at 33 years with severe adolescent conduct problems (echoing findings for the 1946 cohort), although further

adjustment for educational attainment reduced this latter effect to non-significance in men. After all of these adjustments women at this age with severe adolescent conduct problems were still earning approximately eight percent lower than those without adolescent conduct problems.

The effects of adolescent emotional problems on earnings in the 1958 cohort were of much smaller magnitude to those in the 1946 cohort. After allowing for father's social class, childhood cognition, childhood hyperactivity, and educational attainment men who had been rated with severe problems were still earning approximately 5% less at age 23 years than men without emotional problems; however, this was an exceptional finding.

Figure 28. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1958 cohort



The effects of conduct problems on earnings in the 1970 cohort are similar to those of the 1958 cohort, although if anything more pronounced. In the worst case men with severe adolescent conduct problems were on average earning 30% less than men without conduct problems at age 34 years; this figure was still nearly 19% after adjusting for father's social class, childhood cognition, childhood hyperactivity, and educational attainment. As with the 1958 cohort earnings were lower in those with severe compared to mild problems, and for men there was an apparent worsening problem over time. Adjusting for the other variables explained some of the impact of conduct problems on earnings, although for some comparisons this remained robust to these adjustments, above all in men and women in midlife who had had severe problems. The residual effect of conduct problems in women at age 30 years (16% lower than women without problems) was in fact similar in magnitude to that in men noted above.

Again, the effects of adolescent emotional problems on earnings were of relatively small magnitude compared to conduct problems, although they were stronger in women than men; after allowing for father's social class, childhood cognition, childhood hyperactivity and educational attainment, women in this cohort with severe adolescent emotional problems were earning over 7% less than women without emotional problems.

Figure 29. Percent differences in gross hourly earnings in relation to adolescent conduct problems: 1970 cohort

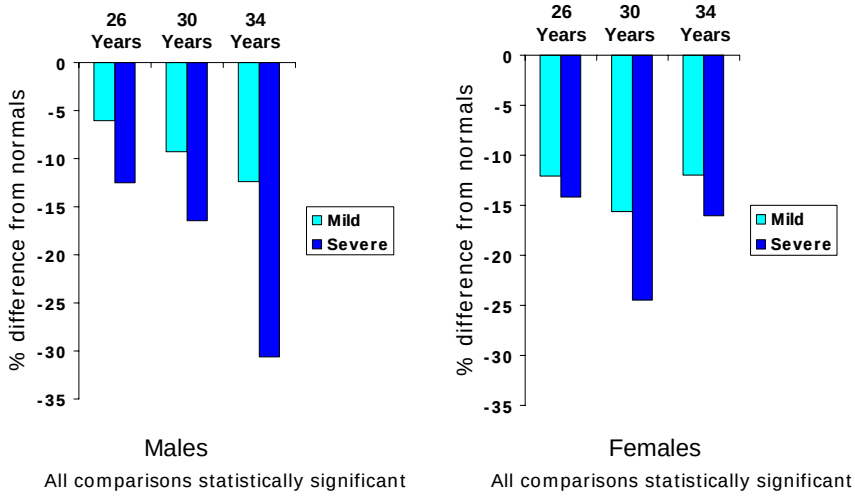
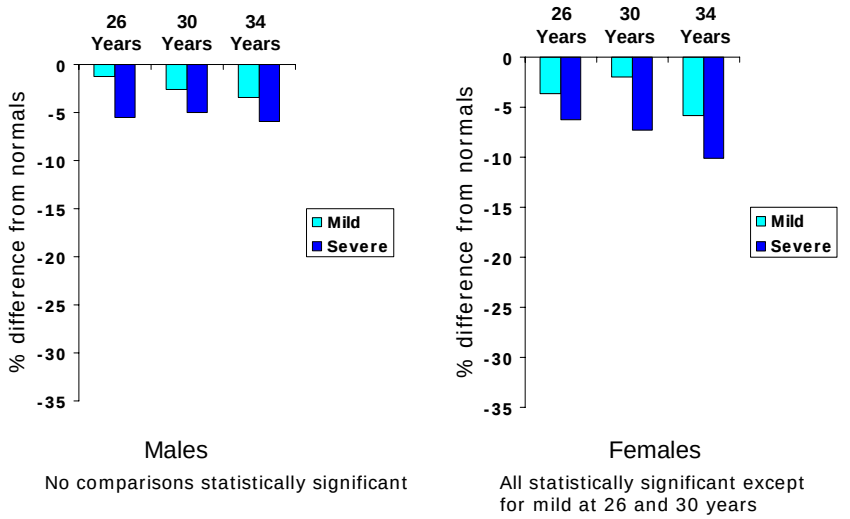


Figure 30. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1970 cohort



In addition to these objective measures of financial return in relation to adolescent mental health, participants in all cohorts were asked about experience of financial problems; such experience has a large impact on anxiety and depression (Hatch et al., 2007). Outcomes were repeated financial problems at ages 36, 43 and 53 years in the 1946 cohort, age 42 years in the 1958 cohort, and ages 30 and 34 years in the 1970 cohort. In all cohorts conduct adolescent problems – particularly severe problems - were associated with a significant elevation in odds of reporting financial difficulties (data not illustrated). These effects were not explained by father's social class, childhood cognition, or childhood hyperactivity (where available). In contrast, associations between adolescent emotional problems and experience of financial difficulties were less pronounced, although severe adolescent emotional problems in women in the 1970 cohort were

associated with a 30% increase in odds of this outcome even after allowing for father's social class, childhood cognition and childhood hyperactivity.

Fully adjusted Odds Ratios for labour market outcomes in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 2, 3, 6, 7, 10 and 11.

3.4.7 Summary of educational and labour market outcomes in relation to adolescent mental health problems

It is clear that adolescent conduct problems are associated with high risk of poor educational attainment. This is the case in men and women; is more pronounced for severe than for mild conduct problems; is not accounted for by early social circumstances (to the extent that this is represented by occupational social class of the father), childhood cognition, or (where available in the 1958 and 1970 cohorts) childhood hyperactivity; and appears to be a trend that is worsening over time, with strong implications for poor employment prospects and risk of social exclusion (Bynner & Parsons, 2001). On the whole adolescent emotional problems had less of an impact on education than conduct problems in these cohorts.

For labour market outcomes the picture is more complicated. In general conduct problems were again more strongly associated with poor outcomes than emotional problems, but the latter played a greater role than they did in educational attainment, particularly for risk of economic inactivity and lower earnings, although less so for risk of sickness absence. Adjustment for father's social class, childhood cognition, childhood hyperactivity (where available) and educational attainment had very different effects in these three sets of outcomes. By and large they did not account for the effects of adolescent mental health problems on economic inactivity, and only partially did so for sickness absence, but with rare exception strongly explained the effects of mental health problems on earnings; for the most part these variables all contributed in this way, with the clear exception of childhood hyperactivity, which had virtually no association with earnings.

3.5 Social roles: binding and belonging

While this project has so far concentrated on life chances in terms of educational achievement and labour market attachment, it is also important to address the consequences of adolescent mental health problems for social attachments and citizenship; these have equally strong implications for demands on the state as well as for general social cohesion.

3.5.1 Marriage and children: binding

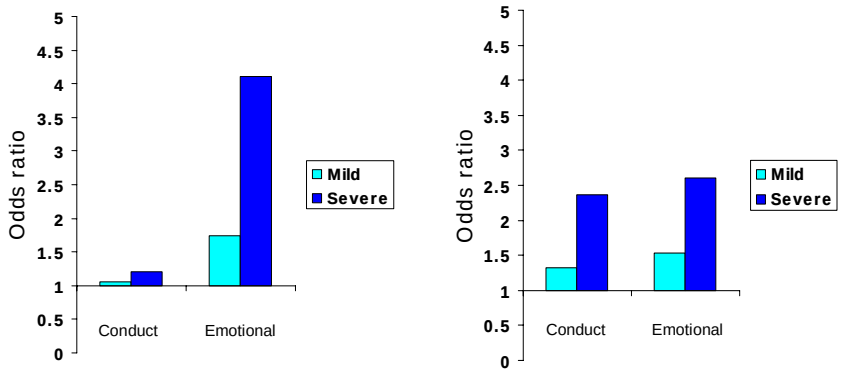
Marital status

Figures 31 to 33 show odds of never marrying (by ages 53, 42 and 34 years in the 1946, 1958 and 1970 cohorts, respectively) in relation to adolescent conduct and emotional problems. Conduct

problems were associated with staying single in women in the 1958 and 1970 cohorts. In contrast emotional problems were associated with never marrying in men in all three cohorts, and in women in the 1946 cohort. Even after taking account of father's social class, childhood cognition and (where applicable) childhood hyperactivity men with severe emotional problems in the 1946, 1958 were over twice as likely, and in the 1970 cohort were 40% more likely, to remain single than men in these cohorts without emotional problems.

Figure 31. Odds of never marrying in relation to adolescent mental health problems: 1946 cohort

Graphs represent odds of never marrying by age 53 years



Males

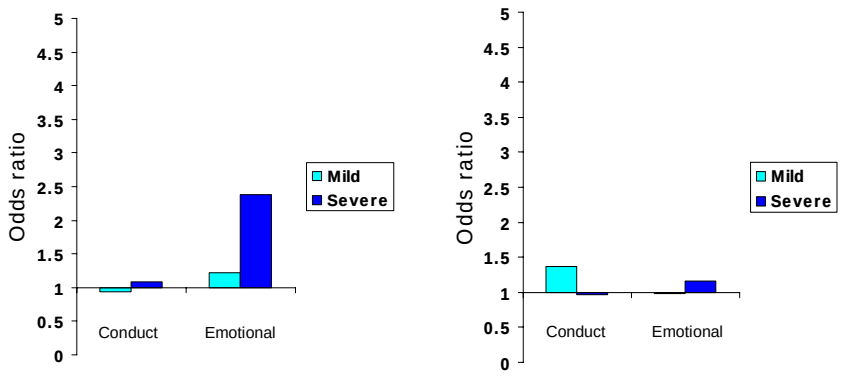
Comparisons statistically significant for mild and severe emotional problems

Females

Statistically significant for severe emotional problems

Figure 32. Odds of never marrying in relation to adolescent mental health problems: 1958 cohort

Graphs represent odds of never marrying by age 46 years



Males

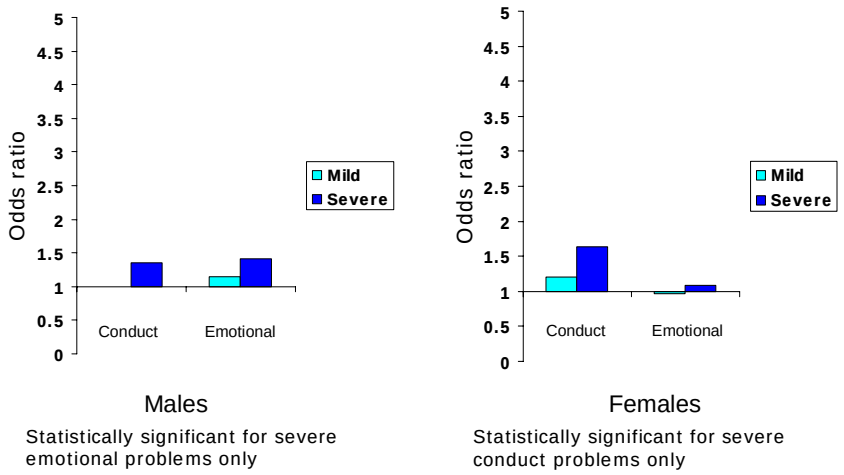
Comparisons statistically significant for mild and severe emotional problems

Females

Statistically significant for mild conduct problems only

Figure 33. Odds of never marrying in relation to adolescent mental health problems: 1970 cohort

Graphs represent odds of never marrying by age 34 years



Males

Statistically significant for severe emotional problems only

Females

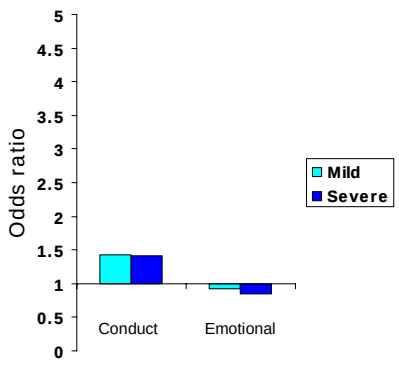
Statistically significant for severe conduct problems only

Figures 34 to 36 show odds of one or more divorce (by ages 53, 42 and 34 years in the 1946, 1958 and 1970 cohorts, respectively) in relation to adolescent conduct and emotional problems, separately for odds of divorce and never marrying compared to those who have had one continuing marriage. There appears to be a steady rise in the odds of divorce in men with conduct problems, even as the window within which this can occur necessarily narrows across the cohorts. With the clear exception of the 1970 cohort odds of one or more divorce in those with conduct problems also appears to be higher in women than men, particularly women with severe conduct problems. Indeed, significant effects for women with conduct problems persisted after allowance for father's social class, childhood cognition and (where applicable) childhood hyperactivity - most clearly in the 1946 cohort, where women with severe conduct problems still had over double the odds of divorcing than women with no conduct problems. Conduct problems were less predictive of divorce in men, although men with severe problems in the 1970 cohort still had nearly 80% higher odds of this outcome than men in this cohort without these problems.

Adolescent emotional problems were almost entirely unrelated to divorce, with the single exception of men in the 1970 cohort with mild problems, who were almost 40% *less* likely to divorce than men in this cohort without emotional problems, even after allowing for father's social class, childhood cognition and childhood hyperactivity. This effect echoes that of emotional problems in relation to never marrying.

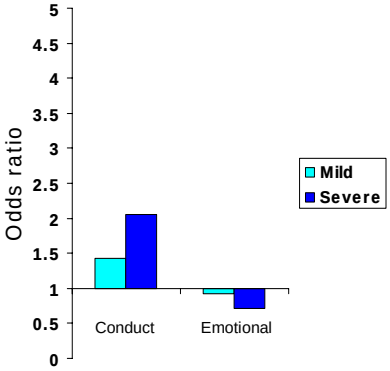
Figure 34. Odds of divorce in relation to adolescent mental health problems: 1946 cohort

Graphs represent odds of divorce by age 53 years



Males

Comparisons statistically significant for mild conduct problems only

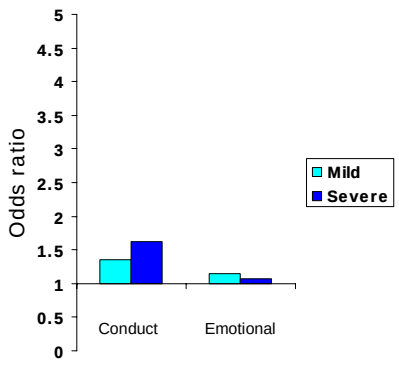


Females

Comparisons statistically significant for mild and severe conduct problems

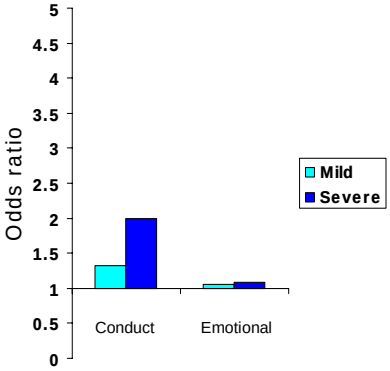
Figure 35. Odds of divorce in relation to adolescent mental health problems: 1958 cohort

Graphs represent odds of divorce by age 46 years



Males

Comparisons statistically significant for mild and severe conduct problems

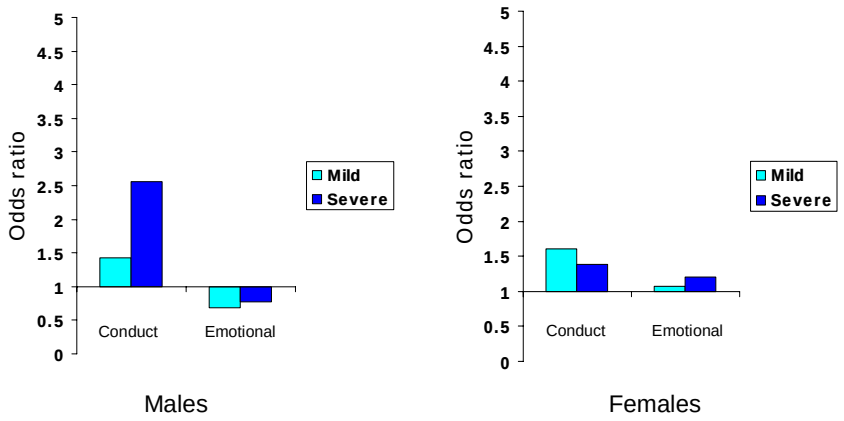


Females

Comparisons statistically significant for mild and severe conduct problems

Figure 36. Odds of divorce in relation to adolescent mental health problems: 1970 cohort

Graphs represent odds of divorce by age 34 years



Males

Comparisons statistically significant for mild and severe conduct problems and for mild emotional problems

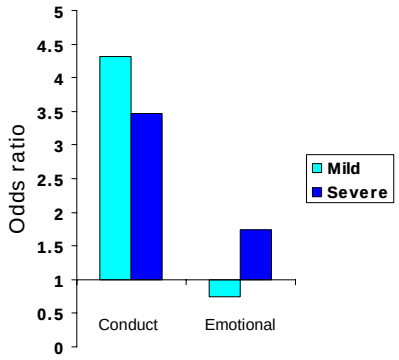
Females

Comparisons statistically significant for mild conduct problems

Teenage parenthood

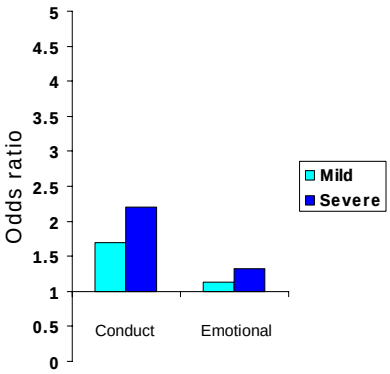
Figures 37 to 39 show odds of becoming a teenage parent in relation to adolescent mental health problems. Results are clear cut; where emotional problems played no significant role in determining age at birth of the first child in any of the cohorts, conduct problems were strongly associated with teenage parenthood, especially in the 1970 cohort, in men in the 1946 cohort, and in women in the 1958 cohort. In all these cases associations remained statistically significant after allowing for father's social class, childhood cognition and (where applicable) childhood hyperactivity; after these adjustments odds of men with even mild conduct problems becoming a teenage parent in the 1946, 1958 and 1970 cohorts were three and a half, one and a half and over double, respectively, those of men without adolescent conduct problems. For women, while these factors largely explained the effect of adolescent conduct problems on teenage parenthood in the 1946 cohort, even mild problems were still associated with around double the risk of teenage motherhood in the 1958 and 1970 cohorts. For severe conduct problems this rose to around threefold.

Figure 37. Odds of teenage parenthood in relation to adolescent mental health problems: 1946 cohort



Males

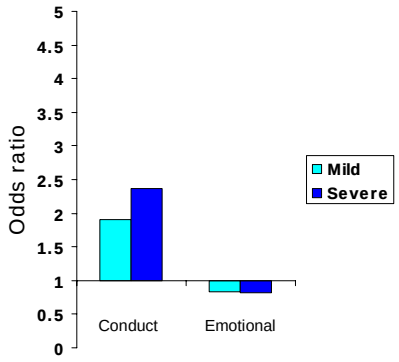
Comparisons statistically significant for mild and severe conduct problems



Females

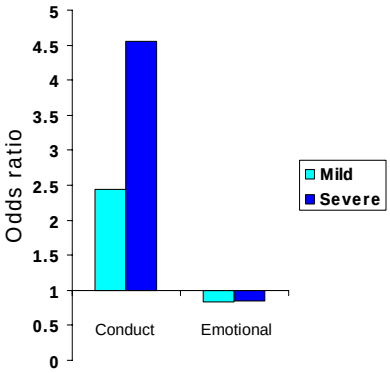
Comparisons statistically significant for mild and severe conduct problems

Figure 38. Odds of teenage parenthood in relation to adolescent mental health problems: 1958 cohort



Males

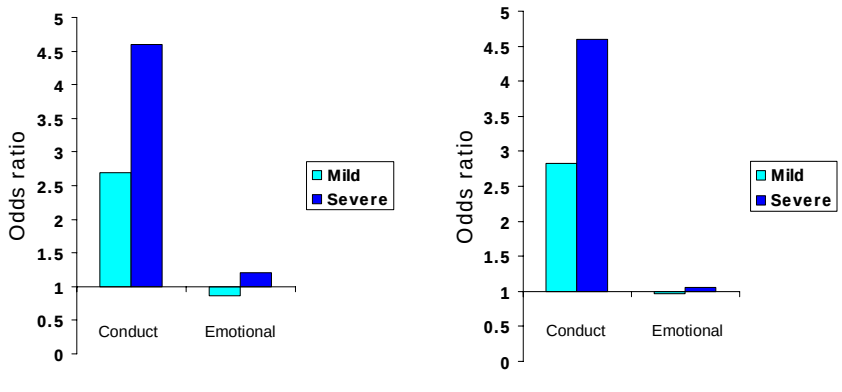
Comparisons statistically significant for mild and severe conduct problems



Females

Comparisons statistically significant for mils and severe conduct problems

Figure 39. Odds of teenage parenthood in relation to adolescent mental health problems: 1970 cohort



Males

Comparisons statistically significant for mild and severe conduct problems

Females

Comparisons statistically significant for mild and severe conduct problems

3.5.2 Social participation: belonging

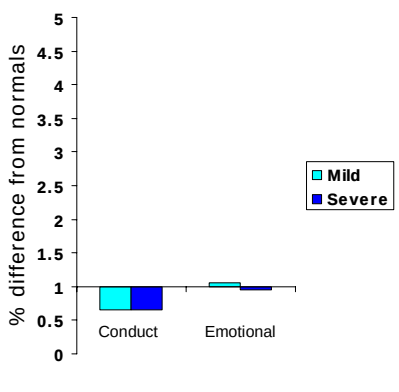
Lin et al. (1999) suggest that community participation or belonging is, along with social networks and intimate ties, one of the factors that promote individual social support. This has not been measured in depth in the UK birth cohorts although various indicators of community participation are available.

Voting

Figures 40 to 42 represent odds of voting in the last UK general election in those with adolescent mental health problems, compared to those without these problems. This refers to 1970 election for the 1946 cohort and the 1997 election for the 1958 and 1970 cohorts, so that the eldest and youngest of these cohorts were of comparable age at the time (24 and 27 years, respectively) whereas the 1958 cohort were, at age 39 years, significantly older. In spite of this age difference, men in the 1946 cohort, and men and women in the other two cohorts, with adolescent conduct problems were significantly less likely to vote than men without conduct problems, to approximately the same degree. These effects were mostly robust to adjustment for father's social class, childhood cognition, and (where applicable) childhood hyperactivity, particularly so in the 1958 and 1970 cohorts.

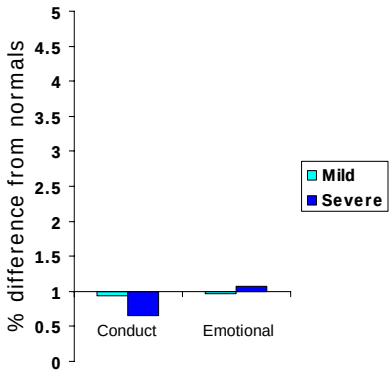
Adolescent emotional problems were not associated with odds of voting in the 1946 and 1958 cohorts, but men in the 1970 cohort with mild and severe problems of this kind were significantly *more* likely to vote than men in this cohort without emotional problems; this effect was also not accounted for by father's social class, childhood cognition, or childhood hyperactivity.

Figure 40. Odds of voting in relation to adolescent mental health problems: 1946 cohort



Males

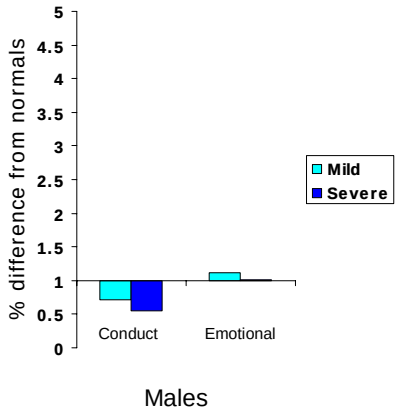
Statistically significant for mild and severe conduct problems



Females

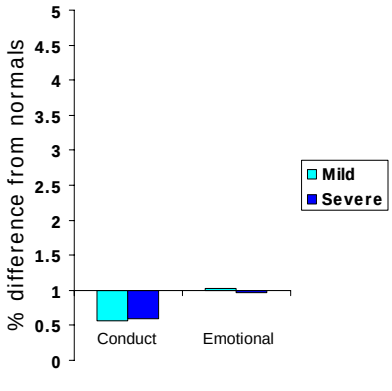
No comparisons statistically significant

Figure 41. Odds of voting in relation to adolescent mental health problems: 1958 cohort



Males

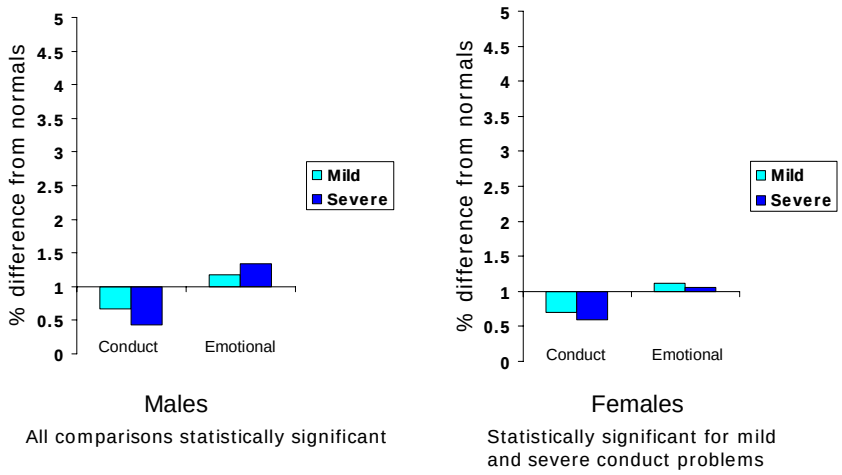
Statistically significant for mild and severe conduct problems



Females

Statistically significant for mild and severe conduct problems

Figure 42. Odds of voting in relation to adolescent mental health problems: 1970 cohort



Trade Union membership (1958 and 1970 cohorts)

Participants in the 1958 and 1970 cohorts were also asked, at age 42 years in for former, and at age 30 years in the latter, whether they had ever belonged to a trade union or staff association. There was some evidence, particularly in the younger cohort, that adolescent conduct problems were associated with low odds of membership (data not illustrated), and in this cohort the odds in women with mild and severe problems of this kind were 30% lower in comparison to women without conduct problems, even after allowing for the effects of for father's social class, childhood cognition, and childhood hyperactivity. Women in this cohort with severe adolescent emotional problems were also 20% less likely to have taken up membership than women without emotional problems after allowing for these factors.

Community participation and social life

At age 34 years members of the 1970 cohort were asked questions about frequency of participation in organisations, clubs and societies (weekly, 2-3 times per month, monthly, less often). Mild conduct problems were associated with lower odds of participation, but on the whole there was little evidence that adolescent mental health problems were associated with community involvement at this more general level in this cohort.

At age 43 years members of the 1946 cohort were also asked questions about social activities, specifically church, playgroup, nursery or school, local government, trade union, voluntary service, sports club, evening class or some form of adult education, or other. Consistent with findings for the 1970 cohort there was little evidence that adolescent conduct or emotional problems were associated with community participation of this kind (data not illustrated). However, each question also distinguished leadership from simple participation by asking if respondents had helped to run any of these activities or organisations; this arguably represents stronger commitment to community involvement than simply belonging or attending. Men in this cohort

with mild adolescent conduct problems and severe adolescent emotional problems had lower odds of showing leadership defined in this way, although both associations were accounted for by father's social class and childhood cognition. There were no significant effects of adolescent mental health problems on this outcome in women in the 1946 cohort.

There was consistent evidence in the 1946 cohort that severe adolescent emotional problems, but not conduct problems at all, were associated with relatively weak social attachment (data not illustrated). Men and women with severe adolescent emotional problems in this cohort had around one and a half times the odds than those without adolescent emotional problems of reporting at ages 43 and 53 years that they were unsatisfied with their social life and had fewer than three social contacts per month. Women with severe adolescent emotional problems also had higher odds than women without adolescent emotional problems of reporting that they had no-one to talk frankly with and share feelings; and thought that they would not, or only occasionally, receive help in the event of a problem or crisis. None of these effects were accounted for by father's social class or childhood cognition.

Fully adjusted Odds Ratios for social outcomes in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 4, 5, 8, 9, 12 & 13.

3.5.4 Summary of social roles in relation to adolescent mental health problems

Consistent with our results for education and the labour market, adolescent conduct problems were associated with outcomes representing relationship difficulties and early parenthood. While these effects tended to be stronger than those for adolescent emotional problems, it should be emphasised that severe emotional problems were also associated with never marrying, with some suggestion of an unsatisfactory social life in general. Further work on outcomes more broadly representing partnership is necessary to determine whether the association with never marrying reflects problems with intimate attachment. In contrast, there was little evidence that adolescent mental health problems were associated with a low level of community participation, although it should be noted that information on this outcome was not obtained in depth in these cohorts.

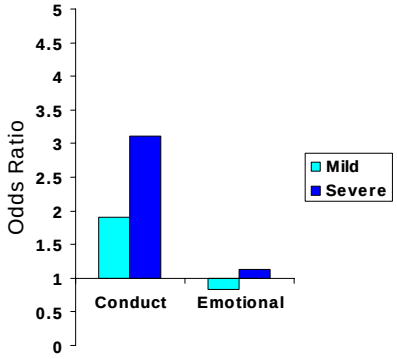
3.6 Offending: contact with the criminal justice system

In the 1958 cohort information on offending patterns was collected by self-report at age 42 years. This information related to offending between ages 33 (the previous wave of data collection) and 42 years. These data therefore relate to offending patterns in mid-adulthood. In contrast, the 1970 cohort represented offending from ages 16 to 33 years, and was self-reported at ages 30 and 34 years. Due to this longer response window the absolute frequency of offending is much higher in the younger cohort, so is not strictly comparable with that of the 1958 cohort. Members of the 1946 cohort were not asked about offending.

Figures 43 to 46 show the odds in both cohorts of at least one arrest, and at least one court conviction. Data were too few for women in the 1958 cohort, and are not shown. An increase in

risk of offending by severity of conduct problems can be observed in both cohorts. For example, men in the 1958 cohort with mild conduct problems had nearly twice the odds of being arrested as those without these problems; for severe conduct problems the odds was over threefold. For women in the 1970 cohort the odds were threefold and fivefold, respectively.

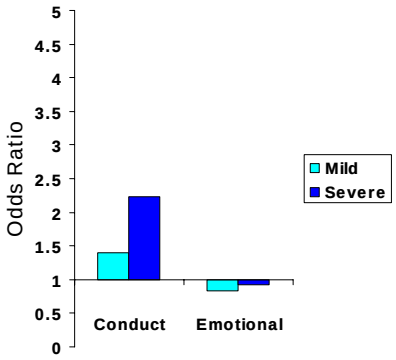
Figure 43. Offending: odds of being arrested in relation to adolescent mental health problems: 1958 cohort (males only)



Statistically significant for mild and severe conduct problems

The relationship between conduct problems and odds of being arrested or convicted could not be accounted for by father's social class, childhood cognition, or childhood hyperactivity; after taking account of these factors men in the 1958 cohort with mild conduct problems had over 50% higher odds of being arrested than those without these problems; for men with severe problems this rose to nearly two and a half times the odds. For women in the 1970 cohorts odds of being arrested in comparison to those without conduct problems were two and a half times and over four times higher, respectively, for those with mild and severe problems.

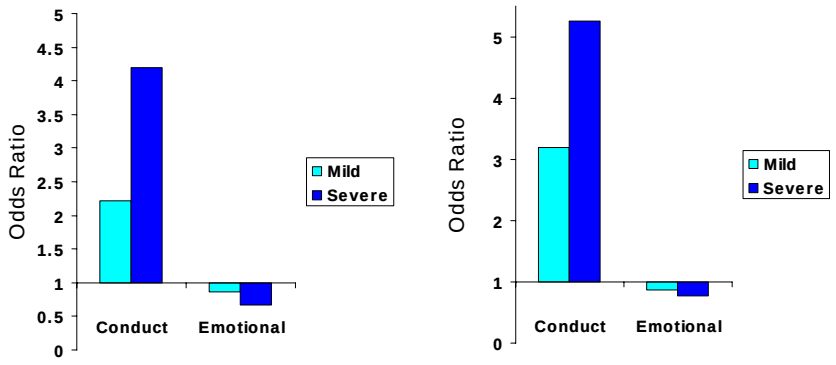
Figure 44. Offending: odds of court conviction in relation to adolescent mental health problems: 1958 cohort (males only)



Statistically significant for mild and severe conduct problems

The picture for offending in relation to adolescent emotional problems is rather different; there is no suggestion that these problems are a risk factor for being arrested or receiving a court conviction. Indeed, severe adolescent emotional problems in men in the 1970 cohort were associated with *lower* odds of arrest and conviction in comparison to absence of emotional problems, even after taking account of father's social class, childhood cognition, and childhood hyperactivity. For men at least, it seems plausible that emotional vulnerability leads to risk aversion, as has been suggested in a different context in the 1946 cohort (Lee et al. 2006).

Figure 45. Offending: odds of being arrested in relation to adolescent mental health problems: 1970 cohort



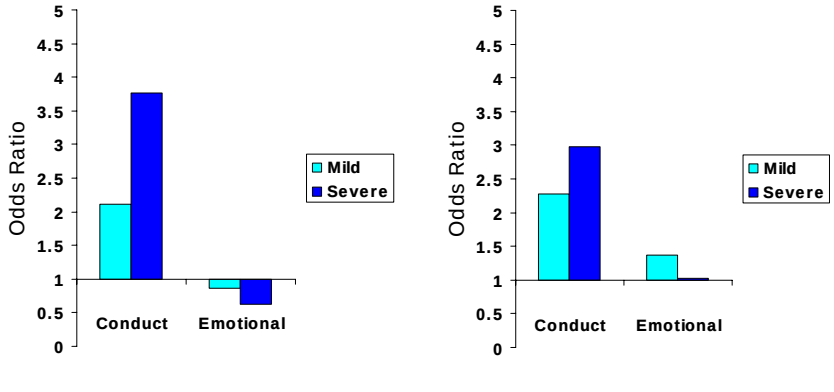
Males

All comparisons statistically significant except for mild emotional problems

Females

Statistically significant for mild and severe conduct problems

Figure 46. Offending: odds of court conviction in relation to adolescent mental health problems: 1970 cohort



Males

All statistically significant except for mild emotional problems

Females

Statistically significant for mild and severe conduct problems

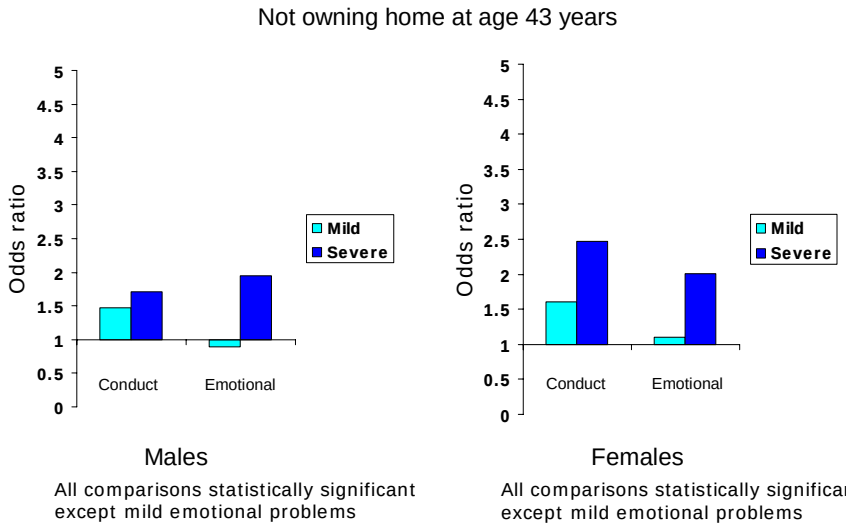
Fully adjusted Odds Ratios for offending in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 4, 5, 8, 9, 12 & 13.

3.7 Miscellaneous outcomes

3.7.1 Housing tenure

Housing tenure was examined in this project because it is a marker of socioeconomic attainment, and because of previous work commissioned by the Smith Institute showing a tendency across the adult UK British birth cohorts for an increasing proportion of those who are resident in social housing to have multiple forms of disadvantage (Feinstein et al., 2008). Figures 26 to 28 show the odds of social housing occupancy or private renting in those with adolescent conduct and emotional problems compared to those without these problems, in all three cohorts.

Figure 47. Odds of social housing or private renting in relation to adolescent mental health problems: 1946 cohort

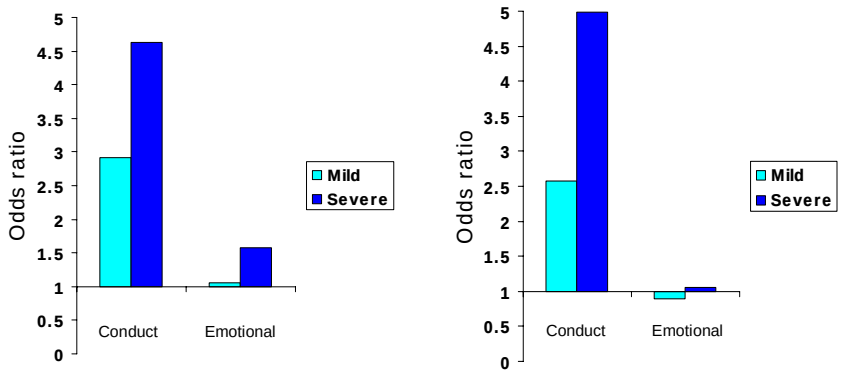


Broadly consistent with the study of Feinstein et al. (2008) there was a striking increase in odds of social housing occupancy or private renting in those with adolescent conduct problems from the 1946 to the 1958 and 1970 cohorts, which was not explained by father's social class, childhood cognition, or childhood hyperactivity. Indeed, men and women in these latter cohorts had two to three times the odds of social housing occupancy or private renting after allowing for these factors. Effects of adolescent emotional problems were less pronounced; they were elevated in men and women with severe emotional problems in the 1946 cohort, to an approximately 50% higher degree after accounting for father's social class and childhood cognition, but not in the 1958 cohort, and in the 1970 cohort were even associated with *reduced* risk of such housing tenure in men with mild adolescent emotional problems.

Fully adjusted Odds Ratios for housing tenure in relation to adolescent conduct and emotional problems, along with their 95% confidence intervals and p values, are shown in the Appendix, Tables 2, 3, 6, 7, 10 & 11.

Figure 48. Odds of social housing or private renting in relation to adolescent mental health problems: 1958 cohort

Social housing or private renting at ages 33, 42 and 46 years



Males

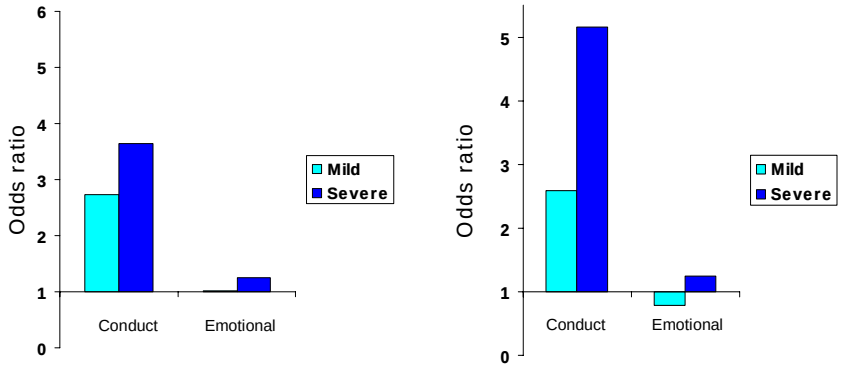
All comparisons statistically significant except mild emotional

Females

Statistically significant for mild and severe conduct problems

Figure 49. Odds of social housing or private renting in relation to adolescent mental health problems: 1970 cohort

Social housing or private renting at ages 30 and 34 years



Males

Statistically significant for mild and severe conduct problems

Females

Statistically significant for mild and severe conduct problems

3.7.2 Self-efficacy

Members of the 1958 and 1970 cohorts were asked three questions about self-efficacy, at ages 46 and 34 years, respectively. These questions were: 1. 'I usually/never really seem to get what I want out of life'; 2. 'I usually have free choice and control over my life/Whatever I do has no real effect on what happens to me'; 3. 'I usually run my life more or less as I want/I find that life problems are just too much for me'.

Adolescent conduct problems were associated with increased odds of responding in the negative to all of these questions, in men and women in both cohorts (data not shown). In most cases the odds were worse in those with severe than with mild problems. These associations were mostly

accounted for by father's social class, childhood cognition and childhood hyperactivity in men, although this was much less the case for women.

Emotional problems were also associated with lower self-efficacy, although to a slightly lesser extent; however, were significant associations were observed these were less likely to be accounted for by father's social class, childhood cognition and childhood hyperactivity than those for conduct problems.

3.8 Consequences of mental health at age 5 years (1970 cohort only)

The 1970 cohort offers an additional opportunity to investigate how far back in life the impact of conduct and emotional problems can be traced, since maternal reports of conduct and emotional problems, also based on the Rutter scales, were first asked when members of this survey were aged five. These ratings were also obtained at age seven years in the 1958 cohort but few items were asked, and the majority of cohort members were rated as positive on at least one of these, indicating relatively normative behaviour. Consequently only the age five information in the 1970 cohort is used here.

Other research has suggested that early-onset conduct problems may have more serious consequences than those emerging in adolescence (Moffit, 1993). However, while we found that the associations between early childhood conduct and emotional problems and later life outcomes showed a similar pattern to those for adolescent problems, the effects were not always as strong. Nevertheless, members of the 1970 cohort who showed evidence of conduct problems at age five years were at increased risk of poor educational attainment and poor labour market returns, the latter particularly so for men; even after allowing for father's social class, childhood cognition, and childhood hyperactivity men with conduct problems at this age had significantly lower odds of achieving educational qualifications by early adulthood, higher odds of economic inactivity between 26 and 34 years, lower odds of social participation, and higher odds of offending. Women with early conduct problems had higher odds of not marrying, and of becoming a teenage parent. On the whole there was little evidence of long-term negative effects of early childhood emotional problems on these outcomes; on the contrary, there was some evidence in men that early emotional problems were associated with *increased* odds of achieving advanced educational qualifications, and with *reduced* odds of offending. However, it should be emphasised that we found evidence of continuity between emotional problems even at this early age into adulthood.

Fully adjusted ORs, along with their 95% confidence intervals and p values, are shown for all outcomes in relation to early childhood mental health problems in the Appendix, Tables 14 to 17.

4.0 Conclusions and policy implications

Our analyses, based on three adult UK birth cohorts, demonstrate very clearly that mental health problems beginning in early life can have profound long-term consequences.

Early mental health problems affect a wide range of outcomes in later life, including emotional problems in adulthood, poor educational achievement, chronic economic inactivity, lower earnings, marital problems, teenage parenthood and contact with the criminal justice system. All of these outcomes have an adverse impact on individual health, wellbeing and daily functioning, as well as costs to the state and to our wider social cohesion.

This represents a strong contrast with physical health problems. The prevalence of all major physical health conditions shows a pronounced age gradient and the burden of physical ill health is now increasingly concentrated in old age. Mental health problems, meanwhile, frequently start early in life. They can persist over long periods and affect people at crucial stages of life: in the early home environment, during school and through the transition from school into adulthood – into the world of work, self-management, partnership, family formation and citizenship.

It is also now clear that conduct problems in childhood and adolescence are a much more important cause of poor life chances than emotional difficulties. Indeed, there was an indication that individuals with the latter problems showed relatively *fewer* behavioural problems, including offending. However, we also found that childhood emotional problems are associated with recurrent emotional problems in adulthood. This is important given evidence from the World Health Organisation that depression is now the leading cause of burden of disease in high-income countries (WHO, 2008).

For children and adolescents whose conduct problems were relatively mild, adverse effects on life chances were less pronounced than in those with more severe problems. But it should be noted that the numbers involved are much larger. For the smaller group of children and adolescents whose conduct problems are severe (and so may constitute a clinically significant disorder), the odds of under-achieving at school and in the labour market, of having family problems and of becoming involved in crime are raised several-fold compared with those without conduct problems.

The adverse long-term consequences associated with childhood and adolescent mental health problems impose major costs, both on the individuals concerned and on wider society. The scale of these costs has major implications for public policy.

Early mental health problems have identifiable and, in many cases, preventable risk factors. Effective treatments are available for many disorders, as described in NICE guidelines (2005; 2007; 2008; www.nice.org.uk). Some of these interventions have extremely high returns. For example, a recent review published by the US Department of Health and Human Services shows that for seven different prevention and early intervention programmes, ranging from early life skills training to multi-systemic therapy for 11-17 year-olds and nurse-family partnerships for pregnant mothers, measurable benefits exceed the costs of intervention by a substantial margin in every case (US DHHS, 2007).

Despite increasingly strong evidence on the effectiveness of early intervention, to prevent and treat childhood disorders, the implementation of these programmes in the UK still has a long way to go. A large amount of mental ill health among children and young people goes unrecognised and untreated. Only about a quarter of those with a clinically diagnosable disorder are in touch with specialist mental health services (Meltzer et al., 2003). The lack of appropriate treatments for child and adolescent mental health problems has been highlighted by, among others, the British Medical Association (2006). Targeted prevention programmes, particularly aimed at preventing early onset conduct problems, are also thin on the ground.

Our analyses also have implications for future research. More detailed research is required to establish the extent to which adolescent conduct problems are associated with multiple adverse outcomes in the same individuals, or whether one subgroup is at particular risk for poor educational and labour market achievement while another is more prone to difficulty with social attachment and intimacy, for example. And even if many with conduct problems have multiple adverse outcomes, it is not clear to what extent this is because the risks for all these outcomes operate simultaneously, or because one adverse outcome leads to another in a cascading series – what Rutter calls a chain of risk and what Pearlin calls stress proliferation – that can be interrupted. We do not yet fully understand the extent to which such a cascading series might be maintained by *adult* mental health problems that continue from childhood, and we do not fully understand the role that poor life chances themselves play in maintaining this continuity; such interplay is highlighted by Schoon et al. (2003).

Above all, we recognise that although associations between early mental health problems and later adverse outcomes are strong, they are by no means pre-determined or inevitable. The extent to which individuals escape from risk or flourish in adulthood requires further research to identify characteristics and experiences (including interventions they may have received) that may cast important light on protection and on resilience.

Finally, our study demonstrates the power of longitudinal analysis in mental health research, and so we close this report in tribute to the unique richness of the UK birth cohorts, by underscoring the necessity of their maintenance as an invaluable and irreplaceable research resource.

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Appendix:

Outcome frequencies and fully adjusted odds ratios for effects in those with mild and severe adolescent mental health problems compared to those with no problems

Table 2: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent conduct problems: 1946 cohort

Outcome		Adolescent (ages 13 and 15 years) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=3,162)	Mild (N=771)	Severe (N=298)	Mild	Severe
Education						
No qualifications	M	34.0%	55.1%	64.6%	**1.6 (1.2, 2.2)**	**2.5 (1.6, 4.0)**
	F	35.8%	51.9%	61.7%	**1.7 (1.2, 2.3)**	1.6 (0.9, 2.7)
Advanced qualifications	M	45.0%	23.5%	14.9%	**0.5 (0.3, 0.7)**	**0.2 (0.1, 0.4)**
	F	28.1%	19.2%	11.3%	**0.5 (0.3, 0.8)**	**0.4 (0.2, 0.9)**
Labour market attachment						
Out of the labour force 26 years	M	4.5%	6.7%	8.1%	1.6 (1.0, 2.7)	**2.2 (1.1, 4.4)**
	F	51.0%	50.8%	60.6%	0.9 (0.7, 1.2)	1.1 (0.7, 1.8)
Out of the labour force 36 years	M	4.8%	7.4%	12.0%	1.1 (0.6, 1.9)	1.7 (0.9, 3.4)
	F	37.3%	41.0%	26.7%	1.2 (0.9, 1.6)	0.6 (0.4, 1.1)
Out of the labour force 43 years	M	4.2%	4.1%	13.3%	0.8 (0.4, 1.6)	**2.7 (1.3, 5.4)**
	F	15.1%	23.8%	13.3%	**1.8 (1.3, 2.7)**	0.9 (0.4, 2.0)
Out of the labour force 53 years	M	15.2%	15.6%	19.8%	0.9 (0.6, 1.4)	1.2 (0.7, 2.2)
	F	24.0%	27.9%	29.0%	1.23 (0.9, 1.8)	1.3 (0.7, 2.2)
Repeated financial problems	M	7.0%	8.5%	15.5%	1.1 (0.8, 1.6)	**2.7 (1.7, 4.5)**
36-53 years	F	8.0%	6.6%	13.0%	0.8 (0.5, 1.3)	1.1 (0.6, 2.2)
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	6.6 (3.4)	5.9 (1.8)	6.3 (2.0)	-3.7 (-8.2, 0.8)	2.2 (-4.7, 9.2)
	F	4.8 (2.0)	4.2 (1.7)	3.9 (1.6)	-7.3 (-15.0, 0.4)	-2.4 (-16.3, 11.5)
Age 36 years	M	7.4 (2.9)	6.5 (2.6)	7.0 (2.6)	-4.2 (-9.4, 1.0)	0.8 (-8.4, 6.8)
	F	5.0 (2.8)	4.5 (1.9)	3.8 (1.2)	-1.1 (-10.0, 7.4)	**-16.1 (-30.9, -1.3)**
Age 43 years	M	10.7 (5.9)	8.9 (4.5)	9.9 (4.2)	-6.7 (-13.9, 0.4)	0.8 (-11.7, 13.3)
	F	6.7 (7.9)	6.1 (5.1)	6.0 (4.3)	1.3 (-8.7, 11.2)	-1.9 (-18.2, 14.4)
Social or rented accommodation (age 43 years)	M	16.0%	20.9%	26.2%	1.1 (0.8, 1.6)	1.3 (0.8, 2.3)
	F	15.8%	21.7%	29.6%	1.4 (0.9, 2.0)	1.7 (1.0, 3.0)

[1] Adjusted for adolescent emotional problems, father's social class, and childhood cognition.
[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at <0.05.

Table 3: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent emotional problems: 1946 cohort

Outcome		Adolescent (ages 13 and 15 years) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=2,114)	Mild (N=1,566)	Severe (N=552)	Mild	Severe
Education						
No qualifications	M	38.8%	40.1%	52.0%	0.9 (0.7, 1.2)	1.4 (0.9, 2.0)
	F	35.4%	40.0%	52.7%	1.2 (1.0, 1.6)	**1.6 (1.1, 2.3)**
Advanced qualifications	M	39.3%	39.4%	29.9%	1.1 (0.8, 1.5)	0.7 (0.4, 1.1)
	F	30.4%	24.4%	15.4%	**0.7 (0.5, 0.9)**	**0.4 (0.3, 0.7)**
Labour market attachment						
Out of the labour force 26 years	M	4.7%	6.0%	6.4%	1.4 (0.9, 2.3)	1.4 (0.7, 2.8)
	F	51.9%	50.8%	52.4%	0.9 (0.7, 1.1)	0.9 (0.7, 1.2)
Out of the labour force 36 years	M	6.2%	4.4%	8.8%	0.7 (0.4, 1.2)	1.2 (0.6, 2.4)
	F	33.6%	38.8%	44.2%	1.3 (1.0, 1.6)	**1.5 (1.1, 2.1)**
Out of the labour force 43 years	M	4.8%	4.0%	8.1%	0.8 (0.4, 1.4)	1.4 (0.7, 3.0)
	F	13.7%	15.6%	26.6%	1.2 (0.9, 1.7)	**2.4 (1.6, 3.6)**
Out of the labour force 53 years	M	14.5%	16.6%	18.7%	1.1 (0.8, 1.6)	1.1 (0.6, 1.9)
	F	20.5%	26.7%	34.0%	**1.5 (1.1, 2.0)**	**2.0 (1.4, 3.0)**
Financial problems 36-53 years	M	7.1%	7.9%	11.7%	1.0 (0.8, 1.4)	1.1 (0.7, 1.9)
	F	8.0%	7.1%	12.0%	0.9 (0.6, 1.3)	1.2 (0.7, 1.9)
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	6.6 (3.6)	6.4 (2.4)	5.7 (2.1)	-1.2 (-5.1, 2.6)	**-10.8 (-16.5, -5.0)**
	F	4.8 (2.2)	4.7 (2.0)	4.2 (1.5)	0.7 (-5.4, 6.8)	-3.0 (-11.7, 5.6)
Age 36 years	M	7.4 (2.9)	7.0 (2.8)	6.8 (2.8)	-4.0 (-8.3, 0.2)	-4.3 (-11.5, 3.0)
	F	4.8 (3.0)	5.0 (2.3)	4.5 (1.7)	3.8 (-3.1, 10.6)	1.2 (-10.6, 8.2)
Age 43 years	M	10.6 (5.0)	10.4 (6.6)	8.2 (4.1)	-1.7 (-7.5, 4.1)	**-19.5 (-29.3, -9.6)**
	F	7.0 (8.2)	6.4 (7.3)	5.7 (3.8)	-4.5 (-11.9, 2.9)	-9.5 (-20.5, 1.4)
Social or rented accommodation (age 43 years)	M	17.1%	16.1%	27.8%	0.8 (0.6, 1.2)	**1.6 (1.0, 2.4)**
	F	16.6%	15.8%	25.1%	1.0 (0.7, 1.4)	**1.6 (1.0, 2.3)**

[1] Adjusted for adolescent emotional problems, father's social class, and childhood cognition.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at <0.05.

Table 4: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent conduct problems: 1946 cohort

Outcome		Adolescent (ages 13 and 15) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=3,162)	Mild (N=771)	Severe (N=298)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	24.7%	31.0%	32.1%	**1.4 (1.0, 1.9)**	1.4 (0.8, 2.4)
	F	28.1%	36.3%	45.8%	**1.4 (1.0, 1.9)**	**2.0 (1.2, 3.3)**
Never married	M	7.0%	6.2%	6.0%	0.9 (0.5, 1.7)	1.1 (0.4, 2.8)
	F	4.4%	4.9%	6.9%	1.4 (0.7, 3.0)	2.8 (0.9, 8.5)
Teenage parenthood	M	1.7%	7.3%	6.5%	**3.6 (1.8, 7.0)**	**2.7 (1.2, 7.3)**
	F	10.7%	16.4%	22.2%	1.5 (1.0, 2.3)	1.5 (0.8, 2.9)
Social participation						
Voted in the 1970 election	M	68.4%	58.7%	57.8%	**0.7 (0.5, 0.9)**	0.7 (0.5, 1.0)
	F	70.4%	68.7%	61.7%	1.0 (0.7, 1.3)	0.7 (0.4, 1.1)
Adult mental health						
Emotional problems					M: 1.2 (0.9, 1.4)[2]	M: **1.9 (1.4, 2.7)** [2]
					F: **1.8 (1.4, 2.2)** [2]	F: **1.6 (1.1, 2.4)** [2]
Mild/moderate symptoms	M	39.8%	40.2%	40.7%		
	F	49.1%	52.0%	47.5%		
Severe symptoms	M	2.7%	4.1%	7.0%		
	F	4.8%	8.3%	9.0%		
					M: **1.7 (1.2, 2.5)** [2]	M: 1.6 (0.8, 2.8) [2]
					F: 1.1 (0.7, 2.0) [2]	F: 0.9 (0.3, 2.2) [2]
Alcohol problems 36/43 years (CAGE)	M	11.3%	17.1%	14.1%		
	F	6.4%	6.2%	4.2%		
Reported once	M	3.4%	5.6%	6.4%		
Reported twice	F	1.8%	3.1%	2.8%		
Daily smoking at age 53 years	M	19.6%	29.3%	32.5%	**1.5 (1.0, 2.0)**	1.7 (1.0, 2.8)
	F	18.4%	36.8%	49.2%	**2.2 (1.6, 3.2)**	**3.1 (1.8, 5.4)**

[1] Adjusted for adolescent emotional problems, father's social class, and childhood cognition.
[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05

Table 5: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent emotional problems: 1946 cohort

Outcome		Adolescent (ages 13 and 15) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=2,114)	Mild (N=1,566)	Severe (N=552)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	28.0%	25.3%	20.8%	0.9 (0.7, 1.2)	0.8 (0.5, 1.4)
	F	33.6%	29.1%	23.2%	0.9 (0.7, 1.2)	0.7 (0.5, 1.2)
Never married	M	4.5%	7.8%	17.5%	**1.7 (1.0, 2.8)**	**3.7 (2.0, 6.9)**
	F	3.1%	5.0%	8.1%	1.6 (0.8, 3.0)	**2.8 (1.4, 5.9)**
Teenage parenthood						
	M	3.5%	2.3%	4.2%	0.7 (0.3, 1.5)	1.5 (0.6, 3.8)
	F	12.5%	11.8%	12.3%	1.1 (0.7, 1.5)	1.0 (0.6, 1.7)
Social participation						
Voted in the 1970 election	M	64.8%	67.3%	65.4%	1.1 (0.9, 1.4)	1.0 (0.7, 1.4)
	F	69.5%	69.1%	71.6%	1.0 (0.8, 1.2)	1.1 (0.8, 1.6)
Adult mental health					M: **3.3 (2.7, 4.0)**[2]	M: **7.4 (5.4, 10.1)**[2]
Emotional problems					F: **2.8 (2.3, 3.4)**[2]	F: **5.0 (3.8, 6.6)**[2]
Mild/moderate symptoms	M	26.8%	56.2%	57.5%		
	F	36.6%	60.2%	58.4%		
Severe symptoms	M	2.2%	1.9%	13.7%		
	F	3.5%	4.4%	14.5%		
Alcohol problems 36/43 years (CAGE)					M: 0.9 (0.6, 1.2)[2]	M: 0.7 (0.4, 1.3)[2]
					F: 0.7 (0.5, 1.1)[2]	F: **0.3 (0.1, 0.7)**[2]
Reported once	M	13.4%	11.8%	10.6%		
	F	7.5%	6.4%	1.7%		
Reported twice	M	4.4%	3.8%	2.6%		
	F	2.9%	1.4%	1.1%		
Daily smoking age 53 years	M	24.5%	19.3%	20.4%	0.7 (0.5, 1.0)	0.7 (0.4, 1.2)
	F	26.3%	20.8%	16.8%	0.8 (0.6, 1.1)	**0.6 (0.4, 0.9)**

[1] Adjusted for adolescent conduct problems, father's social class, and childhood cognition.
[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05

Table 6: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent conduct problems: 1958 cohort

Outcome		Adolescent (age 16) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=8,897)	Mild (N=1,929)	Severe (N=824)	Mild	Severe
Education						
No qualifications	M	17.7%	29.8%	43.9%	**1.4 (1.2, 1.7)**	**2.0 (1.6, 2.6)**
	F	20.4%	31.5%	45.9%	1.2 (1.0, 1.4)	**1.7 (1.3, 2.2)**
Advanced qualifications	M	46.6%	32.4%	20.2%	**0.7 (0.5, 0.8)**	**0.4 (0.2, 0.5)**
	F	37.2%	18.6%	9.9%	**0.6 (0.4, 0.7)**	**0.3 (0.2, 0.5)**
Labour market attachment						
Chronic economic inactivity	M	8.0%	13.6%	18.8%	**1.5 (1.2, 1.9)**	**1.8 (1.3, 2.6)**
between 16 and 33 years	F	9.9%	12.7%	11.8%	1.3 (1.0, 1.6)	1.2 (0.8, 1.7)
Chronic economic inactivity	M	7.3%	12.3%	23.4%	**1.4 (1.0, 1.8)**	**2.5 (1.8, 3.5)**
between 34 and 46 years	F	8.3%	15.1%	17.2%	**2.0 (1.5, 2.5)**	**2.2 (1.6, 3.1)**
Permanent/temporary	M	2.6%	4.4%	8.2%	1.4 (0.9, 2.1)	**2.1 (1.3, 3.5)**
sick or disabled 16-33 years	F	2.5%	3.9%	4.6%	1.3 (0.9, 2.1)	1.4 (0.8, 2.7)
Permanent/temporary	M	5.1%	10.4%	14.9%	**1.6 (1.2, 2.2)**	**2.0 (1.4, 3.0)**
sick or disabled 34-46 years	F	5.6%	11.3%	13.5%	**1.7 (1.1, 2.6)**	**1.7 (1.1, 2.6)**
Financial problems	M	26.9%	37.1%	44.5%	**1.4 (1.1, 1.6)**	**1.7 (1.3, 2.2)**
	F	27.6%	29.5%	32.8%	0.9 (0.8, 1.1)	**1.3 (1.0, 1.8)**
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 23 years	M	5.8 (2.2)	5.6 (1.8)	5.5 (2.0)	-0.5 (-3.7, 2.7)	-0.9 (-5.8, 4.0)
	F	4.9 (1.7)	4.6 (1.6)	4.9 (3.0)	-2.2 (-5.7, 1.2)	1.7 (-4.4, 7.8)
Age 33 years	M	9.5 (5.1)	8.7 (6.5)	7.8 (3.5)	-4.2 (-9.3, 1.0)	**-8.4 (-16.8, -0.1)**
	F	6.9 (4.0)	6.3 (3.8)	5.1 (2.6)	0.6 (-4.6, 5.8)	**-10.4 (-18.9, -2.0)**
Age 42 years	M	12.6 (8.3)	11.3 (8.6)	10.3 (9.4)	0.0 (-5.5, 5.4)	-5.6 (-14.6, 3.2)
	F	8.2 (5.3)	7.4 (6.0)	6.6 (3.3)	-1.7 (-7.1, 3.6)	-2.2 (-10.8, 6.3)
In social housing or renting	M	4.1%	10.8%	17.0%	**2.1 (1.5, 3.0)**	**2.9 (1.8, 4.4)**
at 33 and 46 years	F	6.5%	13.4%	23.3%	**1.8 (1.3, 2.4)**	**2.4 (1.8, 3.8)**

[1] Adjusted for adolescent emotional problems, father's social class, childhood cognition and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05

Table 7: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent emotional problems: 1958 cohort

Outcome		Adolescent (age 16) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=5,468)	Mild (N=4,606)	Severe (N=1,575)	Mild	Severe
Education						
No qualifications	M	20.5%	21.0%	27.5%	0.9 (0.7, 1.0)	1.0 (0.8, 1.3)
	F	22.4%	24.4%	25.2%	1.0 (0.8, 1.2)	**0.8 (0.6, 1.0)**
Advanced qualifications	M	43.1%	42.5%	39.1%	**1.2 (1.0, 1.5)**	1.2 (0.9, 1.5)
	F	34.1%	33.3%	26.3%	1.1 (0.9, 1.4)	1.2 (0.9, 1.6)
Labour market attachment						
Chronic economic inactivity	M	9.4%	8.5%	14.2%	0.8 (0.6, 1.0)	1.0 (0.7, 1.4)
between 16 and 33 years	F	9.2%	11.0%	12.0%	1.2 (1.0, 1.5)	1.3 (1.0, 1.7)
Chronic economic inactivity	M	8.4%	8.2%	16.1%	0.8 (0.7, 1.1)	**1.5 (1.1, 2.1)**
between 34 and 46 years	F	9.4%	9.2%	12.9%	0.8 (0.7, 1.1)	1.2 (0.9, 1.5)
Permanent/temporary	M	3.1%	2.7%	6.2%	0.7 (0.5, 1.1)	1.5 (0.9, 2.3)
sick or disabled 16-33 years	F	2.4%	2.9%	3.9%	1.1 (0.7, 1.6)	1.4 (0.8. 2.2)
Permanent/temporary	M	5.9%	6.4%	10.6%	1.0 (0.8, 1.3)	**1.4 (1.0, 2.1)**
sick or disabled 34-46 years	F	6.1%	6.7%	9.9%	1.0 (0.7, 1.3)	1.4 (1.0, 1.9)
Financial problems	M	28.1%	30.8%	33.6%	1.1 (0.9, 1.2)	1.1 (0.9, 1.4)
	F	27.2%	28.5%	32.4%	1.0 (0.9, 1.2)	1.2 (1.0, 1.4)
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 23 years	M	5.8 (2.3)	5.7 (1.9)	5.4 (1.6)	-1.2 (-3.6, 1.2)	**-5.3 (-9.1, -1.5)**
	F	4.9 (1.9)	4.8 (1.6)	4.7 (1.8)	-0.4 (-2.9, 2.2)	-1.1 (-4.7, 2.5)
Age 33 years	M	9.4 (5.3)	9.4 (5.5)	8.6 (4.0)	2.5 (-1.3, 6.3)	-1.0 (-7.1, 5.0)
	F	6.9 (4.5)	6.6 (3.5)	6.3 (3.3)	-0.3 (-4.2, 3.7)	-1.3 (-6.8, 4.2)
Age 42 years	M	12.5 (8.3)	12.1 (8.6)	11.7 (8.6)	-2.6 (-6.7, 1.6)	-2.6 (-9.5, 4.2)
	F	8.1 (5.2)	8.0 (5.7)	7.4 (4.7)	0.5 (-3.5, 4.5)	-4.6 (-10.3, 1.6)
In social housing or renting	M	5.1%	6.0%	9.9%	1.0 (0.8, 1.4)	1.4 (0.9, 2.2)
at 33 and 46 years	F	7.9%	8.2%	10.7%	0.8 (0.6, 1.1)	0.9 (0.6, 1.3)

[1] Adjusted for adolescent conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05.

Table 8: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent conduct problems: 1958 cohort

Outcome		Adolescent (age 16) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=8,897)	Mild (N=1,929)	Severe (N=824)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	26.2%	32.8%	36.1%	1.2 (1.0, 1.4)	1.3 (1.0, 1.8)
	F	31.7%	37.1%	48.5%	**1.2 (1.0, 1.5)**	**1.8 (1.3, 2.3)**
Never married	M	13.9%	12.6%	14.7%	0.9 (0.7, 1.1)	0.9 (0.6, 1.4)
	F	9.7%	11.8%	7.3%	**1.4 (1.0, 1.8)**	0.9 (0.6, 1.6)
Teenage parenthood	M	4.7%	8.4%	10.0%	**1.5 (1.0, 2.1)**	1.5 (0.9, 2.5)
	F	12.0%	24.4%	37.4%	**1.9 (1.5, 2.3)**	**3.0 (2.3, 4.1)**
Social participation						
Voted in the 1997 election	M	77.4%	71.2%	66.0%	**0.8 (0.7, 1.0)**	**0.7 (0.5, 0.9)**
	F	80.8%	70.5%	71.3%	**0.7 (0.6, 0.8)**	0.8 (0.6, 1.1)
Ever belong to a trade union	M	54.9%	55.4%	54.4%	1.0 (0.8, 1.2)	1.0 (0.8, 1.3)
	F	46.2%	40.8%	41.3%	0.9 (0.7, 1.1)	1.0 (0.7, 1.3)
Offending (33-42 years)						
Ever arrested	M	5.9%	10.5%	16.3%	**1.6 (1.2, 2.1)**	**2.4 (1.7, 3.6)**
	F	1.0%	2.6%	4.8%	Low power	Low power
Ever convicted	M	6.8%	9.1%	13.6%	1.3 (0.9, 1.7)	**2.0 (1,3, 2.9)**
	F	1.4%	1.1%	2.4%	Low power	Low power
Adult mental health					M: **1.3 (1.1, 1.5)** [2]	M: **1.7 (1.4, 2.2)** [2]
Emotional problems					F: **1.5 (1.2, 1.9)** [2]	F: **1.5 (1.4, 1.7)** [2]
Mild/moderate symptoms	M	31.5%	35.1%	37.0%		
	F	44.2%	45.8%	37.4%		
Severe symptoms	M	6.6%	12.6%	20.5%		
	F	15.2%	26.6%	35.7%		
					M: 1.1 (0.9, 1.3) [2]	M: **1.7 (1.3, 2.2)** [2]
					F: **1.3 (1.0, 1.6)** [2]	F: 1.3 (0.9, 1.8) [2]
Potential alcohol abuse (CAGE) (33 or 41 years)	M	22.8%	24.5%	32.5%		
	F	11.7%	14.8%	15.0%		
Daily smoking at 42 years	M	18.6%	28.5%	38.1%	**1.9 (1.5, 2.4)**	**3.3 (2.3, 4.9)**
	F	17.8%	35.3%	50.5%	**2.7 (2.1, 3.4)**	**5.3 (3.6, 7.7)**

[1] Adjusted for adolescent emotional problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Coefficients in **bold** are significant at < 0.05

Table 9: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent emotional problems: 1958 cohort

Outcome		Adolescent (age 16) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=5,468)	Mild (N=4,606)	Severe (N=1,575)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	27.0%	29.9%	25.6%	1.1 (1.0, 1.3)	1.0 (0.8, 1.3)
	F	32.1%	34.1%	35.2%	1.0 (0.9, 1.2)	1.0 (0.8, 1.3)
Never married	M	12.0%	13.6%	23.8%	1.2 (1.0, 1.5)	**2.2 (1.7, 3.0)**
	F	9.8%	9.7%	10.9%	1.0 (0.8, 1.2)	1.1 (0.8, 1.5)
Teenage parenthood	M	5.9%	5.4%	5.7%	0.8 (0.6, 1.1)	0.7 (0.4, 1.2)
	F	15.6%	15.3%	17.4%	0.8 (0.7, 1.0)	0.8 (0.6, 1.0)
Social participation						
Voted in the 1997 election	M	75.4%	76.8%	73.9%	1.1 (1.0, 1.3)	1.0 (0.8, 1.3)
	F	79.7%	78.9%	75.3%	1.0 (0.9, 1.2)	0.9, (0.7, 1.1)
Ever belong to a trade union	M	54.8%	55.6%	53.3%	1.0 (0.9, 1.2)	1.0 (0.8, 1.2)
	F	45.8%	45.4%	42.0%	1.0 (0.9, 1.2)	0.9 (0.8, 1.1)
Offending (33 to 42 years)						
Ever arrested	M	7.2%	6.7%	9.5%	0.8 (0.6, 1.1)	1.1 (0.7, 1.6)
	F	1.4%	1.4%	2.1%	Low power	Low power
Ever convicted	M	7.8%	7.0%	8.1%	1.2 (0.9, 1.7)	**1.9 (1.2, 2.8)**
	F	1.3%	1.4%	1.8%	Low power	Low power
Adult mental health					M: **1.3 (1.2, 1.5)**[2]	M: **2.2 (1.8, 2.6)**[2]
Emotional problems					F: **1.5 (1.2, 1.9)**[2]	F: **2.6 (2.2, 3.1)**[2]
Mild/moderate symptoms	M	29.8%	34.5%	39.4%		
	F	39.4%	47.3%	46.4%		
Severe symptoms	M	6.0%	9.6%	17.9%		
	F	13.3%	18.2%	30.8%		
					M: 0.9 (0.8, 1.0)[2]	M: **0.8 (0.6, 1.0)**[2]
					F: 1.0 (0.8, 1.2)[2]	F: **1.4 (1.1, 1.8)**[2]
Alcohol problems 33/41 years (CAGE)	M	24.5%	23.0%	21.8%		
	F	11.5%	11.8%	16.3%		
Daily smoking at age 42 years	M	21.8%	20.9%	18.6%	**0.8 (0.6, 1.0)**	**0.6 (0.4, 0.8)**
	F	21.2%	22.2%	25.2%	0.8 (0.7, 1.0)	**0.7 (0.5, 0.9)**

[1] Adjusted for adolescent conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Coefficients in **bold** are significant at < 0.05

Table 10: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent conduct problems: 1970 cohort

Outcome		Adolescent (age 16) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=6,600)	Mild (N=1,598)	Severe (N=577)	Mild	Severe
Education						
No qualifications	M	5.6%	12.8%	22.7%	**2.0 (1.4, 2.8)**	**3.0 (1.9, 4.7)**
	F	4.4%	12.8%	18.3%	**2.0 (1.4, 2.8)**	**2.4 (1.4, 4.0)**
Advanced qualifications	M	41.7%	25.8%	20.8%	**0.4 (0.2, 0.5)**	**0.2 (0.1, 0.4)**
	F	41.6%	21.8%	14.2%	**0.3 (0.2, 0.5)**	**0.2 (0.1, 0.4)**
Labour market attachment						
Chronic economic inactivity	M	6.6%	13.6%	21.7%	**1.7 (1.3, 2.3)**	**2.4 (1.6, 3.6)**
16 to 34 years	F	9.1%	12.4%	18.2%	1.2 (0.9, 1.5)	**1.6 (1.0, 2.5)**
Permanent/temporary		4.2%	8.0%	10.4%	**1.6 (1.1, 2.4)**	**2.0 (1.2, 3.4)**
sick or disabled 16-34 years		4.8%	6.6%	4.4%	1.1 (0.8, 1.7)	0.7 (0.3, 1.4)
Financial problems		33.6%	40.5%	53.5%	1.2 (1.0, 1.4)	**1.7 (1.3, 2.4)**
30-34 years		33.6%	44.6%	51.9%	**1.4 (1.1, 1.6)**	**1.8 (1.3, 2.5)**
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	8.2 (5.1)	7.4 (3.3)	6.8 (2.5)	-3.2 (-8.8, 2.4)	-5.2 (-15.2, 4.9)
	F	7.2 (3.6)	6.4 (3.6)	6.1 (2.6)	**-6.3 (-11.3, -1.3)**	**-10.4 (-20.7, -0.2)**
Age 30 years	M	10.4 (6.6)	9.2 (5.0)	8.4 (4.7)	-3.5 (-8.9, 2.0)	-5.9 (-15.0, 3.2)
	F	8.6 (4.9)	7.5 (5.1)	6.9 (3.8)	**-6.4 (-11.9, -1.0)**	**-16.4 (-26.9, -5.9)**
Age 34 years	M	12.9 (9.1)	11.1 (6.6)	9.0 (5.2)	**-6.5 (-12.5, -0.5)**	**-18.7 (-29.4, -7.9)**
	F	10.1 (7.0)	8.8 (6.6)	8.8 (10.7)	-3.9 (-10.4, 2.6)	-6.9 (-19.6, 5.8)
In social housing or		6.1%	14.4%	15.2%	**2.2 (1.6, 3.0)**	**2.3 (1.4, 3.7)**
renting at 30 and 34 years		9.1%	19.3%	31.1%	**1.8 (1.4, 2.3)**	**3.3 (2.2, 5.1)**

[1] Adjusted for adolescent emotional problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05.

Table 11: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to adolescent emotional problems: 1970 cohort

Outcome		Adolescent (age 16) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=4,111)	Mild (N=3,569)	Severe (N=1,141)	Mild	Severe
Education						
No qualifications	M	7.3%	7.8%	11.9%	0.8 (0.6, 1.1)	1.0 (0.6, 1.5)
	F	5.9%	5.6%	11.3%	**0.7 (0.5, 0.9)**	1.1 (0.7, 1.6)
Advanced qualifications	M	40.3%	35.9%	31.4%	**1.5 (1.0, 2.1)**	1.2 (0.7, 1.9)
	F	37.8%	38.5%	32.6%	1.0 (0.7, 1.6)	**0.5 (0.3, 0.7)**
Labour market attachment						
Chronic economic inactivity	M	7.6%	9.6%	12.0%	1.0 (0.8, 1.3)	1.2 (0.8 1.7)
16 to 34 years	F	10.9%	8.8%	14.0%	0.9 (0.7, 1.1)	1.0 (0.7, 1.5)
Permanent/temporary	M	4.5%	5.6%	8.4%	1.2 (0.8, 1.6)	1.5 (0.9, 2.4)
sick or disabled 16-33 years	F	4.8%	4.0%	8.8%	0.8 (0.6, 1.2)	**1.7 (1.2, 2.6)**
Financial problems	M	33.7%	38.2%	41.6%	1.1 (1.0, 1.3)	1.2 (0.9, 1.5)
30-34 years	F	33.3%	36.2%	45.4%	1.1 (0.9, 1.2)	**1.4 (1.1, 1.7)**
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	8.2 (5.3)	7.9 (4.5)	7.3 (2.7)	0.4 (-3.9, 4.6)	-2.5 (-9.7, 4.7)
	F	7.2 (3.4)	7.0 (3.8)	6.6 (3.5)	-3.0 (-6.6, 0.6)	**-6.7 (-12.2, -1.1)**
Age 30 years	M	10.4 (6.7)	9.9 (6.0)	9.3 (4.9)	-1.3 (-5.5, 2.9)	-3.1 (-10.1, 4.0)
	F	8.6 (4.6)	8.3 (5.1)	7.8 (5.0)	-0.3 (-4.8, 4.4)	-3.6 (-9.8, 2.5)
Age 34 years	M	12.7 (8.2)	12.2 (9.4)	11.5 (7.7)	-1.7 (-6.4, 3.0)	-6.9 (-15.0, 1.2)
	F	10.4 (7.7)	9.6 (6.5)	9.2 (7.4)	-4.2 (-9.2, 0.6)	**-8.0 (-15.3, -0.7)**
In social housing or renting at 30 and 34 years	M	7.5%	8.3%	11.2%	1.0 (0.7, 1.3)	1.1 (0.7, 1.7)
	F	11.1%	10.5%	17.8%	**0.7 (0.6, 0.9)**	1.0 (0.7, 1.3)

[1] Adjusted for adolescent conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05

Table 12: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent conduct problems: 1970 cohort

Outcome		Adolescent (age 16) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=6,600)	Mild (N=1,598)	Severe (N=577)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	8.3%	10.8%	15.2%	1.2 (0.9, 1.7)	**1.8 (1.1, 3.0)**
	F	12.8%	18.5%	15.9%	**1.6 (1.3, 2.1)**	1.5 (0.9, 2.5)
Never married	M	36.4%	36.3%	42.4%	1.0 (0.8, 1.2)	1.3 (0.9, 1.8)
	F	27.2%	28.8%	36.3%	1.2 (1.0, 1.5)	**1.6 (1.1, 2.4)**
Teenage parenthood	M	3.4%	8.9%	14.5%	**2.2 (1.3, 3.7)**	**2.9 (1.4, 5.8)**
	F	9.3%	22.4%	32.1%	**2.0 (1.5, 2.7)**	**3.2 (2.1, 5.1)**
Social participation						
Voted in the 1997 election	M	63.7%	54.7%	44.2%	**0.7 (0.6, 0.9)**	**0.5 (0.4, 0.7)**
	F	68.3%	60.6%	56.8%	**0.8 (0.7, 1.0)**	**0.7 (0.5, 1.0)**
Ever belong to a trade union	M	37.9%	35.6%	28.7%	0.9 (0.7, 1.1)	**0.6 (0.4, 0.8)**
	F	37.3%	26.4%	24.3%	**0.7 (0.6, 0.9)**	**0.7 (0.4, 1.0)**
Offending (16-34 years)						
Ever arrested	M	23.8%	39.9%	54.6%	**2.0 (1.6, 2.4)**	**3.4 (2.5, 4.6)**
	F	3.7%	10.7%	16.8%	**2.5 (1.8, 3.6)**	**4.3 (2.6, 7.0)**
Ever convicted	M	18.1%	31.1%	43.4%	**2.0 (1.6, 2.5)**	**3.2 (2.3, 4.6)**
	F	2.9%	6.5%	8.7%	**1.7 (1.0, 2.7)**	**2.4 (1.2, 4.8)**
Adult mental health					M: **1.5 (1.2, 1.8)**	M: **1.5 (1.1, 2.0)**
Emotional problems					F: 1.1 (0.9, 1.3)	F: 1.3 (1.0, 1.8)
Mild/moderate symptoms	M	33.9%	43.7%	43.6%		
	F	46.1%	45.4%	38.7%		
Severe symptoms	M	7.2%	11.3%	14.0%		
	F	11.7%	19.1%	30.4%		
					M: 1.2 (1.0, 1.6)[2]	M: 1.3 (0.9, 1.9)[2]
					F: 1.4 (1.0, 1.9)[2]	F: **2.1 (1.3, 3.5)**[2]
Alcohol problems 33/34 years (CAGE)	M	18.5%	22.6%	23.4%		
	F	7.7%	9.2%	12.3%		
Daily smoking at age 34 years	M	19.8%	38.0%	48.1%	**2.8 (2.2, 3.6)**	**4.4 (2.8, 6.8)**
	F	17.1%	37.6%	43.4%	**3.6 (2.8, 4.6)**	**6.0 (3.7, 9.8)**

[1] Adjusted for adolescent emotional problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05

Table 13: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to adolescent emotional problems: 1970 cohort

Outcome		Adolescent (age 16) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=4,111)	Mild (N=3,569)	Severe (N=1,141)	Mild	Severe
Partnership and offspring						
At least 1 divorce	M	10.5%	7.4%	9.0%	**0.6 (0.5, 0.9)**	0.7 (0.4, 1.2)
	F	12.8%	14.1%	15.8%	1.1 (0.9, 1.4)	1.2 (0.9, 1.7)
Never married	M	34.2%	38.5%	43.1%	1.2 (1.0, 1.4)	**1.4 (1.0, 1.8)**
	F	27.8%	27.4%	30.5%	1.0 (0.8, 1.2)	1.1 (0.9, 1.4)
Teenage parenthood	M	5.0%	4.8%	8.5%	0.8 (0.5, 1.3)	1.0 (0.5, 2.1)
	F	11.4%	12.9%	17.0%	1.0 (0.7, 1.3)	0.9 (0.6, 1.2)
Social participation						
Voted in the 1997 election	M	59.8%	62.1%	62.8%	**1.2 (1.0, 1.4)**	**1.4 (1.1, 1.8)**
	F	66.0%	67.6%	64.6%	1.1 (1.0, 1.3)	1.1 (1.0, 1.4)
Ever belong to a trade union	M	35.5%	38.5%	38.0%	1.2 (1.0, 1.4)	1.2 (0.9, 1.6)
	F	36.6%	35.4%	27.8%	1.0 (0.9, 1.2)	**0.8 (0.6, 1.0)**
Offending (16-34 years)						
Ever arrested	M	29.1%	27.9%	28.1%	**0.8 (0.7, 1.0)**	**0.6 (0.5, 0.9)**
	F	5.1%	5.5%	6.2%	0.8 (0.6, 1.1)	0.6 (0.4, 1.0)
Ever convicted	M	22.5%	21.6%	20.2%	0.8 (0.7, 1.0)	**0.6 (0.4, 0.9)**
	F	2.9%	4.4%	3.9%	1.2 (0.8, 1.8)	0.8 (0.4, 1.5)
Adult mental health					M: **1.6 (1.4, 1.8)** [2]	M: **2.6 (2.1, 3.3)** [2]
Emotional problems					F: **1.7 (1.5, 1.9)** [2]	F: **2.9 (2.4, 3.6)** [2]
Mild/moderate symptoms	M	32.5%	40.1%	44.9%		
	F	39.3%	49.7%	51.9%		
Severe symptoms	M	5.4%	9.8%	18.3%		
	F	9.6%	13.9%	24.7%		
					M: 1.1 (0.9, 1.3) [2]	M: 1.0 (0.7, 1.3) [2]
					F: 1.0 (0.8, 1.4) [2]	F: 1.1 (0.7, 1.6) [2]
Alcohol problems 33/34 years (CAGE)	M	18.6%	20.9%	20.2%		
	F	7.9%	8.2%	8.6%		
Daily smoking at age 34 years	M	23.8%	26.0%	23.6%	0.9 (0.8, 1.2)	**0.6 (0.4, 0.8)**
	F	21.9%	21.0%	22.1%	**0.8 (0.6, 1.0)**	**0.6 (0.4, 0.8)**

[1] Adjusted for adolescent conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05

Table 14: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to early childhood conduct problems: 1970 cohort

Outcome		Early childhood (age 5) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=9,643)	Mild (N=2,479)	Severe (N=909)	Mild	Severe
Education						
No qualifications	M	7.5%	12.1%	20.6%	1.2 (0.9, 1.6)	**1.6 (1.1, 2.3)**
	F	6.2%	11.4%	21.4%	1.3 (0.9, 1.7)	**2.2 (1.4, 3.6)**
Advanced qualifications	M	38.1%	26.3%	19.0%	**0.7 (0.5, 0.9)**	**0.5 (0.3, 0.7)**
	F	35.9%	27.0%	18.5%	**0.7 (0.5, 1.0)**	**0.4 (0.2, 0.8)**
Labour market attachment						
Chronic economic inactivity	M	7.5%	13.9%	17.4%	**1.6 (1.3, 2.0)**	**1.7 (1.2, 2.3)**
16 to 34 years	F	8.8%	11.8%	22.0%	1.2 (0.9, 1.6)	**2.1 (1.4, 3.2)**
Permanent/temporary	M	4.1%	8.5%	10.1%	**1.8 (1.3, 2.4)**	**1.8 (1.2, 2.7)**
sick or disabled 16-33 years	F	4.9%	5.5%	9.6%	1.1 (0.7, 1.5)	**1.8 (1.0, 3.1)**
Financial problems	M	34.1%	42.1%	42.8%	**1.3 (1.1, 1.5)**	1.1 (0.9, 1.4)
30-34 years	F	36.3%	44.2%	51.1%	**1.2 (1.0, 1.4)**	1.4 (1.0, 1.9)
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	8.0 (4.0)	8.1 (5.8)	7.9 (6.0)	0.6 (-5.0, 6.1)	1.5 (-7.7, 10.8)
	F	7.0 (3.5)	6.8 (4.1)	7.3 (5.2)	-2.9 (-8.1, 2.3)	-5.4 (-17.7, 6.8)
Age 30 years	M	10.2 (6.0)	9.4 (6.8)	9.2 (6.8)	-1.7 (-7.3, 3.9)	3.8 (-4.6, 12.2)
	F	8.4 (4.8)	7.6 (4.6)	7.4 (3.6)	**-8.6 (-14.3, -2.9)**	-1.9 (-14.5, 10.7)
Age 34 years	M	12.5 (8.0)	12.2 (11.0)	11.0 (7.6)	0.7 (-4.2, 5.7)	0.8 (-6.9, 8.5)
	F	9.8 (7.4)	9.1 (5.0)	8.0 (4.3)	-3.0 (-10.0, 4.0)	-2.4 (-18.1, 13.3)
In social housing or renting	M	6.1%	14.4%	15.2%	**1.4 (1.0, 1.8)**	1.4 (1.0, 1.9)
at 30 and 34 years	F	9.1%	19.3%	31.1%	**1.5 (1.2, 1.9)**	**3.3 (2.2, 4.9)**

[1] Adjusted for early childhood emotional problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05.

Table 15: Frequencies and fully adjusted regression coefficients for educational and economic outcomes in relation to early childhood emotional problems: 1970 cohort

Outcome		Early childhood (age 5) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=6,267)	Mild (N=5,063)	Severe (N=1,702)	Mild	Severe
Education						
No qualifications	M	10.0%	9.3%	8.3%	0.8 (0.7, 1.1)	0.7 (0.5, 1.0)
	F	7.3%	6.9%	9.8%	0.8 (0.6, 1.0)	1.3 (0.9, 1.8)
Advanced qualifications	M	32.8%	34.5%	38.5%	**1.3 (1.0, 1.7)**	**2.2 (1.5, 3.3)**
	F	35.5%	32.8%	32.1%	1.2 (0.9, 1.6)	0.9 (0.6, 1.3)
Labour market attachment						
Chronic economic inactivity	M	8.6%	10.5%	11.6%	1.2 (1.0, 1.5)	1.2 (0.9, 1.7)
16 to 34 years	F	9.5%	9.8%	10.5%	1.0 (0.8, 1.2)	1.1 (0.8, 1.4)
Permanent/temporary	M	4.8%	5.9%	7.4%	1.2 (0.9, 1.5)	1.4 (0.9, 2.0)
sick or disabled 16-33 years	F	5.5%	5.0%	4.6%	0.9 (0.6, 1.1)	0.8 (0.5, 1.2)
Financial problems	M	36.1%	37.2%	35.9%	1.1 (0.9, 1.2)	0.9 (0.8, 1.1)
30-34 years	F	36.0%	40.0%	39.4%	1.1 (1.0, 1.3)	1.1 (0.9, 1.3)
Gross hourly earnings[2]					**% difference[2]**	**% difference[2]**
Age 26 years	M	7.8 (3.9)	8.2 (5.3)	8.0 (4.3)	**5.1 (0.5, 9.7)**	1.7 (-4.8, 8.2)
	F	7.0 (3.6)	7.0 (3.7)	7.3 (4.0)	2.0 (-1.8, 5.9)	5.2 (-0.3, 10.7)
Age 30 years	M	9.9 (5.9)	10.1 (6.7)	9.8 (5.8)	0.8 (-3.7, 5.3)	-3.4 (-10.2, 3.4)
	F	8.4 (4.7)	8.1 (4.9)	7.9 (4.4)	-2.3 (-6.6, 2.0)	1.8 (-4.5, 8.0)
Age 34 years	M	12.3 (8.4)	12.4 (9.2)	12.1 (8.1)	0.2 (-4.0, 4.4)	-1.5 (-4.8, 7.8)
	F	9.7 (7.0)	9.6 (6.9)	9.8 (7.6)	1.6 (-3.6, 6.8)	3.2 (-4.4, 10.9)
In social housing or renting at 30 and 34 years	M	7.5%	8.3%	11.2%	1.0 (0.8, 1.3)	1.1 (0.7, 1.7)
	F	11.1%	10.5%	17.8%	0.9 (0.7, 1.0)	0.8 (0.6, 1.0)

[1] Adjusted for early childhood conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Mean and standard deviation (in parenthesis) in pounds sterling, adjusted to 2000 rates. Coefficients represent mean percent difference in earnings for those with mild and severe problems compared to those without.

Coefficients in **bold** are significant at < 0.05.

Table 16: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to early childhood conduct problems: 1970 cohort

Outcome		Early childhood (age 5) conduct problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=9,643)	Mild (N=2,479)	Severe (N=909)	Mild	Severe
Partnership and offspring						
Divorced	M	9.0%	10.2%	13.3%	1.1 (0.8, 1.4)	1.3 (0.9, 2.0)
	F	13.8%	15.2%	17.0%	1.1 (0.8, 1.4)	1.3 (0.8, 2.0)
Never married	M	36.7%	37.0%	36.8%	1.0 (0.9, 1.2)	1.1 (0.8, 1.4)
	F	27.7%	30.0%	35.2%	1.2 (1.0, 1.4)	**1.6 (1.1, 2.3)**
Teenage parenthood	M	4.6%	7.8%	10.2%	1.4 (0.9, 2.0)	1.5 (0.9, 2.5)
	F	11.6%	20.0%	30.8%	**1.6 (1.2, 2.0)**	**2.3 (1.5, 3.5)**
Social participation						
Voted in the 1997 election	M	62.8%	55.5%	49.7%	**0.8 (0.7, 0.9)**	**0.7 (0.5, 0.9)**
	F	66.0%	59.8%	60.1%	**0.8 (0.7, 1.0)**	0.9 (0.7, 1.3)
Ever belong to a trade union						
	M	36.0%	36.7%	31.2%	1.0 (0.9, 1.2)	**0.8 (0.6, 1.0)**
	F	33.8%	30.9%	29.3%	1.0 (0.8, 1.2)	1.0 (0.7, 1.4)
Offending (16-34 years)						
Ever arrested	M	27.0%	38.4%	45.1%	**2.0 (1.6, 2.4)**	**3.4 (2.5, 4.6)**
	F	5.4%	7.6%	13.5%	1.2 (0.9, 1.7)	**1.9 (1.2, 3.1)**
Ever convicted						
	M	21.8%	28.6%	34.2%	**1.2 (1.0, 1.5)**	**1.4 (1.1, 1.8)**
	F	3.8%	5.2%	7.6%	1.2 (0.8, 1.8)	1.5 (0.8, 3.0)
Adult mental health					M: **1.3 (1.1, 1.5)** [2]	M: **1.3 (1.0, 1.6)** [2]
Emotional problems					F: 1.2 (1.0, 1.4) [2]	F: **1.3 (1.0, 1.8)** [2]
Mild/moderate symptoms	M	35.4%	38.1%	42.9%		
	F	46.5%	44.7%	39.5%		
Severe symptoms	M	7.8%	12.5%	11.7%		
	F	12.7%	20.0%	28.0%		
					M: 1.2 (1.0, 1.4) [2]	M: 1.2 (0.9, 1.6) [2]
					F: **1.3 (1.0, 1.8)** [2]	F: 1.5 (0.9, 2.7) [2]
Alcohol problems 33/34 years (CAGE)	M	19.5%	21.2%	21.5%		
	F	7.6%	9.3%	9.7%		
Daily smoking at 34 years	M	22.5%	32.6%	39.3%	**1.7 (1.4, 2.1)**	**2.2 (1.6, 3.0)**
	F	20.3%	31.2%	40.8%	**1.9 (1.5, 2.4)**	**2.4 (1.6, 3.7)**

[1] Adjusted for early childhood emotional problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05

Table 17: Frequencies and fully adjusted regression coefficients for social roles and adult mental health in relation to early childhood emotional problems: 1970 cohort

Outcome		Early childhood (age 5) emotional problems			Adjusted Odds Ratios[1] (95% CI)	
		None (N=6,267)	Mild (N=5,063)	Severe (N=1,702)	Mild	Severe
Partnership and offspring						
Divorced	M	10.2%	8.7%	9.8%	0.8 (0.6 1.0)	0.9(0.6 1.2)
	F	13.5%	15.1%	13.9%	1.1 (0.9, 1.4)	0.9 (0.7, 1.2)
Never married	M	37.4%	36.1%	36.2%	0.9 (0.8, 1.1)	0.9 (0.8, 1.2)
	F	28.1%	29.0%	27.2%	1.1 (0.9, 1.2)	0.9 (0.8, 1.2)
Teenage parenthood	M	5.5%	6.3%	6.5%	1.1 (0.7, 1.6)	1.0 (0.6, 1.7)
	F	13.1%	14.3%	14.0%	1.0 (0.8, 1.2)	0.9 (0.7, 1.3)
Social participation						
Voted in the 1997 election	M	59.3%	61.0%	60.9%	1.1 (1.0, 1.2)	1.1 (0.9, 1.4)
	F	64.4%	65.3%	65.3%	1.1 (1.0, 1.2)	1.1 (0.9, 1.4)
Ever belong to a trade union						
	M	36.1%	34.4%	38.8%	0.9 (0.8, 1.1)	1.1 (0.9, 1.4)
	F	34.7%	32.1%	31.1%	0.9 (0.8, 1.0)	0.9 (0.7, 1.1)
Offending (16-34 years)						
Ever arrested	M	32.0%	30.6%	28.0%	0.9 (0.8, 1.0)	**0.7 (0.6, 0.9)**
	F	5.9%	6.0%	6.8%	0.9 (0.7, 1.2)	1.0 (0.7, 1.4)
Ever convicted	M	25.7%	23.2%	22.1%	0.8 (0.7, 1.0)	**0.7 (0.6, 0.9)**
	F	4.4%	4.1%	3.5%	0.8 (0.6, 1.2)	0.6 (0.4, 1.1)
Adult mental health						
Emotional problems (26 to 30 years)					M: **1.2 (1.1, 1.4)** [2]	M: **1.6 (1.3, 1.9)** [2]
Mild/moderate symptoms	M	34.8%	37.3%	41.5%	F: 1.1 (1.0, 1.2) [2]	F: 1.3 (1.1, 1.5) [2]
	F	44.6%	48.2%	44.0%		
Severe symptoms	M	7.6%	9.9%	12.9%		
	F	13.1%	13.9%	20.4%		
					M: 1.1 (1.0, 1.3) [2]	M: 1.1 (0.9, 1.4) [2]
					F: 1.0 (0.8, 1.4) [2]	F: 1.1 (0.7, 1.6) [2]
Alcohol problems 33/34 years (CAGE)	M	19.0%	21.2%	20.9%		
	F	7.6%	9.3%	9.7%		
Daily smoking at 34 years	M	27.4%	25.2%	22.6%	**0.8 (0.7, 0.9)**	**0.6 (0.4, 0.8)**
	F	23.8%	22.1%	19.9%	**0.8 (0.7, 0.9)**	**0.6 (0.4, 0.7)**

[1] Adjusted for early childhood conduct problems, father's social class, childhood cognition, and childhood hyperactivity.

[2] Refers to overall odds of having worse adult emotional problems/more alcohol problems

Odds ratios in **bold** are significant at < 0.05.