The University Of Sheffield.

Social inequalities in young people's conduct problems: informing intervention development

Main Report, June 2022

Richard Rowe, Nora McIntyre, Christopher B. Stride, Barbara Maughan & Patrycja J. Piotrowska

Contents

Results from the project have been published in the following article:

Piotrowska, P. J., Stride, C. B., Maughan, B., Ford, T., McIntyre, N. A., & Rowe, R. (2022). Understanding the relationship between family income and conduct problems: findings from the mental health of children and young people survey. *Psychological Medicine*, 1-8. doi:10.1017/S0033291722000654

For further information, please contact Professor Richard Rowe (r.rowe@sheffield.ac.uk).

Executive Summary

Conduct problems, such as fighting, lying and stealing, are common in people aged 18 and younger, harming both victims and perpetrators. Developing and applying interventions to reduce conduct problems is therefore a key policy goal. One way to identify appropriate targets for such interventions is to understand the processes that lead to conduct problems and to target the factors implicated in these processes. A large body of evidence identifies low socio-economic status as a risk factor for conduct problems: Young people from lower income backgrounds are more likely to engage in conduct problems than children from higher income backgrounds. We focus on identifying the processes that underlie these inequalities, which in turn may identify how interventions should be formulated in order to reduce conduct problems. First, we systematically reviewed longitudinal research studies examining the mechanisms of social inequality in conduct problems. This highlighted data supporting the Family Stress Model which posits a series of steps whereby low socio-economic status impacts parental mental health and family functioning which in-turn leads to sub-optimal parenting and then to conduct problems in young people. The review also highlighted methodological limitations in the existing literature that reduce confidence in the validity of the processes identified to date. Second, we carried out our own analysis of the longitudinal Mental Health in Children and Young People 1999 survey. We addressed factors included in the Family Stress Model and a number of other potential processes that might link low socio-economic status to conduct problems. We found that lower income predicted future conduct problems but did not find evidence of the processes that explained social inequality in conduct problems. This highlights the need for future studies to explore alternative processes that link family socio-economic status to conduct problems in young people. Our results also highlighted that conduct problems have a negative effect on the future everyday lives of children, parents, and relationships within the family. Therefore, our findings underscore the need to prioritise interventions to reduce conduct problems in order to address these substantial societal challenges.

Background

Conduct problems in young people (18 years old or younger) present a major challenge to public health and wider social policy with negative short- and long-term consequences for perpetrators and victims alike. Therefore, intervening to reduce conduct problems is a priority. One way to identify intervention targets is to trace the processes that lead to conduct problems and to intervene to address the implicated risk factors. A social gradient, where children from lower income families are more likely to demonstrate conduct problems than children from more affluent families is well-documented. There is also substantial evidence that part of this association is causal. Identifying the processes through which this effect occurs may provide intervention targets that can reduce child conduct problems and flatten the social gradient in conduct problems, making society fairer.

The Family Stress Model provides one explanation of the processes that may be involved. In this model low income leads to economic pressure, which in turn leads to poor parental mental health and family dysfunction. This in turn leads to sub-optimal parenting and it is this factor that is hypothesised to lead to conduct problems in young people. A number of other potential processes have also been considered, however. For example, it has been proposed that low income might lead to living in a deprived neighbourhood, poor diet, and involvement with deviant peers, and that these factors may in turn lead to conduct problems.

Identification of the processes linking socio-economic status and conduct problems would offer potential targets for policy intervention. For example, if the Family Stress Model is correct, interventions improving parental mental health might be able to break the link between family income and conduct problems in young people.

Aims and Methods

First, we systematically reviewed research published between 1960 and 2020 that addressed the links between family income and conduct problems in young people. We focussed on 32 studies that followed young people over time as longitudinal studies offer the strongest method for identifying processes that has been commonly applied. Second, informed by our review, we tested processes identified in the literature review using the longitudinal 1999 Mental Health of Children and Young People Study. This dataset included 2399 children sampled from the UK general population, aged 5-15 at first contact. The sample was followed up three years later.

Key findings

Systematic review: We found a number of studies consistent with the Family Stress Model but support was not universal. There were also weaknesses in the methodologies that studies commonly used to evaluate this model that limited the conclusions that could be drawn. While the Family Stress Model remains an intuitive hypothesis regarding the processes linking socioeconomic status and conduct problems, rigorous tests of the proposed processes are limited to date and consideration of alternative processes is important.

The review identified other processes that might link socio-economic status and conduct problems. There were studies showing that low socio-economic status might influence life stressors, school and peer problems, and that these factors may in turn increase risk for conduct problems. A number of other potential processes have been discussed in the literature but have received limited research attention to date. These include pathways from socio-economic status to conduct problems via a stimulating home environment, academic achievement and diet. Neighbourhood deprivation has also been addressed in a number of studies, although the balance of evidence in the reviewed studies was that it does not perform a role.

Longitudinal analyses: Our own analyses tested links between socio-economic status and child conduct problems via a number of processes highlighted in the systematic review. Specifically, we explored pathways running from socio-economic status to

conduct problems via parental mental health, family functioning, stressful life events, along with the child's physical health and literacy. Our analytic approach addressed common methodological weaknesses identified in our systematic review. We found that lower socio-economic status did indeed predict worsening levels of conduct problems three years later, emphasising that interventions that increase income in vulnerable families may decrease conduct problems. Unexpectedly, however, none of the processes that we tested explained this effect. Instead we found that conduct problems in children predicted poor outcomes for the children themselves (lower reading achievements, poorer physical health) and for their families (poorer parental mental health, poorer family functioning and more stressful life events). These findings suggest that more research is required to identify intervention targets to break the link between low socio-economic status and child conduct problems. Our results also highlight the importance of intervening with conduct problems in young people to improve outcomes for the families of children with conduct problems.

Implications

- Low family socio-economic status is a risk factor for young people developing conduct problems. This implies that raising income for families with reduced resources could reduce inequalities in conduct problems.
- The literature testing potential pathways is not sufficiently developed to identify the processes involved with certainty and further developing this literature is a priority. This will involve focussing on longitudinal studies and applying the most appropriate statistical models that can assess the direction of effect.
- Conduct problems are a substantial problem for victims, perpetrators and society in general. Our results highlight the negative effect that child conduct problems have on the children themselves, on their parents and on the relationships within their families. Therefore, interventions to reduce conduct problems in young people are a priority action to reduce this range of harms.

Introduction

Conduct problems encompass a wide range of behaviours in young people including stealing, fighting, lying, argumentativeness and disobedience[1]. Many of these behaviours are likely to be displayed at some levels by most children during typical development. However, presentation at clinically significant levels can involve substantial costs to public services (Rivenbark et al., 2018) and important impacts on the mental health of victims (Prino, Longobardi, Fabris, Parada, & Settanni, 2019) and the psycho-social functioning of perpetrators (Burke, Rowe, & Boylan, 2014) with effects persisting into adulthood (Bevilacqua, Hale, Barker, & Viner, 2018). Clinically significant presentation is relatively common; in the UK, conduct problems are the most frequent reason for referral to Child and Adolescent Mental Health Services and are the most often diagnosed psychiatric disorder in community prevalence studies (NICE, 2013).

Given the severity of the public health challenge posed by conduct problems, prevention and intervention are key policy goals. Parenting interventions are the most commonly adopted approach, particularly with reference to younger children (NICE, 2013). Parenting interventions have been demonstrated to be effective in large-scale quantitative reviews, with small to medium effects on average (e.g., Leijten et al., 2019). While interventions based on parenting remain a priority, complementary targets for intervention can be identified through understanding the processes underlying conduct problems. Low family socio-economic status (SES) is a well-documented risk factor for conduct problems. In this project we aimed to identify the processes that link SES to child conduct problems, with the goal of identifying points in the chain that interventions can target to prevent or reduce conduct problems. Interventions that target the processes linking SES to conduct problems might have the additional advantage of reducing social inequalities in conduct problems and therefore making society fairer, in addition to reducing the absolute levels of conduct problems in the community.

In this report we first review the evidence linking SES and conduct problems. Second, we describe a systematic literature review of studies investigating the processes underlying this relationship. Third, we test potential processes using the longitudinal 1999 Mental Health of Children and Young People (MHCYP) dataset. Box 1 introduces the MHCYP studies as these inform much of the work reported here.

[1] In this report we take the symptoms of Conduct Disorder and Oppositional Defiant Disorder as listed in the Diagnostic and Statistical Manual of the American Psychiatric Association (2013) to identify the range of conduct problems common in childhood and adolescence.

Box 1. The Mental Health of Children and Young People (MHCYP) Studies

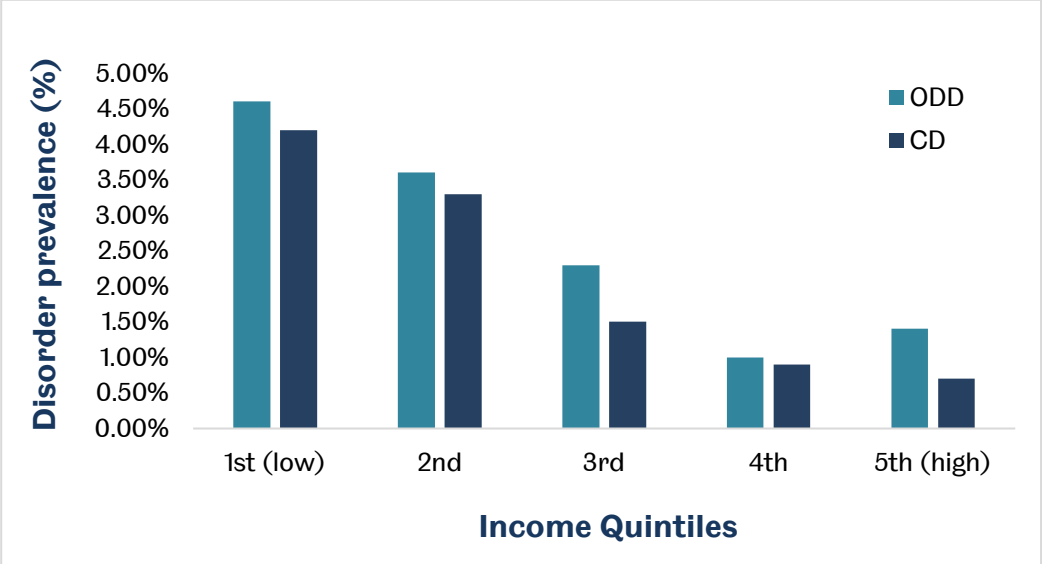
The surveys are described in detail by Ford et al. (2020). Briefly there have been three MHCYP surveys, started in 1999, 2004 and 2017. Each sampled 7000-11000 children and adolescents from the general UK population and collected follow-up data three years later. They all used the Development and Well-Being Assessment to measure all common psychiatric diagnoses, combining information from parent-, teacher- and self-report, with the aim of estimating the prevalence of psychiatric disorders. In addition, they collected some common questionnaire measures of child psychopathology and also measured a range of risk factors, including socio-economic status, family functioning and stressful life events.

The relationship between family SES and child conduct problems

A wealth of evidence supports a relationship between conduct problems in young people and their family SES (Peverill et al., 2021; Piotrowska, Stride, Croft, & Rowe, 2015). As with many health problems, SES-related variations follow a gradient, where the most disadvantaged suffer the largest burden. Even relatively more advantaged families suffer a greater burden than those at the very top of the status hierarchy as shown in Figure 1 (Piotrowska, Stride, Maughan, et al., 2015). The strength of the relationship between SES and conduct problems is illustrated by the diagnosis of Conduct Disorder being 4-5 times more common in the least well-off families compared to the most affluent. Full psychiatric diagnoses identify only the most extremely antisocial cases in the community. A similarly shaped gradient was observed for sub-diagnostic measures of conduct problems including aggressive behaviour, delinquency and callousness (Piotrowska, Stride, Maughan, et al., 2015).

As reviewed by Jaffee, Strait, and Odgers (2012), Maughan, Rowe, and Murray (2017) and Cooper and Stewart (2021) a range of studies indicate that there is a causal effect of family SES on offspring conduct problems. Figure 1 illustrates that the majority of children exposed to low family SES do not receive a Conduct Disorder diagnosis. One explanation for this is that SES can be conceptualised as a distant cause of conduct problems. For example, the Situational Action Theory (Wikström, 2004) models the perception-choice aspects of criminal decision-making in the context of social pressures that put individuals in criminogenic situations. In this model social inequalities are seen as a more distal cause of proximal causes that are addressed in the theory (Wikstrom, 2011). As such, models of this sort propose that low SES increases the chances of intermediate risk factors (termed *mediators*) that in turn increase the chances of elevated conduct problems. An explicit theoretical statement of the potential causal chain running from low SES to child conduct problems is provided by the Family Stress Model (Masarik & Conger, 2017). This model proposes that economic pressure increases the risk of parental emotional problems which in turn increase the risk of sub-optimal parenting. Sub-optimal parenting then increases the chances that the child will exhibit higher levels of conduct problems. It is therefore possible for there to be deviation from the pathway from lower SES to conduct problems at each step of this hypothesised causal chain.

Figure 1. Social gradients in psychiatric definitions of antisocial behaviour: Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) in the 2004 Mental Health of Children and Young People Survey [2].



The Family Stress Model has been tested in a number of studies (Masarik & Conger, 2017). Although the Family Stress Model proposes a sequence of impacts/influences across time, many of these studies used a cross-sectional design, where measurement of risk factors and outcomes were taken at the same time. Cross-sectional studies have also modelled a number of other potential mediators of the effect of lower SES on conduct problems including life events, poor physical health, literacy, neighbourhood deprivation and peer problems (Piotrowska, Stride, Maughan, & Rowe, 2019). These designs provide weak evidence regarding causal relationships because they cannot identify the direction of effects between the measured variables. For example, a cross-sectional study might identify *correlations* between SES, family functioning and conduct problems, but it cannot statistically distinguish between models specifying different temporal relationships between these variables. As a result, the hypothesis that impaired family functioning predicts future conduct problems cannot be statistically distinguished from the hypothesis that child conduct problems predict problems in future family functioning. However, cross-sectional studies do provide useful initial pointers to the factors that might mediate the effect of SES on conduct problems, that can then be examined in designs that are better suited to testing causality. Longitudinal studies, that measure SES and potential mediators earlier in development and assess their effects on conduct problems at a later timepoint, can provide stronger evidence of underlying processes than cross-sectional studies. In our first study we systematically reviewed relevant longitudinal studies to identify the current state of knowledge on potential processes linking family SES and child conduct problems.

[2] Based on data published in Piotrowska, P. J., Stride, C. B., Maughan, B., Goodman, R., McCaw, L., & Rowe, R. (2015). Income gradients within child and adolescent antisocial behaviours. *British Journal of Psychiatry, 207*(5), 385-391.

Study One: A systematic review of longitudinal studies linking family SES and child conduct problems

Method

We updated the database used in our previous meta-analysis (Piotrowska, Stride, Croft, et al., 2015) to include more recently published work, following the original literature search strategy that we described in detail elsewhere (Piotrowska, Stride, & Rowe, 2012). The database was formed through searching academic databases including Scopus and Web of Science for papers that contained synonyms for children (e.g., young people, adolescent, teen), SES (e.g., poverty, income), conduct problems (e.g., delinquency, antisocial behaviour) and longitudinal analyses (e.g., follow-up, wave) in their title, keywords or abstract.

We identified 343 papers published 1960 - June 2020 as potential inclusions. These were independently assessed by two reviewers. Papers were included if they were: written in English; reported empirical results from samples ≤18 years old recruited from the general population; measured both family SES (e.g., occupational/employment, income, or educational indicators) and conduct problems, and presented longitudinal analyses (i.e., SES measured before conduct problems) testing processes linking SES and conduct problems. Thirty studies were judged to meet the inclusion criteria and two further studies were included based on recommendation from experts. Therefore, our review included 32 studies.

Results

Nearly half of the included studies were published between 2015 and 2020, highlighting that this is a topic of current research interest. The majority of studies (n=21) had an even gender balance (between 45-55% boys), and six studies included boys only. Sample sizes ranged from 37 to 18,513 participants. We identify four distinct processes that have been commonly tested as pathways between low SES and conduct problems; the Family Stress Model (that includes parental mental health, family functioning and parenting), the role of neighbourhood, life stressors and school/peer characteristics.

<u>Family Stress Model</u>

Overall, support for the Family Stress Model was mixed. Three studies that tested the full model (Barajas, 2011; Martin et al., 2010; Simons et al., 2016) were supportive; they demonstrated relationships between lower SES and increased family stress and parental mental health difficulties, which in turn, were related to increased family conflict (i.e., lower family functioning) and predicted lower quality parenting (more aggressive, less warm and nurturing). Other studies that focussed on individual components of the FSM provided less clear support.

Twelve studies provided mixed evidence on the role of parenting. Several studies reported that lower SES was associated with lower levels of supportive/sensitive or positive parenting which, in turn predicted a higher level of conduct problems

(Bornstein, Putnick, & Suwalsky, 2018; Mills-Koonce, Willoughby, Garrett-Peters, Wagner, & Vernon-Feagans, 2016; Odgers et al., 2012). It is also possible that a specific aspect of parenting plays a role in explaining the SES-conduct problems relationship. Stern, Smith, and Jang (1999) showed that discipline was the key component of parenting linking poverty to conduct problems; they found no evidence that supportive parenting performed a role.

Four studies examined parental mental health as underlying the SES-conduct problems relationship. One study found evidence of a role for parental distress (Stern et al., 1999) while others (Amone-P'Olak, Burger, Huisman, Oldehinkel, & Ormel, 2011; Huisman et al., 2010) did not. Only two studies considered family functioning in isolation. Le Blanc, McDuff, and Kaspy (1998) reported that family functioning did not mediate the relationship between SES and delinquency whereas Lavigne, Gouze, Hopkins, and Bryant (2016) showed there was a pathway from low SES to conduct problems through increased family conflict. However, Lavigne et al. (2016) included an important additional analysis in which they controlled the level of initial conduct problems in the prediction of later conduct problems from family conflict. This addition to the model provides a more clearly longitudinal test of the effect of family conflict because the outcome in the model becomes *change in conduct problems* between initial measurement and follow-up. Family conflict was not a significant predictor of later conduct problems in this more appropriate modelling approach.

Neighbourhood

We did not find support for neighbourhood characteristics as a factor linking lower SES and conduct problems. Three studies found that neighbourhood measures did not explain the relationship between SES and conduct problems (Rekker et al., 2015; Simons et al., 2016; Vogel & South, 2016). However, Burrington (2018) found that, in the United States, youth with first generation immigrant status from low SES families demonstrated the highest odds of violence in the most advantaged neighbourhoods. In contrast, high SES first generation adolescents had the highest probability of violence in the least advantaged neighbourhoods but the lowest in the most advantaged neighbourhoods. These findings highlight the potential importance of *relative* deprivation, where the effects of family SES differ between advantaged and disadvantaged neighbourhoods.

Life stressors

Two studies supported life stressors in processes linking lower SES and conduct problems. Guerra, Huesmann, Tolan, and Van Acker (1995) showed that stressful life events, such as a family member becoming seriously ill, mediated the association between socio-economic position and aggression. Amone-P'Olak et al. (2009) identified a contribution from environment-related life stressors (e.g., chronic illness of a family member), but not from person-related stressors (e.g., bullying, romantic breakup).

School and Peers

There was some support for school characteristics contributing to the SES-conduct problems relationship. Higgins, Perra, Jordan, O'Neill, and McCann (2020) reported that school attachment, commitment and fighting functioned as a pathway between SES and offending. Another study found that lower SES was associated with deviant peer clustering which in turn predicted adolescent problem behaviour (Dishion, Ha, & Véronneau, 2012).

Other processes

A number of other processes received some attention in our reviewed studies. In the few relevant studies available, there was some support for pathways between low SES and conduct problems involving family investment in a cognitively stimulating environment (Martin et al., 2010; Simons et al., 2016), healthy diet (Wu, Lin, Li, Chang, & Chiang, 2020), low academic achievement (Defoe, Farrington, & Loeber, 2013), normative beliefs about aggression (Guerra et al., 1995) and access to substances (Stogner, Gibson, & Miller, 2014). Other processes have received limited testing and this evidence does not currently indicate that they perform a role in the link between low SES and conduct problems. These studies have examined pathways via child's health (Stogner et al., 2014), various brain regions (Spann, Bansal, Hao, Rosen, & Peterson, 2020) and youth economic resources (Stogner et al., 2014). Given the infrequency that all the processes addressed in this section have been tested to date, it would be premature to draw conclusions about them at this stage.

Conclusions

Processes linking SES and conduct problems are increasingly being tested in longitudinal analyses. The most commonly studied processes are specified in the Family Stress Model, particularly regarding parenting. There was evidence supporting the contention of this model that a pathway from low SES to conduct problems runs through parental distress, disrupted family functioning and sub-optimal parenting. However, the evidence base was not fully consistent and there was evidence supporting other pathways too, including a role for stressful life events.

Our focus on studies using longitudinal designs strengthened the quality of the evidence reviewed. However, the specific longitudinal designs adopted and the analyses applied in the studies that we found usually did not maximise the potential of longitudinal analyses to provide the most robust evidence on the processes involved. With regards to design, we only included studies that measured family income prior to conduct problems. However, we did not require that hypothesised intervening variables (such as parenting) were measured at an intermediate timepoint; they might have been measured at the same time as either SES or conduct problems. Where this was the case, the studies provide weaker evidence regarding pathways linking SES and conduct problems across time. Shortcomings in analysis to some extent reflect some important statistical developments only recently becoming available (e.g., Hamaker, Kuiper, & Grasman, 2015).

Furthermore, many studies did not control initial levels of conduct problems when testing potential pathways. Controlling initial levels of outcome variables is commonly advocated for analyses of this sort (Preacher, 2015) because it strengthens the power of the longitudinal design to establish the temporal ordering of relationships. When predicting conduct problems at time 2, from a variable such as parenting measured at an earlier time 1, control of the level of conduct problems at time 1 means that only the difference in conduct problems between time 1 and 2 is predicted by parenting. Therefore, the results reflect the effect of parenting on *changes* in conduct problems that take place after parenting was measured. Including this statistical control can be important for the pattern of results observed. This was illustrated by Lavigne et al. (2016) as discussed above. This study found evidence of a pathway from low SES to conduct problems running through family functioning. However, this pathway was no longer significant once initial levels of conduct problems were controlled.

In addition, effects may operate bidirectionally. The discussion so far has assumed that child conduct problems are an outcome of other risk factors, such as SES and parenting. However, it is also possible that child conduct problems might have implications for other aspects of the child's and family's functioning. For example, it is possible that child conduct problems could lead to lower family SES, perhaps through a parent reducing their employment commitment in order to focus on caring for a child exhibiting behaviour problems. Research addressing this issue suggests that conduct problems in childhood and adolescence may influence the same individual's SES in adulthood (Martin et al., 2010). During childhood and adolescence, however, the evidence indicates that SES causes conduct problems, as discussed earlier. Bidirectional effects are also possible regarding the processes hypothesised to link SES and conduct problems. For example, it is possible that parental depression might reduce parental monitoring and subsequently increase child conduct problems. However, it is also possible that child conduct problems might increase depression in parents. Therefore, it is important to check on the direction of effect in observed relationships. For example, a pathway in which low SES influences parenting practices and parenting influences conduct problems, has markedly different intervention implications from a pathway where low SES influences conduct problems and conduct problems influence parenting. Only two (Defoe et al., 2013; Lavigne et al., 2016) of the 32 studies that we reviewed examined bidirectional effects between hypothesised intermediate factors and conduct problems. Testing the possibility of bidirectional effects within hypothesised pathways is crucial to fully understand how SES, individual and family functioning, and conduct problems are linked.

Building on the findings of this review we went on to conduct primary analyses in the MHCYP 1999 dataset to test longitudinal pathways between low SES and conduct problems (Study Two). We included pathways relevant to the Family Stress Model (parental mental health and family functioning) and also examined potential pathways running separately through stressful life events, physical health and child literacy. Our dataset and analytic approach had two advantages over many of the studies included in our systematic review. First, we statistically accounted for conduct problems at initial contact when predicting conduct problems at follow-up.

This means that our prediction focussed on change in conduct problems between the time points. Second, we tested potential bidirectional effects, examining whether conduct problems might be usefully conceptualised as a predictor of family difficulties as well as an outcome.

Study Two: Identifying processes linking income and conduct problems in the MHCYP 1999 study

Method

We used the 1999 MHCYP dataset as described in Box 1 (page 7). The initial sweep of data collection is described in detail in Meltzer, Gatwood, Goodman, and Ford (2000). Meltzer, Gatward, Corbin, Goodman, and Ford (2003) describe the follow-up dataset. Our analysis sample included 2,399 participants; 52% male, mean age 9.93 years (SD=3.11, range: 5-15) at first contact.

The key predictor variable was annual household gross income which was reported by parents (97% mother). Child conduct problems were the key outcome. We used separate measures recorded by parents and teachers. The parent reports were taken from the conduct problems sub-scale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). This contains items measuring losing temper, fighting, lying, stealing and disobedience. Teacher-rated Conduct Disorder symptoms were assessed using the Development and Well-Being Assessment (DAWBA; Goodman, Ford, Richards, Gatward, & Meltzer, 2000). This measured bullying, fighting and lying, which were relatively commonly reported for approximately 11%-13% of the sample. The DAWBA also measured stealing, physical cruelty, and vandalism, which were each endorsed for 4%-5% of the sample. Four additionally measured items (uses weapons when fighting, deliberately cruel to animals, sets fires deliberately, and unwanted sexual activity) were dropped because <2% of the sample were reported to show them.

Parents completed the 12-item General Health Questionnaire (GHQ-12; Goldberg et al., 1997) which assesses recent problems in everyday functioning, such as feeling strained and facing problems with concentration and sleep. Family functioning was assessed using the parent-completed General Functioning Scale of the McMaster Family Assessment Device (Epstein, Baldwin, & Bishop, 1983). This asks questions about the efficacy of family decision making, feeling of acceptance, and discussions of emotions within the family. We measured the number of stressful life events that parents reported. Our analyses included parental separation and marital difficulties, major financial crisis, serious illness/stay at hospital, and serious accident (Meltzer et al., 2003). The child's physical health was measured by asking parents 'How is your child's health in general?' which was answered on a scale from very good to very bad. Children's reading and spelling were compared to peers; teachers assessed them as above average, average, facing some difficulty or facing marked difficulty. All measures were taken identically at initial contact and follow-up.

Results

We will present our formal analyses and full details of the results in an academic publication (Piotrowska et al., 2022). In brief, we found, as expected, that lower income at initial contact was related to worsening parent-reported (though not teacher-reported) conduct problems. Lower income also predicted worsening family functioning and child physical health at follow-up, but it did not predict worsening of the other potential mediators included in the study (parental mental health, life events and literacy). In addition, none of the mediators measured at initial contact (parental mental health, family functioning, life events, physical health, literacy) predicted worsening conduct problems. This implies that these factors were not involved in processes linking income and future conduct problems in this study. In summary, this initial stage of the analyses suggested that there was indeed an effect of family income on children's conduct problems, but that that effect was not explained by the potential mediators measured here.

By contrast, our analysis of bidirectional effects from conduct problems to difficulties in family and child functioning did identify some significant pathways. Specifically, higher parent-reported conduct problems at initial contact predicted worsening levels of family functioning, parental mental health, child's physical health and stressful life events but not reading. Teacher-reported conduct problems at first contact predicted worsening reading levels across the study.

We checked whether these associations were similar for younger (5-10) and older (11-15) age groups. We found no evidence that they were different, so these patterns appear consistent for both younger and older children.

Discussion

We examined the association of family income and child conduct problems over time to test processes that might mediate this relationship. The MHCYP 1999 dataset has many strengths for this purpose including a large sample, detailed assessment of conduct problems as reported by both parents and teachers and a 3 year follow-up. A further strength was the measurement of an array of potential processes that are good indicators of the factors included in current theoretical models of the relationship, such as the Family Stress Model (Conger, Ge, Elder, Lorenz, & Simons, 1994). As noted above, our analytic approach also had advantages over previous approaches. First, we statistically controlled conduct problems at initial contact when predicting conduct problems at follow-up, meaning that our prediction focussed on changes in conduct problems over time. Second, we examined bidirectional relationships between family difficulties and conduct problems, rather than simply treating conduct problems as an outcome.

The findings highlighted some expected associations, but also others that we had not anticipated. In terms of expected findings, we found that lower income was associated with greater future adversity regarding unhealthy family functioning and child physical health. We did not find, however, that the adversities measured at initial contact were related to worsening conduct problems between initial contact

and follow-up. We had expected to find that at least some of the measures would identify processes linking income with future conduct problems. Our measures included parental mental health and family functioning which are important components of the Family Stress Model account of the processes linking SES and antisocial behaviour (Masarik & Conger, 2017). It is possible that our originally hypothesised pathways have their origins earlier in development than at the ages studied here. Our model did not fit differently in children aged 5-10 compared to those aged 11-15, but our data cannot tell us anything about processes that are influential before age 5.

Our analyses did show that lower income at initial contact was associated with worsening conduct problems during the course of the study. This finding is particularly striking given the lack of relationship identified between our measures of child and family adversities at initial contact and conduct problems at follow-up. This result highlights that increasing income in low- and middle-income families may improve child conduct problems, but that the effects of income variations are likely to be carried by factors that were not included in this study.

Plausible candidate processes that were not included in this study include parenting. Parenting was not measured in MHCYP 1999 in a way that was compatible with our modelling approach. Our primary goal was to explore new intervention targets. There is already sufficient evidence elsewhere that targeting parenting is an effective intervention approach for reducing conduct problems as discussed above and considered in more detail at the end of this section. Other factors identified as potential candidates in our systematic review included peer and school effects; these were not measured in MHYCP 1999. These should be examined as potential mediators in future studies. Our systematic review also highlighted a number of other potential candidate mediators of the effect of SES on conduct problems, including academic achievement and diet that have received little research attention to date. These should become a focus for future work. Future work would benefit from the rigorous approach to statistical control adopted in our work and additionally considering the latest advances in cross-lagged modelling which are applicable to studies which take measurements at three or more time points (Hamaker et al., 2015).

Our inclusion of potential bidirectional effects, where conduct problems predicted later family adversity rather than vice versa, identified a number of significant effects. Parent-reported conduct problems at initial contact were associated with worsening family functioning, parental mental health, child physical health problems and stressful life events. Teacher-reported conduct problems at initial contact did not link to changes in these adversities, but did predict worsening reading at follow-up. It is possible that teachers are most attuned to identifying conduct problems that will have educational consequences while parents are better able to identify forms of conduct problems with implications for child and family functioning.

Our findings emphasise a role for conduct problems in predicting future adversity for the child (life events, physical health, and reading problems) and the family more broadly (parental mental health and unhealthy family functioning). This might reflect

the strain of parenting a child displaying conduct problems. It will be important to examine whether conduct problems are a genuinely causal agent in these relationships in future research. The findings also emphasise the importance of intervening to reduce conduct problems in childhood and adolescence. A number of adverse outcomes of conduct problems for victims, broader society and the perpetrators themselves were considered in the introduction to this report. Our findings underscore additional harms to the families resulting from child conduct problems. Further evidence of these harms provides additional impetus for policy to target ways to reduce the levels of conduct problems displayed by children and adolescents.

As noted in the introduction, parenting interventions are the most commonly recommended approach for addressing conduct problems, particularly in younger children (NICE, 2013). The literature has identified the effectiveness of this approach, which can yield small to medium effect sizes in conduct problem reductions that can be of considerable value at the population level. Recent studies have focussed on identifying the key components of interventions that can maximise effectiveness and efficiency (Leijten et al., 2019; Leijten, Melendez-Torres, & Gardner, 2021). For example, Leijten et al. (2019) reviewed 154 trials and identified that interventions were more effective when they targeted children displaying higher levels of conduct problems rather than being applied to all children. A number of techniques that enhanced effectiveness were identified, including positive reinforcement.

In addition to parenting interventions, a wide range of intervention methods have been trialled with adolescent participants. Castillo-Eito et al. (2020) reviewed 95 trials of interventions for aggression, many of which involved school-based training programmes. The average effect size, was comparable to that identified for the parenting interventions discussed above. Similar to the review of parenting interventions, Castillo-Eito et al. (2020) found interventions targeted to those who were showing higher levels of aggression had larger effect sizes than those applied to the whole population. Other characteristics of more effective interventions included delivery by an intervention specialist, rather than a teacher, and that shorter interventions were more effective than longer. In terms of content, interventions were most effective when they provided training in problem solving, involving analysing the factors influencing aggressive behaviour, and in generating alternative behavioural strategies to use in those situations, and opportunities for practicing appropriate behaviours to develop good habits.

General Conclusions

There is a clear link between low family SES and child conduct problems. We set out to understand the processes involved, with the aim of identifying targets for intervention. Our systematic review of the existing literature identified a number of plausible processes through which this effect might be transmitted but also some methodological weaknesses in much of the existing literature. Our own analyses of a large-scale longitudinal study confirmed that lower income predicts worsening conduct problems, adding to the evidence that interventions that increase income are likely to be beneficial in reducing conduct problems. Our analyses also

highlighted the need for further research to identify the intermediate processes underlying the association between SES and conduct problems.

The importance of intervention for conduct problems is clear. In addition to the negative consequences of conduct problems for victims, society and perpetrators, our findings emphasised the impact of child conduct problems on family functioning. We identified that a number of effective methods for reducing conduct problems are already available in the literature and believe that an important policy goal is to continue refining these methods and ensuring that they are available to the families that need them most.

Acknowledgements

We are grateful to the families that provided data for the British Child and Adolescent Mental Health Surveys and to Professor Robert Goodman (King's College London) and Professor Tamsin Ford (University of Cambridge) for assistance in accessing some aspects of these data.

This work was funded by The Nuffield Foundation. The Nuffield Foundation is an independent charitable trust with a mission to advance social well-being. It funds research that informs social policy, primarily in Education, Welfare, and Justice. It also funds student programmes that provide opportunities for young people to develop skills in quantitative and scientific methods. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics and the Ada Lovelace Institute. The Foundation has funded this project, but the views expressed are those of the authors and not necessarily the Foundation. Visit www.nuffieldfoundation.org

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Amone-P'Olak, K., Burger, H., Huisman, M., Oldehinkel, A. J., & Ormel, J. (2011). Parental psychopathology and socioeconomic position predict adolescent offspring's mental health independently and do not interact: the TRAILS study. *J Epidemiol Community Health, 61*(1), 57-63.

Amone-P'Olak, K., Ormel, J., Huisman, M., Verhulst, F. C., Oldehinkel, A. J., & Burger, H. (2009). Life stressors as mediators of the relation between socioeconomic position and mental health problems in early adolescence: the TRAILS study. *J Am Acad Child Adolesc Psychiatry, 48*(10), 1031-1038.

Barajas, R. G. (2011). *The Family Process Model: Predicting Youth Behavior Problems in Mexican American, African American, and European American Families.* (PhD). Columbia University,

Bevilacqua, L., Hale, D., Barker, E. D., & Viner, R. (2018). Conduct problems trajectories and psychosocial outcomes: a systematic review and meta-analysis. *European Child & Adolescent Psychiatry, 27*(10), 1239-1260.

Bornstein, M. H., Putnick, D. L., & Suwalsky, J. T. D. (2018). Parenting cognitions -> parenting practices -> child adjustment? The standard model. *Development and Psychopathology, 30*(2), 399-416.

Burke, J. D., Rowe, R., & Boylan, K. (2014). Functional outcomes of child and adolescent oppositional defiant disorder symptoms in young adult men. *Journal of Child Psychology and Psychiatry, 55*(3), 264-272.

Burrington, L. A. (2018). Neighborhood Advantage, Relative Status, and Violence Among Foreign-Born Adolescents. *Justice Quarterly, 35*(4), 699-725.

Castillo-Eito, L., Armitage, C. J., Norman, P., Day, M. R., Dogru, O. C., & Rowe, R. (2020). How can adolescent aggression be reduced? A multi-level meta-analysis. *Clinical Psychology Review, 78*, 101853.

Conger, R. D., Ge, X. J., Elder, G. H., Lorenz, F. O., & Simons, R. L. (1994). Economic-stress, coercive family process, and developmental problems of adolescents. *Child Development, 65*(2), 541-561.

Cooper, K., & Stewart, K. (2021). Does Household Income Affect children's Outcomes? A Systematic Review of the Evidence. *Child Indicators Research, 14*(3), 981-1005.

Defoe, I. N., Farrington, D. P., & Loeber, R. (2013). Disentangling the relationship between delinquency and hyperactivity, low achievement, depression, and low socioeconomic status: Analysis of repeated longitudinal data. *Journal of Criminal Justice, 41*(2), 100-107.

Dishion, T. J., Ha, T., & Véronneau, M.-H. (2012). An ecological analysis of the effects of deviant peer clustering on sexual promiscuity, problem behavior, and childbearing from early adolescence to adulthood: an enhancement of the life history framework. *Developmental Psychology, 48*(3), 703-717.

Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy, 9*(2), 171-180.

Ford, T., Vizard, T., Sadler, K., McManus, S., Goodman, A., Merad, S., . . . the, M. C. (2020). Data Resource Profile: Mental Health of Children and Young People (MHCYP) Surveys. *International Journal of Epidemiology, 49*(2), 363-364g.

Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine, 27*(1), 191-197.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry, 38*(5), 581-586.

Goodman, R., Ford, T., Richards, H., Gatward, R., & Meltzer, H. (2000). The Development and Well-Being Assessment: Description and initial validation of an integrated assessment of child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 41*(5), 645-655.

Guerra, N. G., Huesmann, L. R., Tolan, P. H., & Van Acker, R. (1995). Stressful events and individual beliefs as correlates of economic disadvantage and aggression among urban children. *Journal of Consulting and Clinical Psychology, 63*(4), 518-528.

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychoiogical Methods, 20*, 102-116.

Higgins, K., Perra, O., Jordan, J. A., O'Neill, T., & McCann, M. (2020). School bonding and ethos in trajectories of offending: Results from the Belfast Youth Development Study. *British Journal of Educational Psychology, 90*(2), 424-448.

Huisman, M., Araya, R., Lawlor, D. A., Ormel, J., Verhulst, F. C., & Oldehinkel, A. J. (2010). Cognitive ability, parental socioeconomic position and internalising and externalising problems in adolescence: findings from two European cohort studies. *European journal of epidemiology, 25*(8), 569-580.

Jaffee, S. R., Strait, L. B., & Odgers, C. L. (2012). From Correlates to Causes: Can Quasi-Experimental Studies and Statistical Innovations Bring Us Closer to Identifying the Causes of Antisocial Behavior? *Psychological Bulletin, 138*(2), 272-295.

Lavigne, J. V., Gouze, K. R., Hopkins, J., & Bryant, F. B. (2016). A multidomain cascade model of early childhood risk factors associated with oppositional defiant disorder symptoms in a community sample of 6-year-olds. *Development and Psychopathology, 28*(4pt2), 1547-1562.

Le Blanc, M., McDuff, P., & Kaspy, N. (1998). Family and Early Adolescent Delinquency: A Comprehensive Sequential Family Control Model. *Early Child Development and Care, 142*(1), 63-91.

Leijten, P., Gardner, F., Melendez-Torres, G. J., van Aar, J., Hutchings, J., Schulz, S., . . . Overbeek, G. (2019). Meta-Analyses: Key Parenting Program Components for Disruptive Child Behavior. *Journal of the American Academy of Child & Adolescent Psychiatry, 58*(2), 180-190.

Leijten, P., Melendez-Torres, G. J., & Gardner, F. (2021). Research Review: The most effective parenting program content for disruptive child behavior – a network meta-analysis. *Journal of Child Psychology and Psychiatry*.

Martin, M. J., Conger, R. D., Schofield, T. J., Dogan, S. J., Widaman, K. F., Donnellan, M. B., & Neppl, T. K. (2010). Evaluation of the interactionist model of socioeconomic status and problem behavior: a developmental cascade across generations. *Development and Psychopathology, 22*(3), 695-713.

Masarik, A. S., & Conger, R. D. (2017). Stress and child development: a review of the Family Stress Model. *Current Opinion in Psychology, 13*, 85-90.

Maughan, B., Rowe, R., & Murray, J. (2017). Family poverty and structure. In J. E. Lochman & W. Matthys (Eds.), *The Wiley Handbook of Disruptive and Impulse-Control Disorders* (pp. 257-274). Hoboken, NJ: John Wiley and Sons.

Meltzer, H., Gatward, R., Corbin, T., Goodman, R., & Ford, T. (2003). *Persistence, onset, risk factors and outcomes of childhood mental disorders*. London: Office for National Statistics.

Meltzer, H., Gatwood, R., Goodman, R., & Ford, T. (2000). *The Mental Health of Children and Adolescents in Great Britain*. London: Office for National Statistics.

Mills-Koonce, W. R., Willoughby, M. T., Garrett-Peters, P., Wagner, N., & Vernon-Feagans, L. (2016). The interplay among socioeconomic status, household chaos, and parenting in the prediction of child conduct problems and callous-unemotional behaviors. *Development and Psychopathology, 28*(3), 757-771.

NICE. (2013). *Antisocial behaviour and conduct disorders in children and young people: recognition and management* (Clinical Guideline CG158). Retrieved from https://www.nice.org.uk/guidance/cg158

Odgers, C. L., Caspi, A., Russell, M. A., Sampson, R. J., Arseneault, L., & Moffitt, T. E. (2012). Supportive parenting mediates neighborhood socioeconomic disparities in children's antisocial behavior from ages 5 to 12. *Development and Psychopathology, 24*(3), 705-721.

Peverill, M., Dirks, M. A., Narvaja, T., Herts, K. L., Comer, J. S., & McLaughlin, K. A. (2021). Socioeconomic status and child psychopathology in the United States: A meta-analysis of population-based studies. *Clinical Psychology Review, 83*, 101933-101933.

Piotrowska, P. J., Stride, C. B., Croft, S. E., & Rowe, R. (2015). Socioeconomic status and antisocial behaviour among children and adolescents: A systematic review and meta-analysis. *Clinical Psychology Review, 35*, 47-55.

Piotrowska, P. J., Stride, C. B., Maughan, B., Ford, T., McIntyre, N. A., & Rowe, R. (2022). Understanding the relationship between family income and conduct problems: findings from the mental health of children and young people survey. *Psychological Medicine*, 1-8.

Piotrowska, P. J., Stride, C. B., Maughan, B., Goodman, R., McCaw, L., & Rowe, R. (2015). Income gradients within child and adolescent antisocial behaviours. *British Journal of Psychiatry, 207*(5), 385-391.

Piotrowska, P. J., Stride, C. B., Maughan, B., & Rowe, R. (2019). Mechanisms underlying social gradients in child and adolescent antisocial behaviour. *SSM - Population Health, 7*, 100353.

Piotrowska, P. J., Stride, C. B., & Rowe, R. (2012). Social gradients in child and adolescent antisocial behavior: a systematic review protocol. *Systematic reviews, 1*, 38.

Preacher, K. J. (2015). Advances in Mediation Analysis: A Survey and Synthesis of New Developments. In S. T. Fiske (Ed.), *Annual Review of Psychology, Vol 66* (Vol. 66, pp. 825-852).

Prino, L. E., Longobardi, C., Fabris, M. A., Parada, R. H., & Settanni, M. (2019). Effects of Bullying Victimization on Internalizing and Externalizing Symptoms: The Mediating Role of Alexithymia. *Journal of Child and Family Studies, 28*(9), 2586-2593.

Rekker, R., Pardini, D., Keijsers, L., Branje, S., Loeber, R., & Meeus, W. (2015). Moving in and out of Poverty: The Within-Individual Association between Socioeconomic Status and Juvenile Delinquency. *Plos One, 10*(11).

Rivenbark, J. G., Odgers, C. L., Caspi, A., Harrington, H., Hogan, S., Houts, R. M., . . . Moffitt, T. E. (2018). The high societal costs of childhood conduct problems: evidence

from administrative records up to age 38 in a longitudinal birth cohort. *Journal of Child Psychology and Psychiatry, 59*(6), 703-710.

Simons, L. G., Wickrama, K. A. S., Lee, T. K., Landers-Potts, M., Cutrona, C., & Conger, R. D. (2016). Testing Family Stress and Family Investment Explanations for Conduct Problems Among African American Adolescents. *Journal of Marriage and Family, 78*(2), 498-515.

Spann, M. N., Bansal, R., Hao, X., Rosen, T. S., & Peterson, B. S. (2020). Prenatal socioeconomic status and social support are associated with neonatal brain morphology, toddler language and psychiatric symptoms. *Child Neuropsychology, 26*(2), 170-188.

Stern, S. B., Smith, C. A., & Jang, S. J. (1999). Urban families and adolescent mental health. *Social Work Research, 23*(1), 15-27.

Stogner, J., Gibson, C. L., & Miller, J. M. (2014). Examining the Reciprocal Nature of the Health-Violence Relationship: Results from a Nationally Representative Sample. *Justice Quarterly, 31*(3), 473-499.

Vogel, M., & South, S. J. (2016). Spatial dimensions of the effect of neighborhood disadvantage on delinquency. *Criminology, 54*(3), 434-458.

Wikstrom, P. O. (2011). Does Everything Matter? Addressing the Problem of Causation and Explanation in the Study of Crime. In J. M. McGloin, C. J. Sullivan, & L. W. Kennedy (Eds.), *When Crime Appears: The Role of Emergence.* London: Routledge.

Wikström, P. O. (2004). Crime as Alternative. Towards a Cross-level Situational Action Theory of Crime Causation. In J. McCord (Ed.), *Beyond Empiricism: Institutions and Intentions in the Study of Crime.* New Brunswick: Transaction.

Wu, W.-C., Lin, C.-I., Li, Y.-F., Chang, L.-Y., & Chiang, T.-l. (2020). The mediating effect of dietary patterns on the association between mother's education level and the physical aggression of five-year-old children: a population-based cohort study. *BMC Pediatrics, 20*(1), 1-10.