



The Social Gradient
in Adolescent Mental Health

**What, Why
and for Whom**

Dominic Weinberg

The Social Gradient in Adolescent Mental Health

What, Why and for Whom

Dominic Weinberg

Cover design: Sarah Oxley, longfeltwant.com
Provided by thesis specialist: Ridderprint, ridderprint.nl
Printing: Ridderprint
Layout and design: Michiel Huige, persoonlijkproefschrift.nl
ISBN: 978-94-6416-871-6
DOI: <https://doi.org/10.33540/736>

© 2021 Dominic Weinberg

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage or retrieval system, without permission from the author, or, when appropriate, the publishers of the articles.

The social gradient in adolescent mental health

What, why and for whom

De samenhang tussen SES en mentale gezondheid van adolescenten

Welke indicatoren, waarom en voor wie

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de
Universiteit Utrecht
op gezag van de
rector magnificus, prof.dr. H.R.B.M. Kummeling,
ingevolge het besluit van het college voor promoties
in het openbaar te verdedigen op

vrijdag 19 november 2021 des ochtends te 10.15 uur

door

Dominic Willy Weinberg

geboren op 18 november 1985
te Londen, Verenigd Koninkrijk

Promotor:

Prof. dr. Catrin Finkenauer

Copromotor:

Dr. Gonneke W.J.M. Stevens

Beoordelingscommissie:

Prof. dr. Marloes Kleinjan	Universiteit Utrecht
Prof. dr. Anton E. Kunst	Universiteit van Amsterdam
Prof. dr. Marcel Lubbers	Universiteit Utrecht
Prof. dr. Ineke Maas	Universiteit Utrecht, Vrije Universiteit Amsterdam
Prof. dr. Wilma A. M. Vollebergh	Universiteit Utrecht

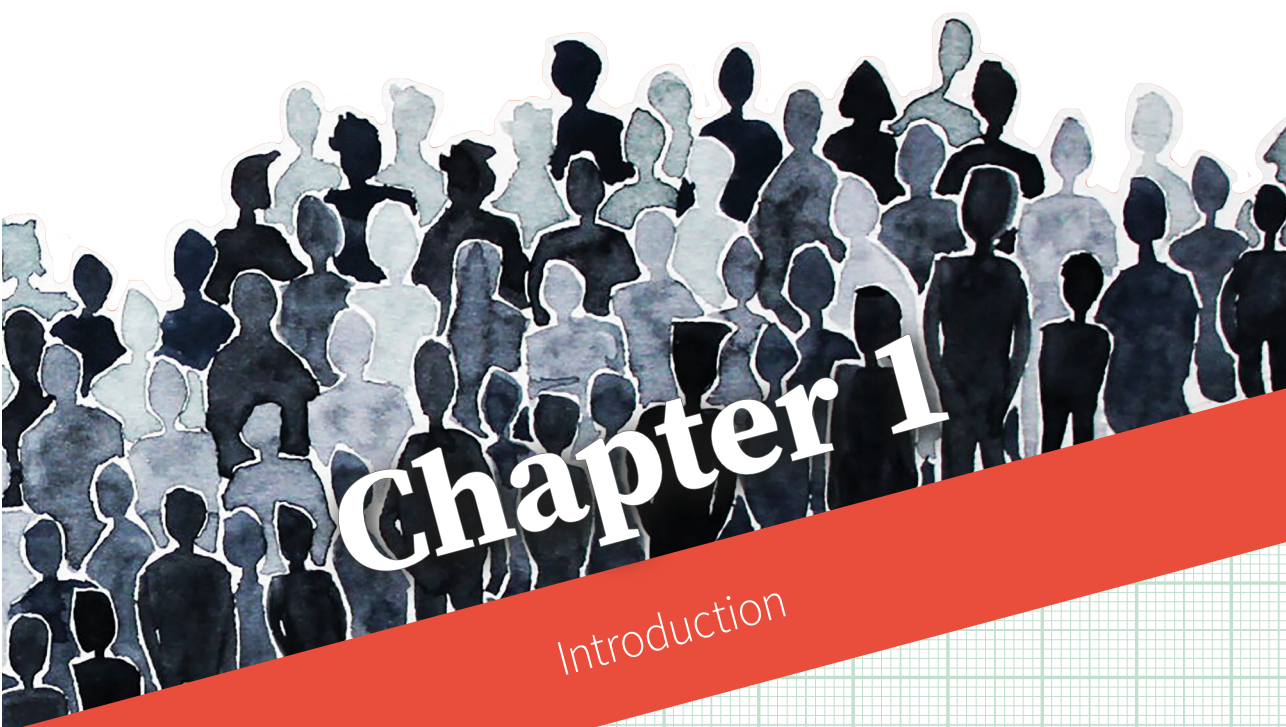
I believe that every person is born with talent

Maya Angelou

Table of Contents

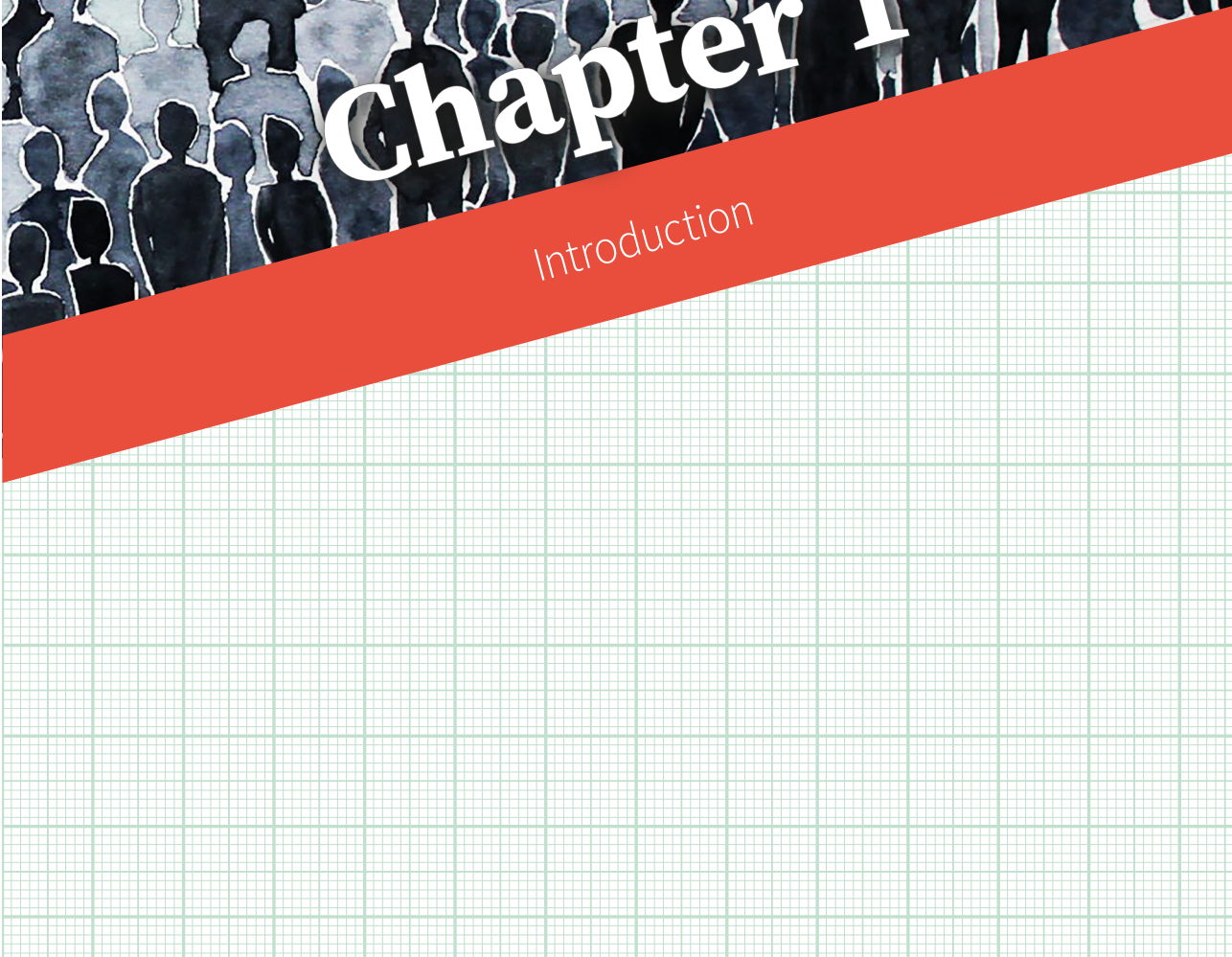
Chapter 1	Introduction	9
Chapter 2	Adolescent socioeconomic status and mental health inequalities in the Netherlands, 2001-2017	19
Chapter 3	The social gradient in adolescent mental health: Mediated or moderated by belief in a just world?	41
Chapter 4	The role of social cognitions in the social gradient in adolescent mental health: A longitudinal mediation model	57
Chapter 5	Country-level meritocratic beliefs moderate the social gradient in adolescent mental health: A multilevel study in 30 European countries	83
Chapter 6	The pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment: An examination of the role of cognitive ability, teacher assessment, and educational expectations	105
Chapter 7	Summary and general discussion	129
	Samenvatting (Summary in Dutch)	147
	References	153
	Acknowledgments	181
	Curriculum Vitae	187





Chapter 1

Introduction



Chapter 1

There are vast human, social, and economic costs of mental ill-health across the life course (Vigo et al., 2016). The majority of lifetime mental health problems, perhaps as many as three-quarters, develop before the end of adolescence (Kessler et al., 2007) and future patterns of adult health are established during this important developmental period (Sawyer et al., 2012). Adolescents also become the parents of the future (Patton et al., 2018). Thus, improving adolescent mental health can bring a “triple dividend” – benefiting adolescents in the present, paving the way for healthier future adults, and improving the prospects of the next generation (Patton et al., 2016). To achieve this triple dividend, it is important that adolescents not only avoid mental health problems, but also achieve well-being: mental health is a multidimensional construct and its positive and negative indicators are partly independent of one another (Huppert & Whittington, 2003). Therefore, this dissertation considers both positive mental health (life satisfaction) and mental health problems (emotional symptoms, conduct problems, hyperactivity, peer problems, psychosomatic complaints, and aggressive behaviour) in adolescence.

Adolescent development is characterised by profound physical, cognitive, and behavioural changes, as well as the realignment of relationships with family, peers, community, and society (Smetana et al., 2006). Ecological models emphasise that this development is shaped by interactions between adolescents and the social contexts they are embedded within (Bronfenbrenner & Morris, 2007; see Figure 1.1). Adolescents are nested within the microsystem of their families, schools, and peer groups, which are themselves fixed in a macrosystem of cultural, political, and economic conditions. The macrosystem is embedded within the chronosystem, the historical period in which the adolescent lives. Each system contains processes, roles, rules, and norms that interact and shape adolescent development.

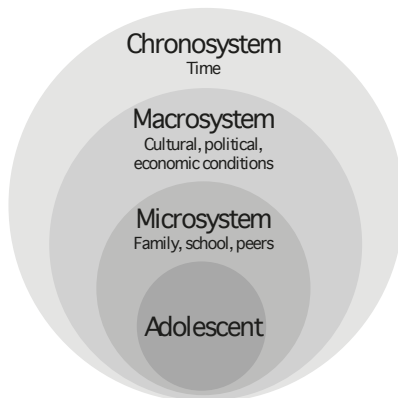


Figure 1.1 Ecological systems model.

One important marker of the ecological context is socioeconomic status (SES). There is robust evidence of a ‘social gradient’ (Adler et al., 1994); the higher an adolescents’

SES, the better their mental health is (Devenish et al., 2017; Peverill et al., 2021; Reiss, 2013). However, much remains unknown about three key questions regarding the social gradient in adolescent mental health. *What* is the social gradient in adolescent mental health (i.e., how strongly are different indicators of SES associated with adolescent mental health)? *Why* does SES matter for adolescent mental health (i.e., which mechanisms mediate the link between SES and adolescent mental health)? *For whom* is the social gradient strongest and weakest (i.e., what moderates the social gradient)? Answering these questions may shed light on why this social gradient is persistent and found even in high-income countries with strong welfare states and extensive public services (Elgar et al., 2015; Inchley et al., 2016; Mackenbach, 2012). This dissertation primarily looks at the social gradient in one such country, the Netherlands, which is near the top of international rankings on income, income equality and human development (Mulder et al., 2018). It also includes one chapter with cross-country analysis to help put the findings for the Netherlands in an international context.

What is the social gradient in adolescent mental health?

SES indicates position in the societal hierarchy and reflects access to material and social resources and assets (Currie et al., 2008; Krieger et al., 1997). Most studies investigating the social gradient in adolescent mental health include a measure of parental SES (Letourneau et al., 2013; Reiss, 2013). These indicators generally measure one, or more, of the following objective markers of the SES of the adolescent's mother or father (or both parents): completed education, occupation, income, and/or wealth (Krieger et al., 1997). In addition to these objective markers, SES also has a subjective component – for adolescents this refers to their perception of their family's SES (American Psychological Association, Task Force on Socioeconomic Status, 2007; Quon & McGrath, 2014). There is increasing evidence that subjective SES is associated with adolescent mental health independently from objective SES, and is thus a second important indicator of the social gradient (Quon & McGrath, 2014; Rivenbark et al., 2019).¹ Furthermore, during the adolescent period, which marks the transition into adulthood, adolescents are beginning to establish their *own* emerging SES. Adolescents grow increasingly independent from their parents and begin to shape their own educational and occupational trajectories (Hagquist, 2007; Schoon & Lyons-Amos, 2017). In countries like the Netherlands, where there is early tracking into educational routes (OECD, 2016), adolescent educational level may be a good indicator of their own current and future SES (Havas et al., 2010). There is also some evidence that adolescent educational level is positively associated with adolescent mental health (Hagquist, 2007; Havas et al., 2010).

While there is evidence that all three SES indicators (parental SES, subjective SES, and adolescent educational level) are associated with adolescent mental health, the

1 There is some inconsistency in the terminology used in this dissertation, due to changes made when publishing chapters as articles. Some chapters refer to 'family affluence' in place of 'parental SES' and 'perceived family wealth' in place of 'subjective SES'.

Chapter 1

interplay between these different SES indicators has not been explored. For example, both subjective SES and educational level could moderate the association between parental SES and adolescent mental health. High subjective SES may buffer the social gradient, because perceiving one's family situation favourably may be a mechanism that reduces the association between parental SES on adolescent mental health (cf., Taylor & Seeman, 1999). For adolescent educational level, a moderation effect could be plausible in either direction. On the one hand, adolescents in higher educational levels may gain psychosocial resources, such as problem-solving skills (Ross & Mirowsky, 2011), that reduce the association between parental SES and adolescent mental health. On the other hand, for adolescents in higher educational levels there may be a stronger association between parental SES and feelings of belonging at school, which is a good predictor of mental health (Chu et al., 2010). This is because in higher educational levels adolescents with lower parental SES may suffer identity challenges from their SES mobility and be at risk of social isolation (Destin, 2019), while adolescents with higher parental SES fit in with more ease.

Furthermore, there may be historic changes in the social gradient due to societal changes over recent decades. Social, economic, cultural, technological, or demographic developments in Dutch society could have led to changes in the association between the three SES indicators and adolescent mental health (Silbereisen & Tomasik, 2015; Sweeting et al., 2010). Thus, it is also important to look at whether there are trends in the social gradient over the course of several years.

Despite the existence of these three different indicators of SES (parental SES, subjective SES, and adolescent educational level) in the adolescent period, little is known about the interplay of associations between all three and adolescent mental health (with the exception of Klanšček et al., 2014). The presence (or absence) of different SES indicators in existing studies may also explain some of the inconsistency among results; though almost all studies find a social gradient in adolescent mental health, the strength of the relationship varies across studies (Letourneau et al., 2013; Reiss, 2013). The inclusion of multiple indicators can also help researchers better understand which facets of SES in adolescence are most important to adolescent mental health. Thus, the first aim of this dissertation is to investigate indicators of the social gradient. In **Chapter 2**, this gap in the literature is addressed by looking at associations between three indicators of SES – parental SES, subjective SES, and adolescent educational level – and adolescent mental health. This chapter also investigates whether subjective SES and adolescent educational level moderate the association between parental SES and adolescent mental health, and whether the social gradient has changed between 2001 and 2017. In **Chapter 3** and **Chapter 5** (detailed further in sections below) indicators of both parental SES and subjective SES are included to shed further light on their independent associations with adolescent mental health. Finally, **Chapter 6** (see also below) includes the association between parental SES and adolescent educational level in order to better understand what mediates the association between these two indicators of SES in adolescence.

Why is there a social gradient in adolescent mental health ?

To understand, and reduce, the social gradient in adolescent mental health, it is also necessary to understand the pathways through which SES is associated with mental health. Existing research on mediators of the social gradient has mostly focused on the family-level context (Devenish et al., 2017; Grant et al., 2003; Letourneau et al., 2013). This research has shown, for example, that key promotive mechanisms in the pathway from SES to adolescent mental health include the presence of stable and supportive family relationships, and the absence of stressful and threatening environments (Bradley & Corwyn, 2002; R. D. Conger & Donnellan, 2007; McLoyd et al., 2009). But adolescents' own psychological processes – such as how they see themselves and the world – may also be mediators of the social gradient in adolescent mental health (Adler & Tan, 2017; E. Chen et al., 2002; Heberle & Carter, 2015). Three key psychological processes, defined in this dissertation as social cognitions, are: self-esteem - the evaluation of one's importance, worth, or value; sense of control – the belief that one's actions determine outcomes; and optimism – a generalized feeling of confidence in positive future outcomes (Taylor & Brown, 1988). Adolescents' beliefs about society may also be mediating psychological processes; an important indicator of such beliefs is Belief in a Just World (BJW), the belief that people get what they deserve because the world is fair (Lerner, 1980). Social cognitions are formed by making social comparisons and internalizing the views of others (Gecas, 1982), which are pronounced features of adolescence (Bandura et al., 2001; Crone & Dahl, 2012; Jacobs et al., 2003), and adolescence is period of growing awareness and knowledge of the world and the socioeconomic environment (Almås et al., 2010; Flanagan et al., 2014). Thus, both social cognitions and beliefs about society may become especially salient during the adolescent period, and thus potentially important mediators of the social gradient in adolescent mental health. Some studies have shown that both adolescents' social cognitions and their beliefs about the society are shaped by the socioeconomic context (Heberle & Carter, 2015; Stephens et al., 2014). Furthermore, there is strong evidence that these psychological processes are important for mental health, with positive psychological processes associated with positive mental health outcomes (S. R. L. Johnson et al., 2014; Matthews et al., 2010; Taylor & Brown, 1988). However, little research has addressed whether adolescents' psychological processes mediate the social gradient in adolescent mental health (Devenish et al., 2017; Heberle & Carter, 2015).

The second aim of this dissertation is therefore to investigate whether adolescents' psychological processes mediate the social gradient. In order to address the lack of existing research on this question, two chapters in this dissertation explore adolescent psychological processes as potential mediators of the social gradient in adolescent mental health. **Chapter 3** investigates whether general BJW and personal BJW mediate the social gradient in adolescent mental health, and **Chapter 4** gives attention to the mediating role of adolescents' social cognitions, namely their self-esteem, sense of control, and optimism.

For whom is there a social gradient in adolescent mental health?

As noted, there is some inconsistency across existing studies regarding the strength of the social gradient in adolescent mental health. This inconsistency could be due to the use of different indicators (as discussed above in relation to the first aim), or, alternatively, to the presence of factors that moderate the social gradient. Extant research on moderators is scant (Devenish et al., 2017), yet several possible factors at different ecological levels could moderate the strength of the social gradient in adolescent mental health. At the adolescent-level, few studies consider whether adolescents' psychological processes could buffer or amplify the relationship between SES and adolescent mental health. One such process that could moderate the social gradient in adolescent mental health is BJW. Adolescents with high BJW may feel that they have control of their own fate and by working hard can achieve their goals (Laurin et al., 2011). A belief in the possibility of SES mobility may be especially useful for adolescents with lower SES in buffering against mental health problems (Day & Fiske, 2019), so BJW may weaken the social gradient. Yet, high BJW may instead amplify the social gradient in adolescent mental health by strengthening attributional beliefs that internal factors are the primary cause of individual outcomes. Internal attributions are expected to have good mental health consequences for higher SES adolescents, who can feel proud of their SES, but detrimental effects for lower SES adolescents, who may be ashamed of their SES (Bosma et al., 2015).

Furthermore, similar processes for BJW could also operate at the macrosystem-level. This dissertation uses *country-level meritocratic beliefs* to refer to the extent to which people in a country generally believe that people get what they deserve (i.e., hold a belief in a just world). These country-level beliefs are likely to be internalised by adolescents, so in countries with stronger meritocratic beliefs, adolescents may be more likely to have stronger BJW. As noted above, this could have a buffering or amplifying effect on the social gradient. Country-level meritocratic beliefs may also affect how other people treat adolescents differentially based on their SES. Existing research on country-level differences in the social gradient has focused solely on country-level economic and policy factors (e.g., Bjarnason et al., 2012; Currie & Morgan, 2020; Elgar et al., 2015; Zaborskis et al., 2018). Yet, this research shows that economic and policy factors are unable to fully explain country-level differences, thus sociocultural factors, such as meritocratic beliefs, may be important additional factors that contribute to cross-country differences in the social gradient.

In sum, the third aim of this dissertation is to investigate whether BJW at the individual-level and meritocratic beliefs at the country-level can moderate the social gradient in adolescent mental health. **Chapter 3** investigates whether general BJW and personal BJW moderate the social gradient and **Chapter 5** addresses whether country-level meritocratic beliefs moderate the social gradient and contribute to explaining different strengths in the social gradient seen across 30 European countries.

Why is parental SES associated with adolescent educational level?

This dissertation also has a fourth aim, addressed in the final empirical chapter. To complement the research on the social gradient in adolescent mental health, **Chapter 6** investigated mediators of the association between parental SES and adolescent educational level. Although this association is well-established (Sirin, 2005), less is known about how mechanisms at different levels of the ecological system combine to explain it. Specifically, processes at the adolescent-level, such as cognitive ability and educational expectations (Schoon & Polek, 2011), and at the microsystem-level, such as teacher assessment (Timmermans et al., 2015), may mediate the association between parental SES and adolescent educational level. Yet, to my knowledge, no studies previously tested these three mediators in one model, despite evidence of their importance, and their relation (Wood et al., 2007). In addition to parental SES indicators (maternal education and paternal education), the chapter also includes another indicator of SES – neighbourhood SES, representing the social and economic characteristics of the neighbourhood. Neighbourhood SES may be an important factor in adolescent educational level, because adolescents increasingly spend time outside the home in their neighbourhoods and are influenced by this context where many of their interactions occur (Leventhal et al., 2009; Visser et al., 2020).

Methodological approach

This dissertation uses several datasets, primarily based on adolescent self-reports, which are well-suited to addressing these research questions. **Chapter 2** uses data from the Dutch Health Behaviour in School-aged Children (HBSC) study, a cross-sectional survey conducted every four years, which provides unparalleled insights into adolescent health in the Netherlands over the last few decades. The chapter analysed nationally representative data of 11- to 16-year-old adolescents ($n = 28,310$) collected in 2001, 2005, 2009, 2013 and 2017 (de Looze et al., 2014; G. W. J. M. Stevens et al., 2018; ter Bogt et al., 2003; van Dorsselaer et al., 2007, 2010). **Chapters 3** and **4** use data from the Youth Got Talent project, an ongoing longitudinal study of adolescents (aged 16+) attending three vocational schools in the region of Utrecht in the Netherlands. The study includes a socioeconomically diverse sample of adolescents and numerous questions on SES, mental health, and resources and barriers that could mediate and/or moderate the social gradient in adolescent mental health. **Chapter 3** includes data from the first wave, collected in autumn 2019/winter 2020 ($n = 1,130$). **Chapter 4** uses data from adolescents in the first three waves (in autumn 2019/winter 2020, in late spring 2020, and roughly one year after the first wave, in autumn 2020/winter 2021; $n = 1,429$). **Chapter 5** uses data of a nationally representative group of 11, 13, and 15 year-old adolescents from 30 countries in the 2013/14 international HBSC study ($n = 131,101$) (Inchley et al., 2016). This unique dataset, based on a standardised research protocol, enables cross-country research into adolescent health. The chapter also includes country-level data on meritocratic beliefs based on Eurobarometer data (European Commission, Brussels, 2019), and Eurostat data on income inequality, national income, and welfare expenditure (Eurostat, 2019c,

Chapter 1

2019b, 2019a). **Chapter 6** uses data from the Prevention and Incidence of Asthma and Mite Allergy (PIAMA) study ($n = 2,814$). The study followed children born in 1996/1997 in three areas of the Netherlands, and the chapter used adolescent-reported data collected at the age of 11, 14, and 17, as well as parent-reported data collected when their children were aged 1 (Wijga et al., 2014). Information on neighbourhood socioeconomic status (SES) was obtained from The Netherlands Institute for Social Research (Knol et al., 2012).





Chapter 2

Adolescent socioeconomic status and mental health inequalities in the Netherlands, 2001-2017

Based on: Weinberg, D., Stevens, G. W. J. M., Duinhof, E. L., & Finkenauer, C. (2019). Adolescent socioeconomic status and mental health inequalities in the Netherlands, 2001–2017. *International Journal of Environmental Research and Public Health*, 16(19), 3605. <https://doi.org/10.3390/ijerph16193605>

Abstract

Even in wealthy countries there are substantial socioeconomic inequalities in adolescent mental health. Socioeconomic status (SES) indicators – parental SES, adolescent subjective SES and adolescent educational level – are negatively associated with adolescent mental health problems, but little is known about the interplay between these SES indicators and whether associations have changed over time. Using data from the Dutch Health Behaviour in School-Aged Children (HBSC) studies ($n = 27,020$) between 2001 and 2017, we examined associations between three SES indicators and six indicators of adolescent mental health problems. Linear regressions revealed that adolescent subjective SES and adolescent educational level were independently negatively associated with adolescent mental health problems and positively associated with adolescent life satisfaction, but parental SES had negligible independent associations with adolescent mental health problems and life satisfaction. However, when interactions between SES indicators were considered, high adolescent subjective SES was shown to buffer the negative association between parental SES and adolescent mental health problems and the positive association between parental SES and life satisfaction. Despite societal changes between 2001 and 2017, socioeconomic inequalities in adolescent mental health were stable during this period. Findings suggest that all three SES indicators – parental SES, adolescent subjective SES and adolescent educational level – are important for studying socioeconomic inequalities in adolescent mental health.

Keywords: socioeconomic status (SES); adolescent mental health problems; subjective SES; adolescent educational level; health trends; health inequalities

Author contributions: **DW** *Conceptualization, Formal analysis, Methodology, Visualisation, Writing – original draft, Writing – review & editing.* **GWJMS** *Conceptualization, Methodology, Project administration, Investigation, Supervision, Writing – original draft, Writing – review & editing.* **ELD** *Data curation, Methodology, Writing – review & editing.* **CF** *Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing.*

Even in relatively wealthy and egalitarian countries, such as the Netherlands, there are socioeconomic inequalities in adolescent mental health: adolescents with a lower socioeconomic status (SES) have more mental health problems than their higher SES peers (Elgar et al., 2015; Inchley et al., 2016; Reiss, 2013). To date, most studies on socioeconomic inequalities in adolescent mental health have measured parental SES, for example, parental affluence, educational level or occupation (R. D. Conger et al., 2010; Devenish et al., 2017; Reiss, 2013). However, this strong focus on parental SES might have led researchers to underestimate the importance of two other indicators of adolescent SES – adolescent subjective SES and adolescent educational level – which may have stronger associations with adolescent mental health (Koivusilta et al., 2006; McLaughlin et al., 2012; Quon & McGrath, 2014; Reiss, 2013), or may moderate the association between parental SES and adolescent mental health. Furthermore, societal changes during recent decades may have affected the size of SES inequalities in adolescent mental health (Mackenbach et al., 2018; Patton et al., 2016; Pfortner et al., 2017), but studies have rarely investigated changes in these inequalities over time. Therefore, this cross-sectional study uses a time-sequential design to investigate the interplay between three SES indicators – parental SES, adolescent subjective SES and adolescent educational level – and adolescent mental health problems and explores changes in these associations during the last two decades.

Associations between SES indicators and adolescent mental health problems

Researchers have consistently found that adolescents with lower parental SES (R. D. Conger et al., 2010; Devenish et al., 2017; Reiss, 2013), lower subjective SES (Quon & McGrath, 2014), and a lower educational level (Hagquist, 2007; Havas et al., 2010; Koivusilta et al., 2006) have more mental health problems compared to their peers with higher levels on these SES indicators. Different, though overlapping, mechanisms have been proposed for these three associations. Lower parental SES has been found to have associations with adolescent mental health problems through mechanisms such as material hardship, harsher parenting, greater parental stress and parental mental health problems (R. D. Conger et al., 2010; Devenish et al., 2017; Grant et al., 2003). Adolescent subjective SES taps adolescents' perception of the relative position of their family in the socioeconomic hierarchy and is theorised to influence mental health through social comparison effects (Festinger, 1954; E. Goodman et al., 2001; Odgers, 2015; Wilkinson, 1999). More specifically, lower subjective SES may be associated with adolescent mental health problems through mechanisms such as feelings of resentment and shame and lacking psychosocial resources (e.g., optimism, coping strategies and perceptions of personal control and social support) that could help alleviate stressors (Hoebel & Lampert, 2018; Smith et al., 2012; Taylor & Seeman, 1999). Adolescent educational level indicates adolescents' increasing agency and growing independence from their parents, including the establishment of their own SES (Hagquist, 2007; Schoon & Lyons-Amos, 2017). A lower adolescent educational level may be associated with more mental health problems through mechanisms such as experiencing a negative classroom climate,

with unsupportive, misbehaving peers (Antaramian et al., 2010), or perceiving that one's educational position indicates a lack of effort or intelligence, which may generate feelings of academic inadequacy and inferiority (Dishion & Tipsord, 2011; Havas et al., 2010; Patterson et al., 1989; Veed et al., 2019).

Research on adolescent mental health problems has found that associations with the three SES indicators are not independent. Negative associations between parental SES and adolescent mental health problems generally weaken substantially when including adolescent subjective SES (E. Goodman et al., 2007; Pförtner et al., 2015; Svedberg et al., 2016), though some studies found that these associations do not fully disappear (McLaughlin et al., 2012; Moreno-Maldonado et al., 2018; Quon & McGrath, 2014). Similarly, negative associations between parental SES and adolescent mental health problems weaken substantially when including adolescent educational level (Havas et al., 2010; Koivusilta et al., 2006; Moor et al., 2014). To our knowledge, only one study, of Slovenian adolescents, has included all three SES indicators simultaneously; the study found that adolescent subjective SES and adolescent educational level, but not parental SES, were negatively associated with adolescent mental health problems (Klanšček et al., 2014). Extending the existing research, we investigate the independence and relative strength of associations between the three SES indicators and adolescent mental health problems.

A moderating role for adolescent subjective SES and adolescent educational level?

Existing research has not explored the interplay between the different SES indicators. Adolescent subjective SES may moderate the negative association between parental SES and adolescent mental health problems. In a wealthy country like the Netherlands, with a strong welfare state that redistributes income and provides extensive public services (Mackenbach, 2012), psychosocial mechanisms may explain much of the negative association between parental SES and adolescent mental health problems (Odgers, 2015; Wilkinson, 1999). Therefore, in the presence of low parental SES, higher adolescent subjective SES may act as a protective factor, weakening the negative association between parental SES and adolescent mental health problems (Taylor & Seeman, 1999).

Adolescent educational level may also moderate the association between parental SES and adolescent mental health problems. On the one hand, according to the resource substitution theory, a higher adolescent educational level may attenuate the negative association between parental SES and adolescent mental health problems (Ross & Mirowsky, 2011). Adolescents in higher educational levels gain cognitive and psychosocial skills, such as problem-solving skills, which can be used to protect themselves from the harmful effects of low parental SES on their mental health (Andersson, 2016; Ross & Mirowsky, 2011). On the other hand, the negative association between parental SES and adolescent mental health problems may be stronger for adolescents with a higher educational level. Adolescents who come from a lower SES family may not feel at home in a higher educational levels (Destin, 2019; S. E. Johnson et al., 2011). Such experiences may lead to feelings of social isolation, which are associated with mental

health problems (Chu et al., 2010). To our knowledge, no research has yet examined whether the association between parental SES and adolescent mental health problems depends upon adolescent subjective SES or adolescent educational level.

Changes in socioeconomic inequalities in adolescent mental health

Several societal changes, both worldwide and specific to the Netherlands, may have caused changes in socioeconomic inequalities in adolescent mental health during the last two decades (Pfortner et al., 2017; Sweeting et al., 2010). Firstly, the Great Recession, which lasted from roughly 2008 to 2013, substantially altered the socioeconomic environment by increasing material hardship, unemployment and financial uncertainty (Ashton, 2017). These changes may have increased parents' and adolescents' stress about future financial circumstances, especially among adolescents with lower parental SES, which increases the risk of adolescent mental health problems (Kalil, 2013). Secondly, between 2003 and 2017, there was a substantial reduction in student numbers in the lower educational levels in the Netherlands (adolescents are tracked into one of four educational trajectories at age 11-12; Centraal Bureau voor de Statistiek (CBS), 2018). Based on its presumed negative influence on future educational and career options, the reputation of the lower educational levels has declined (Onderwijsraad [Education Council], 2015; Timmermans et al., 2018). This may have motivated parents and adolescents to avoid the lower educational levels. As a consequence, these lower educational levels may have increasingly included students with relatively lower cognitive and psychosocial skills and worse mental health (Onderwijsraad [Education Council], 2015). Thirdly, the last two decades have seen extraordinary changes in access to, and use of, digital media (Peter & Valkenburg, 2006; van Deursen & Helsper, 2015). There is evidence that adolescents with lower parental SES have been most susceptible to the negative aspects of digital media, such as negative online interactions, and these adolescents have had an increased risk of mental health problems (Odgers, 2018). As such, existing socioeconomic inequalities in adolescent mental health may have been amplified during the last two decades.

Only a few studies have looked at changes over time in these socioeconomic inequalities in the Netherlands. Researchers studying European adolescents between 2002 and 2010 found an increase in socioeconomic inequalities, indicated by parental SES, in psychosomatic complaints and a decrease in socioeconomic inequalities in life satisfaction (Elgar et al., 2015). Other studies have found stable socioeconomic inequalities in adolescent mental health in the Netherlands when using measures of adolescent subjective SES (between 2002 and 2010; Moor et al., 2015) and adolescent educational level (between 2003 and 2013; Duinhof et al., 2015). A study of adolescents in Amsterdam between 2004 and 2013 found complex changes in socioeconomic inequalities by educational level, with increases in emotional symptoms in only the highest and lowest educational levels (van Vuuren et al., 2018). Since the effects of societal changes, such as the Great Recession, on socioeconomic inequalities in adolescent mental health may take time to emerge, it is important to look at longer-

term changes and update previous research with the most recent data (Frasquilho et al., 2016; Kawachi & Subramanian, 2018).

Using nationally representative samples of adolescents in the Netherlands from 2001 to 2017, three different SES indicators and six different indicators of adolescent mental health problems, this study examines three research questions regarding socioeconomic inequalities in adolescent mental health.

1. To what extent are three SES indicators – parental SES, adolescent subjective SES and adolescent educational level – independently associated with adolescent mental health problems?
2. To what extent is the association between parental SES and adolescent mental health problems moderated by adolescent subjective SES and adolescent educational level?
3. To what extent have the associations between three SES indicators, their interplay and adolescent mental health problems changed between 2001 and 2017?

Methods

Sample

We used data from the Dutch Health Behaviour in School-aged Children (HBSC) study, a cross-sectional survey conducted every four years (Currie et al., 2014; G. W. J. M. Stevens et al., 2018). The present study made use of the data collected in the 2001, 2005, 2009, 2013 and 2017 surveys. The HBSC study used identical sampling and survey procedures across the survey years to collect data from nationally representative samples of 11- to 16-year-old adolescents attending the first four classes of secondary education ($N = 28,310$). A two-stage random cluster sampling procedure was used to obtain the samples. First, a random sample of schools in the Netherlands was drawn, and these were stratified based on urbanisation level. Second, each participating school provided a list of all classes, and two to five classes were selected randomly (depending on school size). All students were drawn as a single cluster within the selected classes; to ensure national representativeness, survey weights were applied to the data. The response rate of schools ranged from 37% (2013/2017) to 48% (2009). The adolescent response rate was above 92% in all years. Self-report questionnaires (paper-and-pencil from 2001 to 2013 and computer-assisted in 2017) were administered in the classroom, taking ~40–50 min. The surveys took place in October or November of the corresponding year. Participants were informed of their anonymity and participants and parents gave passive consent (participants gave active consent in 2017). Ethical approval was gained from the Ethics Assessment Committee of the Faculty of Social Sciences at Utrecht University (FETC17-079 in 2017).

Participants were included in the study if they had complete data on all SES measures, as well as gender and age, and reported at least one mental health problem measure ($n = 27,020$, over 95% of the full sample). The size of the included sample was similar across years: 2001 ($n = 5277$), 2005 ($n = 5252$), 2009 ($n = 5321$), 2013 ($n = 5167$) and 2017

($n = 6003$). The mean age in every year was 13.8 (except in 2017, for which it was 13.7). Roughly half the sample were girls (ranging from 49.7% in 2013 to 51.5% in 2017).

Measures

Socioeconomic status

Parental SES was measured using the Family Affluence Scale (FAS; Currie et al., 2008). The scale consisted of 4 items that indicated family material assets: “Does your family have a car or a van?” (0 (*no*), 1 (*yes, one*), 2 (*yes, two or more*)); “Do you have your own bedroom for yourself?” (0 (*no*), 1 (*yes*)); “How many times did you travel away for holiday/vacation last year?” (0 (*not at all*), 1 (*once*), 2 (*twice*), 3 (*more than twice*); for the 2013 and 2017 HBSC study “away” was replaced with “abroad”); “How many computers does your family own?” (0 (*none*), 1 (*one*), 2 (*two*), 3 (*more than two*)). Sum scores (range: 0–9) were computed for participants who completed all scale items; higher scores indicated more material assets. FAS, developed for use in the HBSC study, has been shown to be a reliable instrument that is easily answered by adolescents (Currie et al., 2008). FAS is a composite indicator, constructed of separate independent items indicating family material assets, so internal consistency between items is not necessary (Boyce et al., 2006). We compared each adolescent’s absolute FAS sum score to all other scores in the respective survey year and calculated a rdit-based relative score, ranging from 0 to 1, with a mean of 0.5 (Elgar et al., 2017). By transforming the distribution to relative parental SES per year, we were able to minimise the effect of changes over time in the measure and meaning of FAS items (Hartley et al., 2016; Schnohr et al., 2013).

Adolescent subjective SES was measured using the question, “How well off do you think your family is?” The item included a 5-point response scale ranging from 1 (*very well off*) to 5 (*not at all well off*). The scale was reversed so that higher scores indicated higher levels of subjective SES. The measure has been found to be easy to answer for adolescents (Inchley et al., 2017).

Adolescent educational level was measured using a question on the academic track that the adolescent followed. The secondary education system in the Netherlands has four tracks, and responses were dummy coded, with low used as the reference group in our analyses: 1 (*low* – preparing for labour market; VMBO-bk), 2 (*lower intermediate* – preparing for vocational education; VMBO-gt), 3 (*upper intermediate* – preparing for secondary general education; HAVO), 4 (*high* – preparing for university education; VWO).

Adolescent mental health problems

Mental health is considered a multidimensional construct, with positive and negative indicators that are partly independent of one another (Huppert & Whittington, 2003). As well as examining five indicators of mental health problems (emotional symptoms, conduct problems, hyperactivity, peer problems and psychosomatic complaints), we also include one indicator of positive mental health (life satisfaction).

Emotional symptoms, conduct problems, hyperactivity and peer problems were measured with the SDQ-R: a revised version of the problem subscales of the Strengths and Difficulties Questionnaire (SDQ), which has better psychometric properties than the original self-report SDQ (Duijnhof et al., 2019). From 2005 onwards, adolescents completed the Dutch translation of the self-report version of SDQ, which is suitable for 11- to 17-year-olds (R. Goodman, 1997; Youthinmind, 2015). The SDQ comprises questions on behaviour and feelings over the past six months with 3-point response scales: 0 (*not true*), 1 (*somewhat true*), 2 (*certainly true*). Examples of items are “Other children or young people pick on me or bully me” and “I get very angry and often lose my temper.” The SDQ-R consists of 15 items measuring four subscales – emotional symptoms (5 items), conduct problems (4 items), hyperactivity–inattention problems (3 items) and peer relationship problems (3 items; Duijnhof et al., 2019; R. Goodman, 1997). Two subscales – emotional symptoms (Cronbach’s $\alpha = 0.69\text{--}0.71$) and hyperactivity–inattention problems ($\alpha = 0.69\text{--}0.74$) – had acceptable internal consistency in all survey years, and although the other two subscales had lower α coefficients – conduct problems ($\alpha = 0.53\text{--}0.56$) and peer relationship problems ($\alpha = 0.42\text{--}0.47$) – these coefficients were consistent with existing research on the SDQ (Duijnhof et al., 2019; Essau et al., 2012). Previous research has indicated that the self-report SDQ is measurement invariant over time in the Netherlands (Duijnhof et al., 2015). Subscale mean scores were computed for participants who completed more than half of the subscale items. Higher subscale scores indicated more problems (ranging from 0 to 10).

Psychosomatic complaints were measured using the HBSC-symptom checklist. The checklist consists of eight items measuring: headache, abdominal pain, backache, dizziness, feeling low, irritability/bad temper, feeling nervous and sleeping difficulties. Each item included a 5-point response scale for reporting how often during the past 6 months the complaint was experienced, ranging from 1 (*about every day*) to 5 (*rarely or never*). To ensure that higher scores indicated more problems, we subtracted each score from 5 and computed a composite sum score for participants who completed at least six of the eight subscale items (ranging from 0 to 32; Ravens-Sieberer et al., 2008). The checklist had a good internal consistency in all survey years ($\alpha = 0.76\text{--}0.82$) and convergent validity with indicators for emotional symptoms (Gariépy & Elgar, 2016).

Life satisfaction was measured using the Cantril Ladder (Cantril, 1965). The scale is an 11-point ladder with steps for reporting how participants feel about their life, ranging from 0 (*worst possible life*) to 10 (*best possible life*). The Cantril Ladder is easily understood and has shown high reliability among adolescents (Levin & Currie, 2014).

Other variables

Given gender and age differences in adolescent mental health problems, we controlled for these variables (Reiss, 2013). Gender was measured by asking whether the participant was a girl (coded 0) or boy (coded 1). Age was measured with a question about month and year of birth, which was used to calculate age at the date of data collection. Survey

year was recoded to facilitate interpretation (1 = 2001, 2 = 2005, 3 = 2009, 4 = 2013, 5 = 2017) and included in models as a continuous variable.

Data analysis

To examine socioeconomic inequalities in adolescent mental health in the Netherlands, we tested several linear regressions separately for the six mental health outcomes: emotional symptoms, conduct problems, hyperactivity, peer problems, psychosomatic complaints and life satisfaction. Analyses were conducted using the complex samples module in SPSS (version 24), so as to weight the data to ensure national representativeness and account for clustering within schools. All variables were standardised so that mean differences between groups (i.e., for gender and educational level) could be interpreted using Cohen's *d* guidelines (small = 0.2, medium = 0.5, large = 0.8), and other effects could be interpreted as correlation coefficients (small = 0.1, medium = 0.3, large = 0.5; J. Cohen, 1992). Given the large sample size and large number of tests, effects were considered significant when $p < .001$.

First, we included the control variables (M1), which were also included in all subsequent models. Second, we included the three SES indicators – (a) parental SES, (b) adolescent subjective SES and (c) adolescent educational level – separately (M2a-c). Third, we included all three SES indicators simultaneously (M3). Fourthly, we included all three SES indicators and a two-way interaction between (a) parental SES and adolescent subjective SES, or (b) parental SES and adolescent educational level (M4a-b). Fifth, we included survey year (5a), then all three SES indicators and three two-way interactions between survey year and each SES indicator (M5b). Sixth, we included: all three SES indicators; two-way interactions between survey year and each SES indicator; and three-way interactions between (a) survey year, parental SES and adolescent subjective SES; or (b) survey year, parental SES and educational level (M6a-b). According to a power analysis with the software G*Power, based on an α level of 0.001 and a desired power ($1-\beta$) of 0.85, a three-way interaction effect size of $R^2 = 0.001$ can be detected with a sample of 20,910 adolescents (Faul et al., 2007).

Results

Descriptive statistics

We used nationally representative self-reported data from 11- to 16-year-old adolescents participating in the Dutch Health Behaviour in School-Aged Children (HBSC) studies in 2001, 2005, 2009, 2013 and 2017 ($n = 27,020$; see Methods). Table 2.1 shows changes within the sample in the mean and standard deviation of SES and adolescent mental health problems between 2001 and 2017. The parental SES score was designed to have the same mean for each survey year and mean levels of adolescent subjective SES did not change substantially over time. During the period, there was a 5.4 percentage point decrease in Dutch adolescents in the low educational level and an 8.5 percentage point increase in participation in the high educational level. Mean levels of the mental health

Chapter 2

problems were quite low, except for hyperactivity, which was moderate, whereas life satisfaction was quite high.

Table 2.1 Descriptive statistics for socioeconomic status (SES) and mental health problems by year.

	Range	2001	2005	2009	2013	2017	Total	Total <i>n</i>
Parental SES (<i>M/SD</i>)	0–1	0.5 (0.3)	0.5 (0.3)	0.5 (0.3)	0.5 (0.3)	0.5 (0.3)	0.5 (0.3)	27,020
Subjective SES (<i>M/SD</i>)	1–5	3.3 (0.7)	3.1 (0.7)	3.2 (0.7)	3.1 (0.8)	3.2 (0.7)	3.2 (0.7)	27,020
Low Educational Level (%)		23.5	26.0	17.8	23.3	18.0	21.6	27,020
Lower Intermediate Educational Level (%)		35.4	31.5	35.5	27.1	32.3	32.4	27,020
Upper Intermediate Educational Level (%)		23.1	24.4	22.9	26.8	23.1	24.0	27,020
High Educational Level (%)		18.0	18.1	23.8	22.8	26.5	22.0	27,020
Emotional Symptoms (<i>M/SD</i>)	0–10		2.2 (2.1)	2.2 (2.1)	2.6 (2.3)	2.5 (2.3)	2.4 (2.2)	21,503
Conduct Problems (<i>M/SD</i>)	0–10		1.3 (1.8)	1.1 (1.7)	1.2 (1.7)	1.2 (1.7)	1.2 (1.7)	21,480
Hyperactivity (<i>M/SD</i>)	0–10		3.6 (2.8)	3.9 (2.9)	4.1 (3.0)	4.1 (3.0)	4.0 (2.9)	21,518
Peer Problems (<i>M/SD</i>)	0–10		1.7 (1.9)	1.7 (2.0)	1.8 (2.0)	1.9 (2.0)	1.8 (2.0)	21,484
Psychosomatic Complaints (<i>M/SD</i>)	0–32	6.6 (5.6)	5.6 (5.8)	6.5 (5.6)	7.9 (6.4)	7.9 (6.5)	6.9 (6.1)	26,813
Life Satisfaction (<i>M/SD</i>)	0–10	7.9 (1.6)	7.7 (1.6)	7.9 (1.4)	7.6 (1.6)	7.6 (1.6)	7.7 (1.6)	26,729

Table 2.2 shows that all three SES indicators had small positive associations with each other (r s range from 0.11 to 0.38), indicating that they measured different dimensions of SES that may have an underlying component. Mental health problems were positively associated with each other (r s range from 0.11 to 0.63) and negatively associated with life satisfaction (r s range from 0.19 to 0.46). Associations were mostly small in size ($|r| < 0.30$), suggesting that the indicators measured different dimensions of mental health problems that may have an underlying component. Table 2.3 shows the results of the linear regression models examining socioeconomic inequalities in adolescent mental health. Model 1, which included only control variables, showed age and gender differences in adolescent mental health problems. Boys reported higher levels of conduct problems and higher life satisfaction, though the effects were small. Girls reported higher levels of emotional symptoms and psychosomatic complaints; the effects were medium-sized. Gender differences in peer problems and hyperactivity were absent or of negligible size. Age differences in mental health problems were negligible, but younger adolescents reported somewhat higher levels of life satisfaction.

Table 2.2 Correlations between variables.

Variables	2	3	4	5	6 ^b	7	8	9	10	11	12
Control	.02	-.03**	-.06**	-.05**	-.10**	.06**	.02*	.05**	.07**	.06**	-.15**
2. Gender ^a		-.01	.10**	.11**	-.01	-.31**	.12**	.01	.03**	-.22**	.14**
Time			.00	-.03**	.08**	.06**	-.01	.07**	.03**	.12**	-.08**
SES				.38**	.21**	-.09**	-.04**	.03**	-.11**	-.05**	.12**
5. Subjective SES					.11**	-.14**	-.04**	-.04**	-.08**	-.12**	.23**
6. Adolescent Educational Level ^b						-.02**	-.20**	-.11**	-.15**	-.01	.01
Adolescent							.28**	.29**	.35**	.63**	-.46**
Mental Health								.33**	.29**	.31**	-.23**
Problems									.11**	.31**	-.19**
10. Peer Problems										.26**	-.23**
11. Psychosomatic Complaints											-.45**
12. Life Satisfaction											

Notes. ^a Reference category: girl. ^b Correlation coefficients with educational level are Spearman's (all other correlations are Pearson's), ns vary due to missing data, ranging from 21,239 to 27,020. * $p < .001$, ** $p < .0001$.

Chapter 2

Table 2.3 Regression models 1–6b showing the effects of SES indicators on six adolescent mental health problems.

		Emotional Symptoms		Conduct Problems	
		B (SE)	β	B (SE)	β
M1	Intercept	1.67** (0.18)	.00	0.57** (0.17)	.01
	Gender ^a	-1.39** (0.03)	-.31	0.43** (0.03)	.12
	Age	0.10** (0.01)	.06	0.03 (0.01)	.02
M2a	Parental SES	-0.43** (0.06)	-.06	-0.36** (0.05)	-.06
M2b	Subjective SES	-0.33** (0.02)	-.11	-0.12** (0.02)	-.05
M2c	Educ. = High	-0.19 (0.06)	-.08	-0.98** (0.05)	-.57
	Educ. = U. Int.	-0.08 (0.06)	-.04	-0.69** (0.05)	-.40
	Educ. = L. Int.	-0.12 (0.06)	-.05	-0.37** (0.05)	-.21
M3	Parental SES	-0.12 (0.06)	-.02	-0.01 (0.05)	.00
	Subjective SES	-0.31** (0.03)	-.10	-0.06 (0.02)	-.02
	Educ. = High	-0.09 (0.07)	-.04	-0.97** (0.05)	-.56
	Educ. = U. Int.	-0.03 (0.06)	-.01	-0.68** (0.05)	-.39
	Educ. = L. Int.	-0.10 (0.06)	-.04	-0.37** (0.05)	-.21
M4a	Parental SES × Subjective SES	0.35** (0.08)	.03	0.37** (0.07)	.05
M4b	Parental SES × Educ. = High	-0.40 (0.18)	-.05	-0.25 (0.13)	-.04
	Parental SES × Educ. = U. Int.	-0.33 (0.18)	-.04	-0.12 (0.13)	-.02
	Parental SES × Educ. = L. Int.	-0.35 (0.18)	-.04	-0.17 (0.14)	-.03
M5a	Survey Year	0.12** (0.02)	.08	-0.02 (0.02)	-.02
M5b	Year × Parental SES	-0.14 (0.05)	-.03	-0.05 (0.04)	-.01
	Year × Subjective SES	-0.02 (0.02)	-.01	-0.05 (0.02)	-.03
	Year × Educ. = High	0.05 (0.05)	.03	0.10 (0.04)	.08
	Year × Educ. = U. Int.	0.06 (0.05)	.04	0.11 (0.04)	.09
	Year × Educ. = L. Int.	0.04 (0.05)	.03	0.05 (0.04)	.05
M6a	Year × Parental SES × Subjective SES	-0.07 (0.07)	-.01	-0.01 (0.07)	.00
M6b	Year × Parental SES × Educ. = High	0.20 (0.16)	.04	0.06 (0.11)	.01
	Year × Parental SES × Educ. = U. Int.	0.26 (0.16)	.05	0.20 (0.12)	.05
	Year × Parental SES × Educ. = L. Int.	0.06 (0.16)	.01	-0.10 (0.12)	-.02

Notes. ^a Reference category: girl. Educ. = adolescent educational level; U. Int. = upper intermediate. L. Int. = lower intermediate. The reference category for adolescent educational level is Educ. = low. * $p < .001$, ** $p < .0001$.

Hyperactivity		Peer Problems		Psychosomatic Complaints		Life Satisfaction	
B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
2.50** (0.29)	.00	0.26 (0.18)	.00	4.29** (0.49)	.00	10.14** (0.12)	.00
0.08 (0.04)	.01	0.14** (0.03)	.04	-2.71** (0.08)	-.22	0.44** (0.02)	.14
0.10** (0.02)	.04	0.11** (0.01)	.07	0.29** (0.04)	.06	-0.19** (0.01)	-.15
0.33* (0.10)	.03	-0.80** (0.06)	-.11	-0.66** (0.16)	-.03	0.55** (0.04)	.10
-0.16** (0.03)	-.04	-0.22** (0.02)	-.08	-0.77** (0.06)	-.09	0.44** (0.02)	.21
-0.88** (0.09)	-.30	-0.78** (0.05)	-.40	-0.71* (0.20)	-.12	0.07 (0.04)	.05
-0.29* (0.10)	-.10	-0.56** (0.05)	-.29	-0.54 (0.19)	-.09	-0.02 (0.04)	-.02
-0.10 (0.09)	-.03	-0.27** (0.06)	-.13	-0.37 (0.18)	-.06	-0.04 (0.04)	-.03
0.83** (0.10)	.08	-0.49** (0.06)	-.07	0.25 (0.16)	.01	0.15* (0.04)	.03
-0.22** (0.03)	-.05	-0.11** (0.02)	-.04	-0.78** (0.07)	-.09	0.42** (0.02)	.20
-0.98** (0.08)	-.34	-0.66** (0.05)	-.34	-0.57 (0.20)	-.09	-0.05 (0.04)	-.03
-0.37** (0.09)	-.13	-0.48** (0.05)	-.25	-0.48 (0.19)	-.08	-0.09 (0.04)	-.06
-0.14 (0.09)	-.05	-0.23** (0.06)	-.12	-0.35 (0.18)	-.06	-0.07 (0.04)	-.04
0.39* (0.11)	.03	0.22 (0.08)	.02	1.48** (0.20)	.05	-0.41** (0.05)	-.05
-0.32 (0.23)	-.03	-0.42 (0.17)	-.06	0.15 (0.49)	.01	-0.05 (0.12)	-.01
-0.07 (0.24)	-.01	-0.29 (0.17)	-.04	0.37 (0.49)	.02	-0.16 (0.12)	-.03
0.16 (0.23)	.02	-0.39 (0.16)	-.06	0.13 (0.48)	.01	-0.12 (0.12)	-.02
0.20** (0.03)	.10	0.06 (0.02)	.04	0.50** (0.04)	.12	-0.09** (0.01)	-.08
0.05 (0.09)	.01	-0.13 (0.05)	-.03	0.10 (0.12)	.01	0.02 (0.03)	.01
-0.07 (0.03)	-.02	-0.03 (0.02)	-.02	-0.11 (0.04)	-.02	0.00 (0.01)	.00
-0.06 (0.07)	-.03	0.04 (0.05)	.03	0.06 (0.12)	.01	0.00 (0.03)	.00
0.01 (0.07)	.00	0.05 (0.04)	.04	0.26 (0.12)	.06	-0.04 (0.03)	-.03
0.00 (0.08)	.00	0.03 (0.05)	.02	0.08 (0.11)	.02	-0.03 (0.03)	-.03
-0.02 (0.09)	.00	-0.01 (0.07)	.00	-0.08 (0.13)	.00	-0.01 (0.04)	.00
0.34 (0.19)	.05	-0.04 (0.14)	-.01	0.62 (0.34)	.04	-0.04 (0.08)	-.01
0.19 (0.21)	.03	0.13 (0.14)	.03	0.35 (0.34)	.02	-0.03 (0.08)	-.01
0.03 (0.21)	.00	-0.17 (0.12)	-.03	-0.22 (0.32)	-.01	0.04 (0.08)	.01

Associations between three SES indicators and adolescent mental health problems

Models 2a–c examined all SES indicators separately. The results showed that, in general, all three SES indicators – parental SES, adolescent subjective SES and adolescent educational level – were negatively associated with mental health problems and positively associated with life satisfaction. Apart from the medium-sized negative association between a high educational level and conduct problems, other associations were negligible to small in size. Model 3, which included all three SES indicators simultaneously, showed that adolescent subjective SES and adolescent educational level were independently associated with adolescent mental health problems: adolescent subjective SES was negatively associated with emotional symptoms and positively associated with life satisfaction, and higher educational levels were negatively associated with conduct problems, hyperactivity and peer problems. Associations between parental SES and adolescent mental health problems attenuated (except between parental SES and hyperactivity, which increased) and all associations were negligible in size.

Moderation effects of adolescent subjective SES and adolescent educational level

Model 4a shows that adolescent subjective SES moderated the association between parental SES and adolescent mental health problems and life satisfaction for all outcomes except peer problems. To facilitate interpretation, we depicted the associations between parental SES and adolescent mental health problems and life satisfaction for two values of adolescent subjective SES: low (one standard deviation below the mean) and high (one standard deviation above the mean; Figure 2.1, see also Table A2.1).

Among adolescents with low adolescent subjective SES, parental SES was negatively associated with emotional symptoms, conduct problems and psychosomatic complaints, and positively associated with life satisfaction. However, among adolescents with high adolescent subjective SES, the association between parental SES and these mental health outcomes was not significant (or, in the case of psychosomatic complaints and conduct problems, positive). Thus, for emotional symptoms, conduct problems and psychosomatic complaints, high adolescent subjective SES buffered the association between lower parental SES and higher levels of adolescent mental health problems. High adolescent subjective SES also buffered the association between lower parental SES and lower life satisfaction. For hyperactivity, the positive association between parental SES and hyperactivity was stronger when adolescent subjective SES was high than when adolescent subjective SES was low. Thus, high adolescent subjective SES amplified the association between higher parental SES and higher levels of hyperactivity. Model 4b shows that there were no significant interaction effects between parental SES and adolescent educational level on mental health problems and life satisfaction. Thus, adolescent educational level did not moderate the association between parental SES and adolescent mental health problems and life satisfaction.

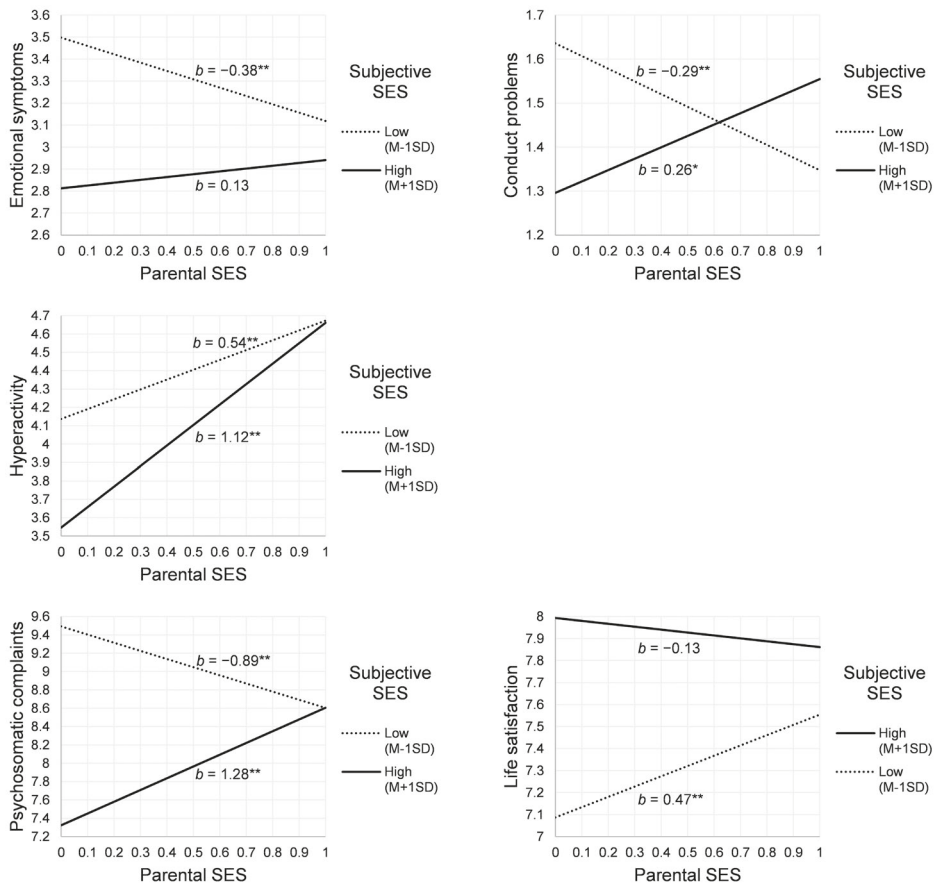


Figure 2.1 Conditional effect of parental SES on adolescent mental health for two values of adolescent subjective SES

Notes. Age = 13.9; Gender = girl; Educational level = low. * $p < .001$, ** $p < .0001$.

Changes in socioeconomic inequalities between 2001 and 2017

Model 5a shows that there was a negligible increase in emotional symptoms and a small increase in hyperactivity (between 2005 and 2017) and a small increase in psychosomatic complaints and a negligible decrease in life satisfaction (between 2001 and 2017). Model 5b shows no significant changes in the associations between the SES indicators and adolescent mental health problems and life satisfaction over time, and Models 6a and 6b show no significant changes in the moderation effects of adolescent subjective SES and adolescent educational level on the association between parental SES and adolescent mental health problems and life satisfaction. As a sensitivity analysis, we also ran models with survey year as a categorical variable, but the results were not substantially different.

Discussion

By including three different SES indicators and six different mental health outcomes, the results of the present study shed light on socioeconomic inequalities in adolescent mental health in the Netherlands. The findings showed that low adolescent subjective SES and low adolescent educational level had small independent associations with adolescent mental health problems. Independent associations between parental SES and adolescent mental health problems were negligible. Furthermore, for four out of six mental health outcomes, high subjective SES buffered the negative association between parental SES and adolescent mental health problems. In addition, this study found no changes in the associations between the SES indicators and adolescent mental health problems between 2001 and 2017, indicating persistent socioeconomic inequalities in adolescent mental health despite societal changes.

Adolescent subjective SES and educational level associated with mental health problems

We replicated previous findings in relatively wealthy and egalitarian countries, showing that the small association between parental SES and adolescent mental health problems attenuates when including other SES indicators (Ahlborg et al., 2017; Klanšček et al., 2014). In such countries, like the Netherlands, where income is redistributed and there are universal public services, the association between parental SES and mental health problems appears to be very small (Havas et al., 2010; Quon & McGrath, 2014).

In accordance with previous studies, we found that the association between adolescent subjective SES and adolescent mental health problems is stronger than the association between parental SES and adolescent mental health problems (Buijs et al., 2016; Karvonen & Rahkonen, 2011; McLaughlin et al., 2012). Perceptions of status appear to be especially important during the adolescent period (Allen et al., 2005). In particular, we found that lower adolescent subjective SES was associated with more emotional symptoms and lower life satisfaction. Our findings that associations are strongest with internalising problems suggest that social comparison effects, perhaps eliciting shame and pessimism, may be important mechanisms in explaining the association (Hoebel & Lampert, 2018; Smith et al., 2012; Taylor & Seeman, 1999). The association between subjective SES and mental health problems may also be due to reverse causation, because mental health problems may cause adolescents to perceive their environment less positively and their family as less wealthy (Garbarski, 2010; Nobles et al., 2013). The association may also be confounded by a third variable; personality traits, such as self-esteem, could affect how individuals rate themselves in general and influence their reports of subjective SES and mental health problems (Hoebel & Lampert, 2018). However, several experimental studies (conducted with adult populations) suggest that low subjective SES does cause mental health problems (Hoebel & Lampert, 2018; Kraus et al., 2013). To further understand the association between subjective SES and adolescent internalising mental health problems and life satisfaction, it would be useful

to further study which factors cause adolescent's subjective SES evaluations (McLaughlin et al., 2012).

Educational level, an indicator of emerging adolescent SES, was also independently associated with adolescent mental health problems, with low education associated with externalising problems (in particular, conduct problems, as well as hyperactivity) and peer problems. These results support previous findings from the Netherlands and other egalitarian countries (Havas et al., 2010; Klanšček et al., 2014). As our results are strongest for conduct problems and negligible for internalising problems and life satisfaction, it is more likely that adolescents with lower educational levels have more mental health problems because they experience a negative classroom climate and poor peer behaviour, rather than feelings of academic inadequacy and inferiority (Dishion & Tipsord, 2011; Patterson et al., 1989; Veed et al., 2019). As with subjective SES, causation could be in the opposite direction; adolescents with mental health problems may struggle to cope in school and be tracked into a low educational level (de Zeeuw et al., 2017; Elstad, 2010). Additionally, the association between a low adolescent educational level and mental health problems may be due to genetic factors or heritable traits (Halpern-Manners et al., 2016). Given the associations we found, research on socioeconomic inequalities in adolescent mental health should take into account the role of adolescent educational level, and consider factors other than educational level which may also indicate emerging adolescent SES, such as educational or occupational expectations (Hagquist, 2007; Schoon & Lyons-Amos, 2017; Sweeting et al., 2016). Further research could also explore whether the associations found depend on age; parental SES may be a stronger predictor of childhood mental health, but have a decreasing impact as adolescents acquire their own SES (Reiss, 2013).

Adolescent subjective SES buffers the association between low parental SES and adolescent mental health problems

Although parental SES did not have an independent association with adolescent mental health problems when adolescent subjective SES and educational level were included, we found that high subjective SES buffered the negative association between parental SES and mental health problems for four of six outcomes. The results suggest that in wealthy and egalitarian countries such as the Netherlands, high subjective SES may be a protective factor against mental health problems for adolescents with lower parental SES (Taylor & Seeman, 1999). High subjective SES, perceiving one's family situation favourably, appears to be especially important to adolescents who experience adverse circumstances of lower parental SES (Taylor & Seeman, 1999). For the fifth outcome, hyperactivity, high adolescent subjective SES amplified a negligible, but unexpected, positive association between parental SES and hyperactivity. In the Netherlands, where adolescents report relatively high levels of hyperactivity compared to their European age-mates (Duijnhof et al., 2019), hyperactivity may be more normative than problematic (Davidovitch et al., 2017), contrasting with research findings elsewhere that higher levels of hyperactivity are typically found in lower SES families (Russell et al., 2016; Willcutt, 2012).

Chapter 2

Our findings are correlational, thus further research on the interaction between parental SES and adolescent subjective SES could examine possible underlying mechanisms, such as psychosocial resources (e.g., optimism) and perceived social support (Matthews & Gallo, 2011; Piko et al., 2013; Taylor & Seeman, 1999). Understanding of these mechanisms could be important for developing effective ways to reduce socioeconomic inequalities in adolescent mental health.

We did not find a moderation effect of educational level on the association between parental SES and adolescent mental health problems. Perhaps, in a relatively wealthy and egalitarian country with a tracked education system, the associations of parental SES and educational level with adolescent mental health problems are cumulative due to the intergenerational transmission of educational level (Chapter 6). Furthermore, theories that adolescents in higher educational levels with lower parental SES may experience mental health benefits – gaining cognitive skills that can be used to reduce the effects of stress (Ross & Mirowsky, 2011) – or mental health disadvantages – experiencing feelings of social isolation or alienation (Destin, 2019) – may not be so relevant to the Netherlands, where lower parental SES may not be so different from higher parental SES.

No changes in socioeconomic inequalities in adolescent mental health

Our results showed socioeconomic inequalities in adolescent mental health did not change between 2001 and 2017. This finding was remarkably consistent – holding for all three SES indicators and all six mental health outcomes, despite societal changes during the period. The results extend the findings of two previous studies, which covered shorter timespans, but also showed stable socioeconomic inequalities in adolescent mental health in the Netherlands using one SES indicator (Duijnhof et al., 2015; Moor et al., 2015). Socioeconomic inequalities in adolescent mental health appear to be stable in several other wealthy countries as well, including Sweden and Canada (Ahlborg et al., 2017; Gariépy & Elgar, 2016; Pförtner et al., 2017). Perhaps, due to living in a country with a strong welfare state (Mulder et al., 2018), changes in the economy and society – including the Great Recession, educational changes and the growth of digital media – have not substantially affected the proximal environment of adolescents, which is most likely to contribute to their mental health (Pförtner et al., 2017; Viner et al., 2012). However, our results also showed that socioeconomic inequalities in adolescent mental health persist, thus even with the Netherlands' strong welfare state, policies to reduce these inequalities do not appear to be especially effective (Mackenbach, 2012).

Strengths and limitations

The large, nationally representative HBS dataset, with consistency in the survey questions and sampling procedures across a 16-year time span, enabled us to include multiple SES indicators and mental health measures, consider time trends and use data from tens of thousands of adolescents, which provides confidence about the robustness of our results. However, this study also has several limitations. First, differences in the characteristics of the five samples (other than gender and age, which we control for), such

as potential changes over time in family structure, may be responsible for the consistent association between the SES indicators and adolescent mental health problems over time. Nevertheless, by using national representative data at all time points, we are able to assess how SES associations with mental health problems have changed in the general adolescent population in the Netherlands. Secondly, our measure of parental SES was designed for cross-national research and is skewed towards high parental SES in the Dutch sample, though by using a relative measure we were able to lessen this limitation (Inchley et al., 2016). Further research could explore whether other measures of parental SES (such as parental income or occupation) have similar associations with adolescent mental health problems and if they interact with adolescent subjective SES. Thirdly, the cross-sectional nature of the data does not enable us to draw causal conclusions. As discussed, mental health may partly influence both subjective SES and educational level, or share (genetic) factors which confound the association. Fourthly, we did not have data for SDQ-R measured mental health problems in 2001, though this was mitigated by our lack of findings of changes in socioeconomic inequalities in psychosomatic complaints and life satisfaction for the full time-period studied. Fifthly, our results for early adolescents (aged 11–16) in the Netherlands may not generalise to older adolescents or adolescents living in other countries, though many of our findings support existing evidence with different samples.

Conclusion

By looking at parental SES, adolescent subjective SES, and adolescent educational level and their interplay, this study adds important new insights to the literature on socioeconomic inequalities in adolescent mental health. We replicated previous findings showing that lower adolescent subjective SES and educational level were independently associated with adolescent mental health problems, but parental SES was not. Findings differed by mental health outcome: adolescent subjective SES was associated with internalising problems and life satisfaction, while adolescent educational level was associated with externalising and peer problems. Extending the existing studies, we found that, when interactions between SES indicators were considered, high subjective SES buffered adolescents from the mental health problems associated with having low parental SES. Socioeconomic inequalities in adolescent mental health remained stable for 16 years. Taken together, these findings suggest that researchers, policy-makers and practitioners looking to improve adolescent mental health and reduce socioeconomic inequalities need to consider all three SES indicators – parental SES, adolescent subjective SES and adolescent educational level – to effectively target interventions towards adolescents most likely to experience mental health problems.

Appendix

Table A2.1 Regression model 4a showing interaction effects of two SES indicators on six adolescent mental health problems.

	Emotional Symptoms		Conduct Problems		Hyperactivity		Peer Problems		Psychosomatic Complaints		Life Satisfaction	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
M4a Intercept	3.42** (0.24)	.01	2.28** (0.20)	.28	4.10** (0.35)	.11	1.93** (0.23)	.17	9.77** (0.65)	.04	8.01** (0.16)	.06
Gender ^e	-1.34** (0.03)	-.30	0.44** (0.03)	.13	0.07 (0.04)	.01	0.18** (0.03)	.05	-2.61** (0.08)	-.21	0.37** (0.02)	.12
Age	0.09** (0.01)	.05	-0.01 (0.01)	.00	0.07* (0.02)	.03	0.07** (0.01)	.05	0.24** (0.03)	.05	-0.18** (0.01)	-.14
Parental SES	-1.23** (0.26)	-.02	-1.21** (0.23)	.00	-0.44 (0.35)	.08	-1.20** (0.25)	-.07	-4.54** (0.66)	.01	1.48** (0.19)	.03
Subjective SES	-0.47** (0.05)	-.10	-0.23** (0.04)	-.02	-0.40** (0.06)	-.05	-0.21** (0.05)	-.04	-1.48** (0.13)	-.09	0.62** (0.03)	.19
Educ. = High	-0.09 (0.06)	-.04	-0.97** (0.05)	-.56	-0.99** (0.08)	-.34	-0.67** (0.05)	-.34	-0.59 (0.20)	-.10	-0.05 (0.04)	-.03
Educ. = U. Int.	-0.03 (0.06)	-.01	-0.68** (0.05)	-.39	-0.37** (0.09)	-.13	-0.49** (0.05)	-.25	-0.49 (0.19)	-.08	-0.09 (0.04)	-.06
Educ. = L. Int.	-0.10 (0.06)	-.04	-0.36** (0.05)	-.21	-0.14 (0.09)	-.05	-0.23** (0.06)	-.12	-0.34 (0.18)	-.06	-0.07 (0.04)	-.05
Parental SES × Subjective SES	0.35** (0.08)	.03	0.37** (0.07)	.05	0.39* (0.11)	.03	0.22 (0.08)	.02	1.48** (0.20)	.05	-0.41** (0.05)	-.05

Notes. ^e Reference category: girl.





Chapter 3

The social gradient in adolescent mental health:
Mediated or moderated by belief in a just world?

Based on: Weinberg, D., Stevens, G. W. J. M., Peeters, M.,
Visser, K., Tigchelaar, J., & Finkenauer, C. (2021). *The social gradient in adolescent
mental health: Mediated or moderated by belief in a just world?*

Manuscript submitted for publication.

Abstract

A social gradient in adolescent mental health exists: adolescents with higher socioeconomic status (SES) have fewer mental health problems than their peers with lower SES. Little is known about whether adolescents' societal beliefs play a role in this social gradient. Belief in a just world (BJW) may be a mediator or moderator of the social gradient in adolescent mental health. Using data from 1,130 adolescents ($M_{age} = 17$) in the Netherlands, path analyses examined whether two indicators of BJW (general and personal) mediated or moderated the associations between two indicators of SES (family affluence and perceived family wealth), and four indicators of adolescent mental health problems (emotional symptoms, conduct problems, hyperactivity and peer problems). Adolescents with lower perceived family wealth reported more emotional symptoms and peer problems, and these associations were partly mediated by lower personal and general BJW. Furthermore, higher personal BJW amplified the negative association between SES and peer problems. This study suggests BJW may both mediate and amplify the social gradient in adolescent mental health. Adolescents' beliefs about society may be important to include in research aimed at understanding this social gradient.

Keywords: social gradient; adolescent mental health; socioeconomic status; health inequalities; belief in a just world

Author contributions: **DW** *Conceptualization, Data Curation, Formal analysis, Methodology, Visualisation, Writing – original draft, Writing – review & editing.* **GWJMS** *Conceptualization, Project administration, Funding acquisition, Investigation, Supervision, Writing – original draft, Writing – review & editing.* **MP** *Methodology, Writing – review & editing.* **KV** *Methodology, Writing – review & editing.* **JT** *Methodology, Writing – review & editing.* **CF** *Conceptualization, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.*

Many studies across multiple countries have consistently found a social gradient in adolescent mental health: adolescents with lower socioeconomic status (SES) have more mental health problems than adolescents with higher SES (Devenish et al., 2017; Peverill et al., 2021; Reiss, 2013). However, there are several gaps in the existing knowledge on this topic. First, while most studies show evidence of a gradient, there may be differences in the strength of the gradient across indicators of both SES and mental health. Second, more research is needed into understanding mechanisms that link SES and adolescent mental health – the mediators of the social gradient in adolescent mental health. Third, inconsistency across existing studies regarding the strength of the social gradient in adolescent mental health may be based on the presence of moderators. These three gaps are addressed in this study, through the inclusion of multiple indicators of SES and mental health and exploring the mediating and moderating potential of adolescents' beliefs about the world, specifically their Belief in a Just World (BJW). Below, we explain BJW and address why it may be a mediator or a moderator of the social gradient in adolescent mental health.

Differences in the literature regarding the strength of the social gradient in adolescent mental health may be due to the use of different indicators of SES and mental health. Regarding SES, adolescent SES has both objective components – such as markers of parental education, occupation or income – and a subjective component, adolescents' perception of their family's SES. Objective SES and subjective SES are proposed to have somewhat different pathways to mental health – objective SES more through the benefits of access to material resources and subjective SES more through psychosocial mechanisms – so it is important that studies of this social gradient include both SES indicators (Devenish et al., 2017; Quon & McGrath, 2014). Regarding mental health, some studies have even found that adolescents with higher SES may show vulnerability for some mental health outcomes (see Luthar et al., 2020). Therefore, in this study we included multiple indicators of SES and of mental health problems.

Adolescence is a period of growing awareness and knowledge of SES, the social context, and societal (in)justice (Almås et al., 2010; Dalbert & Sallay, 2004; Flanagan et al., 2014; Oppenheimer, 2006). One important theory regarding how people think about their social context and injustice is Belief in a Just World (BJW; Lerner, 1980). BJW is the belief that people get what they deserve because the world is fair. This belief is proposed to stem from a fundamental need to believe the world is fair, because this positive illusion acts as a resource that engenders trust, optimism and meaning in people's lives (Lerner, 1980; Lipkus et al., 1996). While most people to some degree believe that the world is just, there are individual differences in the extent to which people believe this (Lipkus et al., 1996). Research also suggests that there are two separate facets to BJW, distinguished by whether experiences of (in)justice are felt for oneself (personal BJW) or for people in general (general BJW; Dalbert & Stoeber, 2005; Hafer et al., 2020; Lipkus et al., 1996). BJW also overlaps with several other concepts, including system justification, the psychological motive to defend and justify the status quo (Jost & Banaji, 1994; Jost & Hunyady, 2005). BJW is also a supporting pillar of System Justification Theory (Jost

& Banaji, 1994) and general BJW, in particular, is closely related to system justification (Kelemen et al., 2014). Because both system justification and general BJW capture the extent of belief that people in general are confronted with just systems and institutions (Dalbert & Sallay, 2004), for the sake of clarity, in this study we refer to general BJW only. Furthermore, as far as we know, no studies on the social gradient in adolescent mental health have taken into account the role played by BJW in either mediating or moderating this social gradient (Devenish et al., 2017).

Previous research into the mechanisms of the relationship between SES and adolescent mental health have focused mainly on family-level pathways (Devenish et al., 2017). This research on family-level pathways shows that SES is positively related to the presence of stable and supportive family relationships, and the absence of stressful and threatening environments, and these, in turn, are related to positive adolescent mental health (Devenish et al., 2017; Grant et al., 2003; Letourneau et al., 2013). Only a few studies have considered the role of adolescent beliefs, such as perceptions of personal capability (Devenish et al., 2017). These suggested mechanisms do not fully explain the social gradient in adolescent mental health; yet, to our knowledge, no research on this social gradient has explored the mediational role of adolescents' beliefs about society. Yet there are reasons to think that BJW may mediate the social gradient in adolescent mental health, because theories and evidence suggest that SES may be associated with BJW, and BJW, in turn, associated with adolescent mental health. Regarding the link between SES and BJW; compared to their peers with higher SES, adolescents with lower SES face greater adversity and instability (Bradley & Corwyn, 2002). Evidence suggests these adolescents may therefore have lower BJW because they are likely to have experienced more injustice, or they may perceive society to be more unjust as a way to understand their lower SES position in society (Dalbert & Sallay, 2004; Schmitt, 1998). Few empirical studies have examined this association in adolescents, but those that do have shown that Kenyan, Brazilian and Chinese adolescents with lower SES have lower BJW (Thomas & Mucherah, 2016; Thomas & Rodrigues, 2019; Yu et al., 2018). We expect that the relationship between SES and BJW may be stronger for subjective SES than for objective SES given that subjective SES and BJW are both based on adolescents' perceptions of their place in the world. In turn, adolescents with lower BJW may doubt that the social context is just and meaningful, may find it difficult to consider people to be trustworthy, and they may be less optimistic about their life chances, making them more susceptible to mental health problems (Dalbert & Sallay, 2004; Jost & Hunyady, 2003). Indeed, there is robust empirical evidence that adolescents with lower BJW have more mental health problems (Dalbert & Sallay, 2004; Hafer & Sutton, 2016). These findings suggest BJW may be a mediator of the social gradient in adolescent mental health, and this may be especially likely to be the case for subjective SES.

Furthermore, there are also reasons to believe BJW may moderate the social gradient, either by weakening or strengthening it. On the one hand, *higher* BJW may weaken the relationship between SES and adolescent mental health. Adolescents with higher BJW may feel more in control of their own fate and capable of achieving their goals (Laurin

et al., 2011; McCoy et al., 2013; Shane & Heckhausen, 2013) and these feelings may be important mechanisms that buffer against stresses more typically associated with being lower SES (Bandura et al., 1999; Taylor & Seeman, 1999). There is evidence that BJW weakens the link between SES indicators (such as unemployment and poverty) and mental health (Dzuka & Dalbert, 2002; Wu et al., 2011), although no studies to date have specifically looked at BJW as a buffer of the social gradient in adolescent mental health. On the other hand, *higher* BJW may instead amplify the social gradient in adolescent mental health. Adolescents with higher BJW are more likely to attribute outcomes to internal factors, such as effort and ability, rather than to external factors, such as structural privileges and barriers (Godfrey et al., 2019; Liu & Platow, 2020; Madeira et al., 2019). In consequence, adolescents with higher BJW may believe that their (family) SES is based on talent and effort, generating self-enhancing feelings of pride in adolescents with higher SES, and self-debilitating feelings of shame and inferiority in adolescents with lower SES (Bosma et al., 2015; Darnon et al., 2018; Pratto et al., 2006). This suggests mental health differences across the SES spectrum may be heightened for adolescents with higher BJW.

In sum, in this study, we investigated whether there was a social gradient in mental health in adolescents in the Netherlands. As discussed above, adolescent SES has both objective and subjective components, therefore we included measures of family affluence (objective SES) and perceived family wealth (subjective SES; Devenish et al., 2017; Quon & McGrath, 2014). We included measures of both personal and general BJW. We studied four indicators of mental health problems, as measured by the strengths and difficulties questionnaire: emotional symptoms, conduct problems, hyperactivity and peer problems (R. Goodman, 1997). We hypothesised that the gradient would be mediated by BJW (both personal and general) and also explored a potential moderating effect of personal and general BJW.

Methods

We preregistered an analysis plan at the Open Science Framework, although the eventual analyses deviated from this plan.² The preregistration and analysis scripts are available at <https://osf.io/js3em/>.

Sample

We used data from the first wave of the ongoing longitudinal Youth Got Talent project on the SES-health gradient in adolescence ($N = 1,231$). Data were collected between

2 The preregistration includes a reference to two models which were not included in the final study. Model 1 in the preregistration (a model with no mediation) did not contribute information that wasn't already included in descriptive statistics and/or the mediation model (Model 2 in the preregistration, Model 1 in this chapter). Model 4 in the preregistration (which included both moderation and mediation pathways) was conceptually unnecessary for answering the proposed research questions.

September 2019 and February 2020 from adolescents at three vocational schools in the Utrecht region of the Netherlands. Classes were selected within these schools, covering the fields of creative, technical and health education. The adolescent response rate was 81%: non-participating students were sick or absent from the classroom (15%); chose not to fill in the questionnaire or refused to participate (3%); or gave consistently invalid responses (2%). Self-report questionnaires (digital for 96.5% and paper-and-pencil for 3.5%) were administered in the classroom, taking roughly 20-30 minutes. Tertiary vocational schools in the Netherlands are divided into four levels (1 – entry-level; 2 – basic, 3 – professional; 4 – middle-management; Eurydice, 2021). Pilot research revealed that adolescents in level 1 classes were unable to complete the questionnaire satisfactorily, so they were not included in this study. Based on researcher expectations that students in lower levels would have lower attention levels, students in levels 2 and 3 ($n = 282$) completed a shortened questionnaire compared to students in level 4 ($n = 848$). The personal BJW scale was not included in the questionnaire for students in levels 2 and 3 classes, and there was no difference in general BJW between students in levels 2 and 3 compared to level 4 ($t(1224) = .11, p = .912$). After taking into account differences between classes in the covariates (gender, age and migration background), the class-level ICC for all main study variables (SES, BJW, and mental health variables) was small (i.e., <10% of the variance in the main variables was at the class level, see Hox, 2010). For most of these variables, the ICC was negligible (<2.5%), so we determined that adjusting for clustering in this study was unnecessary.

Participants gave active consent and were informed that data would be anonymised. Participants were included in the study if they had data on all SES and control variables, and reported at least one BJW score and one mental health outcome ($n = 1,130$, 91.8% of the full sample). Roughly half of the adolescents included in the study were girls (56%) and 17% had a non-western migration background. Compared with excluded adolescents, included adolescents were significantly younger ($M_{\text{age}} = 17.3$ vs $M_{\text{age}} = 18.2$; $t(1225) = 4.66, p < .001$), less likely to have a non-western migration background (17% vs 44%; $\chi^2(1) = 40.01, p < .001$), and more likely to have higher family affluence (0.50 vs. 0.43 $t(1204) = 2.27, p = .023$). These differences were small (J. Cohen, 1992). There were no differences between included and excluded adolescents on perceived family wealth or gender. Ethical approval was gained from the Ethics Assessment Committee of the Faculty of Social Sciences at Utrecht University (FETC18-070) in 2018.

Measures

Socioeconomic status

Family affluence was measured using the six-item Family Affluence Scale (FAS), which assessed family material assets: car/van ownership, having own bedroom, holidays abroad, computer ownership, dishwasher ownership, and bathrooms (Torsheim et al., 2016). Item scores were summed to compute an ordinal score for participants who completed all scale items, then this ordinal score was ridit-transformed into a continuous

family affluence score (range = 0-1; mean = 0.5), with a higher score indicating more material assets (Elgar et al., 2017). The FAS is a reliable and valid instrument that enables adolescent to report their family affluence (Torsheim et al., 2016).

Perceived family wealth was measured with the question, “How well off do you think your family is?” The item had a 5-point response scale ranging from 1 (*very well off*) to 5 (*not at all well off*), which was reversed so that higher scores indicated higher perceived family wealth. The measure has been found to be easy to answer for adolescents (Inchley et al., 2017).

Belief in a just world

Personal BJW was measured using the personal belief in a just world scale (Dalbert, 1999). Seven items measured the belief that events in one’s life are just (e.g., “I believe that I usually get what I deserve”, “I am usually treated fairly”) with a seven-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). An average score was computed for respondents who answered more than half of the items; a higher score indicated a stronger personal BJW (Cronbach’s $\alpha = .81$).

General BJW was measured using an adaptation of the system justification scale (Godfrey et al., 2019; Kay & Jost, 2003). Eleven items measured the belief that the Dutch socio-political and economic system is just (e.g., “In general, Dutch society is fair”, “People get fair treatment in the Netherlands, no matter who they are”) with a seven-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). An average score was computed for respondents who answered more than half of the items; a higher score indicated a stronger general BJW ($\alpha = .89$).

Adolescent mental health problems

Emotional symptoms, conduct problems, hyperactivity and peer problems were measured with the SDQ-R: a revised version of the Strengths and Difficulties Questionnaire (SDQ), which has better psychometric properties for the problem subscales than the original self-report SDQ (Duihnof et al., 2019; R. Goodman, 1997). The SDQ asks about behaviour and feelings over the past six months with a 3-point ordinal response scale: 0 (*not true*), 1 (*somewhat true*), 2 (*certainly true*). Examples of items include “I get very angry and often lose my temper” and “I worry a lot”. The SDQ-R consists of 15 items measuring four subscales – emotional symptoms (5 items), conduct problems (4 items), hyperactivity–inattention problems (3 items) and peer relationship problems (3 items). Two subscales, emotional symptoms (ordinal $\alpha = .82$) and hyperactivity–inattention problems ($\alpha = .79$), had good internal consistency (ordinal $\alpha > .70$) (Gadermann et al., 2012), though internal consistency for conduct problems ($\alpha = .59$) and peer problems subscales ($\alpha = .52$) was less good, in line with former research (Duihnof et al., 2019). For participants who completed more than half of the subscale items, we computed mean scores, which were then multiplied by five to retain comparability with the original SDQ, with higher subscale scores indicating more problems (ranging from 0 to 10).

Control variables

We controlled for gender, age and migration background given their effect on adolescent mental health in the Netherlands (Duijnhof et al., 2020). We asked whether the participant was a girl (coded 0) or boy (coded 1). We asked about month and year of birth to calculate age at the date of data collection. Conforming with previous research in the Netherlands, and Dutch statistical agencies, migration status was measured by asking adolescents about their parents' countries of birth. We distinguished between: adolescents with both parents born in the Netherlands, adolescents with at least one parent with a western immigration background, and adolescents with at least one parent with a non-western immigration background (Duijnhof et al., 2020; Statistics Netherlands, CBS, 2020). Only 5.9% of adolescents had a western immigration background, so this group was merged with adolescents whose parents were born in the Netherlands, given both groups are western.

Data analysis

To test pathways between SES, BJW and mental health, relationships between the variables were examined with structural equation modelling (SEM), using the R package lavaan (Rosseel, 2012). Missing data were modelled using the default Maximum Likelihood estimator. Goodness-of-fit was evaluated using two measures, with good model fit indicated by CFI \geq .95 and RMSEA $<$.05 (Hu & Bentler, 1999). We first specified a mediation model (1), by regressing the four mental health outcomes on the two SES indicators (family affluence and perceived family wealth) and the control variables (gender, age and migration status) and including both personal BJW and general BJW as mediators of the pathways between SES and mental health (see Figure 3.1). The model included a bidirectional pathway between the two BJW indicators, given they were expected to correlate (Dalbert & Stoeber, 2005). Next, to explore whether BJW moderated pathways between SES and mental health, we regressed mental health on the control variables, both SES indicators, both BJW indicators and, one at a time, interaction terms between the two SES and BJW indicators (Models 3a-d). Evidence for mediational pathways was established based on the direct effects, indirect effects (estimated by lavaan) and summing these to compute total effects (Rosseel, 2012). Independent variables were considered fixed, so their means, variances and covariances were fixed to sample values (Rosseel, 2012). We used an α level of 0.05, and to control for inflation of Type I error rates based on multiple testing, we applied the Benjamini-Hochberg procedure with a false discovery rate of 0.05 (Benjamini & Hochberg, 1995). We interpreted standardised regression coefficients as negligible ($|r| < 0.1$), small ($|r| = 0.1-0.3$), medium ($|r| = 0.3-0.5$), or large ($|r| > 0.5$) (J. Cohen, 1992). Given our sample size ($n = 1,130$), we had sufficient statistical power to detect effects in models with fewer than 56 parameters, based on the 20:1 ratio (Kline, 2015).

Results

Descriptive statistics

Table 3.1 shows variable means, standard deviations, and correlations between the variables. Compared to the scale midpoints, adolescents' perceptions of their family wealth were average, they reported quite high personal BJW and general BJW, and they reported low levels of mental health problems. The SES indicators (family affluence and perceived family wealth) had medium positive associations with each other ($r = .41$), as did the BJW indicators ($r = .44$), and there were significant small positive associations between the SES indicators and BJW indicators (r s range from .09 to .22). Mental health problems had small to medium positive associations with each other (r s range from .11 to .36) and negligible to medium negative associations with SES and BJW indicators (r s range from -.01 to -.30), with the exception of a significant but negligible positive association between family affluence and hyperactivity ($r = .07$).

Investigating mediation of the social gradient by BJW

Table 3.2 and Figure 3.1 show the results of Model 1, investigating mediation. Regarding the control variables, older adolescents had slightly higher levels of emotional symptoms and peer problems, girls had higher levels of emotional symptoms and negligibly lower levels of conduct problems than boys, and adolescents with a non-western migration background had slightly lower levels of emotional symptoms and hyperactivity than adolescents with a Dutch/western migration background. Regarding the social gradient, there were small negative total effects of perceived family wealth on emotional symptoms and peer problems (see Table 3.2), but no total effects of family affluence on the different indicators of mental health problems.

Regarding the mediation pathway through BJW, perceived family wealth, but not family affluence, was positively associated with both personal BJW and general BJW, which were both, in turn, negatively associated with all four mental health problems (with one exception, personal BJW was not associated with hyperactivity). Perceived family wealth was also directly negatively associated with emotional symptoms, though there were no other direct effects of the SES indicators on mental health problems. Significant indirect effects were found for perceived family wealth on emotional symptoms and peer problems through both personal BJW and general BJW, and for conduct problems through general BJW only. In sum, for perceived family wealth, the model indicated partial mediation for emotional symptoms (total, indirect, and direct effects), an indirect only effect for conduct problems (no total effect), and full mediation for peer problems (indirect and total effects, but no direct effect).

Table 3.1 Descriptives and correlation table ($n = 1,130$)

	1	2	3	4	5	6	7	8	9	10	11
1. Age											
2. Gender ^a	.04										
3. Migration background ^b	.12**	-.08**									
4. Family affluence	-.16**	.08**	-.23**								
5. Perceived family wealth	-.17**	.07*	-.20**	.41**							
6. Personal BJW	-.05	.16**	-.05	.10**	.18**						
7. General BJW	-.04	.01	.02	.09**	.22**	.44**					
8. Emotional symptoms	.07*	-.30**	-.10**	-.10**	-.17**	-.30**	-.26**				
9. Conduct problems	.01	.08**	-.04	-.01	-.02	-.14**	-.20**	.26**			
10. Hyperactivity	-.05	-.04	-.14**	.07*	-.01	-.10**	-.14**	.32**	.29**		
11. Peer problems	.12**	-.04	-.02	-.04	-.10**	-.24**	-.23**	.36**	.20**	.11**	
Mean	17.31			0.50	3.03	4.64	4.33	3.12	0.93	4.47	2.62
Standard Deviation	1.69			0.28	0.73	0.90	0.99	2.55	1.34	3.02	1.94
Range	16-28	0-1	1-5	1-7	1-7	1-7	1-7	0-10	0-10	0-10	0-10

Notes. ^a Reference category: girl. ^b Reference category: Dutch/western. * $p < .05$. ** $p < .01$.

Table 3.2 Regression models of standardised associations between SES, BJW, and adolescent mental health problems

Model	Emotional symptoms			Conduct problems			Hyperactivity			Peer problems		
	β	CI		β	CI		β	CI		β	CI	
1 Age	0.10**	[0.04,0.15]		0.02	[-0.04,0.08]		-0.03	[-0.08,0.03]		0.13**	[0.07,0.18]	
Gender ^a	-0.31**	[-0.36,-0.26]		0.08*	[0.02,0.14]		-0.05	[-0.11,0.01]		-0.05	[-0.11,0.01]	
Migration background ^b	-0.14**	[-0.20,-0.08]		-0.04	[-0.09,0.02]		-0.14**	[-0.20,-0.09]		-0.03	[-0.09,0.02]	
FA (total)	-0.05	[-0.11,0.01]		-0.01	[-0.07,0.05]		0.06	[0.00,0.13]		0.01	[-0.06,0.07]	
FA (indirect through Personal BJW)	0.00	[-0.02,0.01]		0.00	[-0.01,0.00]		0.00	[-0.01,0.00]		0.00	[-0.02,0.01]	
FA (indirect through General BJW)	0.00	[-0.01,0.01]		0.00	[-0.01,0.01]		0.00	[-0.01,0.01]		0.00	[-0.01,0.01]	
PFW (total)	-0.15**	[-0.22,-0.09]		-0.02	[-0.09,0.06]		-0.06	[-0.12,0.01]		-0.09**	[-0.16,-0.02]	
PFW (indirect through Personal BJW)	-0.03**	[-0.05,-0.01]		-0.02 ^c	[-0.03,0.00]		-0.01	[-0.02,0.00]		-0.03**	[-0.04,-0.01]	
PFW (indirect through General BJW)	-0.04**	[-0.06,-0.02]		-0.02*	[-0.04,0.00]		-0.01	[-0.03,0.00]		-0.03**	[-0.05,-0.01]	
2a FA * Personal BJW	0.01	[-0.34,0.35]		-0.27	[-0.60,0.06]		0.04	[-0.32,0.41]		-0.45 ^c	[-0.86,-0.04]	
2b PFW * Personal BJW	-0.37	[-0.79,0.05]		-0.17	[-0.64,0.29]		-0.32	[-0.73,0.08]		-0.49**	[-0.84,-0.14]	
2c FA * General BJW	0.07	[-0.20,0.34]		-0.23	[-0.50,0.04]		0.04	[-0.27,0.36]		-0.26	[-0.54,0.03]	
2d PFW * General BJW	0.04	[-0.26,0.35]		-0.28	[-0.64,0.09]		-0.10	[-0.45,0.25]		-0.12	[-0.45,0.22]	

Notes. FA = Family affluence. PFW = Perceived family wealth. BJW = Belief in a just world.

^a Reference category: girl. ^b Reference category: Dutch/western. ^c Parameter insignificant after applying Benjamini-Hochberg procedure. Results for main mediation pathways are shown in Figure 3.1. * $p < .05$. ** $p < .01$. All models (except model 2, see Figure 3.1) were fully saturated: $df = 0$, so $CFI = 1$, $RMSEA = 0$.



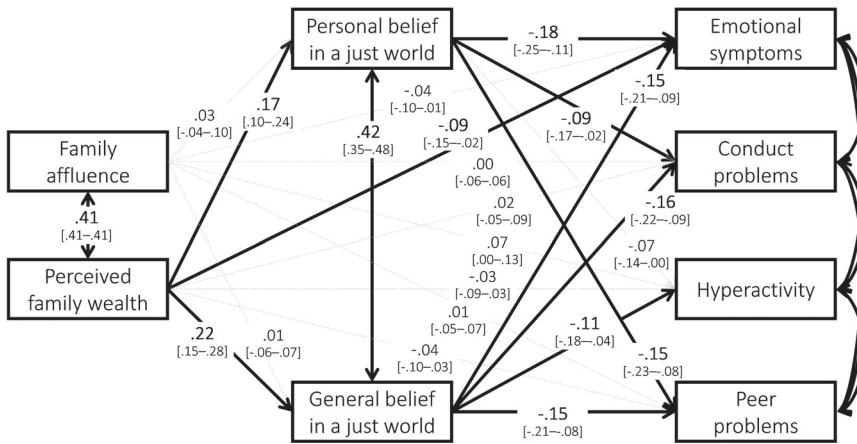


Figure 3.1 The association between SES and adolescent mental health problems mediated by BJW (Model 1).

Notes. Standardised coefficients. Continuous lines indicate significant paths ($p < .05$); dotted lines indicate insignificant paths ($p > .05$). Results for control variables (gender, age, and migration status) and total and indirect effects shown in Table 3.2. Model fit: $\chi^2(12) = 145.1, p < .001, CFI = 0.902, RMSEA = 0.099$.

Investigating moderation of the social gradient by BJW

The moderation models (2a-d) showed that the association between perceived family wealth and peer problems was moderated by personal BJW. To facilitate interpretation, we depicted this association for two values of personal BJW: low (one standard deviation below the mean) and high (one standard deviation above the mean; Figure 3.2). Among adolescents with low personal BJW, perceived family wealth was not associated with peer problems, while, among adolescents with high personal BJW, perceived family wealth was negatively associated with peer problems. Thus, high personal BJW amplified the association between perceived family wealth and peer problems.

Discussion

To our knowledge, this study is the first to investigate the role of individual-level BJW in the social gradient in adolescent mental health. Firstly, we found a social gradient for two of four mental health outcomes, whereby adolescents with lower perceived family wealth reported more emotional symptoms and peer problems. Secondly, these social gradients were (partly) mediated by BJW, such that adolescents with lower perceived family wealth had lower personal and general BJW, which in turn were related to more emotional symptoms and peer problems. For conduct problems, there was an indirect effect such that adolescents with lower perceived family wealth had lower general BJW,

which in turn was associated with more conduct problems, though perceived family wealth had no direct association with conduct problems. Thirdly, there was some evidence of a moderating effect of personal BJW. Adolescents with higher perceived family wealth reported fewer peer problems, which was increasingly true at higher levels of personal BJW.

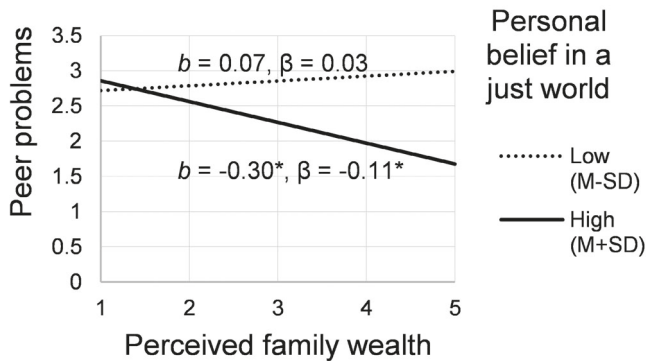


Figure 3.2 Conditional effects of perceived family wealth on peer problems for two values of personal BJW.

Notes. Age, Family affluence, and General BJW at mean values, Gender and Migration background at reference group values, i.e., Dutch/western girls. * $p < .05$

The results suggest that SES associations with mental health were stronger for perceived family wealth than for family affluence. These findings replicate previous results in the Netherlands, and other countries with relatively high standards of living (Chapters 2 and 5). One possible explanation for these findings could be that in such countries almost all adolescents have sufficient material goods, so objective SES is less important, whereas subjective SES still matters because status perceptions and social comparisons are important mechanisms in adolescent mental health (Quon & McGrath, 2014).

In our mediation model, which included both perceived family wealth and family affluence, adolescents with lower perceived family wealth had lower personal and general BJW, while family affluence was not associated with either BJW indicator. One explanation for these differential results may be that perceived family wealth more strongly represents social position compared to others than family affluence does. Adolescents who perceive that their family is less well off than other families may feel this is unjust or doubt whether the world can be fair (Dalbert & Sallay, 2004; Schmitt, 1998). Our research suggests that not only in countries like Kenya, Brazil and China (Thomas & Mucherah, 2016; Thomas & Rodrigues, 2019; Yu et al., 2018) but also in a

country with a relatively high standard of living such as the Netherlands, adolescents with lower perceived family wealth see the world as less just than their higher SES peers. Furthermore, as expected, adolescents with lower BJW had higher levels of (all four indicators of) mental health problems. Existing research suggests that adolescents with lower BJW may be less trusting of others and less able to cope with stressful experiences (Dalbert & Sallay, 2004). Just World Theory also suggests that these adolescents may be less optimistic and feel that their lives are less meaningful, and empirical evidence suggests adolescents with lower BJW may have more mental health problems because they feel less control over their own fate and less capable of achieving their goals (Laurin et al., 2011; McCoy et al., 2013; Shane & Heckhausen, 2013). Both personal BJW and general BJW were independently associated with adolescent mental health, supporting findings that these two constructs have somewhat different pathways to mental health (Dalbert & Stoeber, 2005; Hafer et al., 2020).

We also found some evidence that BJW moderated the social gradient in adolescent mental health: higher personal BJW amplified associations between perceived family wealth and peer problems. Adolescents with higher personal BJW may believe that because the world is fair and people get what they deserve, that their SES is based on talent and effort (Godfrey et al., 2019; Liu & Platow, 2020; Madeira et al., 2019), intensifying the relationship between SES and feelings of pride (versus shame) about their social status (Bosma et al., 2015; Darnon et al., 2018; Pratto et al., 2006). This finding may apply specifically to peer problems because status plays a central role in the task of building relationships with peers (Gilbert & Irons, 2008). However, given that we found no evidence of moderation for three other indicators of mental health problems, the evidence for moderation seems relatively weaker than that for mediation.

Strengths, limitations, and future research

This study had several strengths, in particular the integration of BJW into research on the social gradient in adolescent mental health. Additionally, we used multiple indicators of the key concepts and included over 1,000 adolescents from a sample of students in vocational schools, a group typically under-represented in existing research (M. Nielsen et al., 2017). The study also has several limitations. Firstly, the cross-sectional nature of our data restricts us from drawing causal conclusions. Poor mental health may instead lead to lower BJW, or a third variable, such as optimism, may explain the association between perceived family wealth, BJW, and mental health. Secondly, the Youth Got Talent dataset is limited to adolescents in one type of school in one region in the Netherlands and older adolescents, adolescents with lower family affluence, and adolescents with a non-western migration background had a higher likelihood of missing data, which means that they were under-represented in the final analysed sample. Associations between adolescent SES and beliefs about the world may depend on adolescents' educational and occupational opportunities (Barreiro et al., 2019; F. Nielsen et al., 2015; Nieuwelink et al., 2018), so further research could investigate if our findings generalise to adolescents in a broader range of educational tracks, adolescents

in more rural areas and adolescents in other countries. Thirdly, several measures had limitations. To measure general BJW, we used the system justification scale, which, compared to other scales used to measure general BJW, is focussed more strongly on the (in)justice of systems and institutions, rather than the world more broadly. The measure may be less suited to capturing those for whom BJW is based on belief that other causal forces, such as God, or nature, determine whether people get what they deserve (Stroebe et al., 2015). Participants may not have interpreted our single-item measure of perceived family wealth as a social comparison, because it did not explicitly include a comparative frame. Furthermore, this item is limited by being a Likert-item, which provides an ordinal approximation of a continuous variable. However, a review of research on the association between subjective SES and adolescent mental health found that Likert scales have similar associations with adolescent health outcomes as other measures (Quon & McGrath, 2014).

Future research and practice could address several other issues arising from this study. Firstly, longitudinal research would help with identifying causal pathways in the development of the social gradient in adolescent mental health. Secondly, given beliefs, such as BJW, system justification, and meritocracy (people get what they deserve because the system rewards individual talent and effort) are closely related (Jost & Hunyady, 2005), future research could try to further disentangle which are the key mechanisms that affect the social gradient. One previous study has investigated meritocratic beliefs (Chapter 5), but, rather than looking at individual-level meritocratic beliefs, it focussed on whether aggregated meritocratic beliefs at the country-level explained cross-country differences in the strength of the social gradient. For example, future research could explore the extent to which adolescents attribute their SES to internal or external causes, and whether this relates to their BJW and/or their feelings of pride or shame regarding their SES (Kristjánsson, 2004). Thirdly, research could unpick the mechanisms by which adolescents' direct experiences of (in)justice, and their wider knowledge and perceptions of (in)justice in the world, contribute to adolescent mental health (Dalbert & Stoeber, 2005; Hertogh, 2010; Thomas & Mucherah, 2016). Fourthly, interventions to reduce the social gradient in adolescent mental could consider adolescents beliefs about society, although specific suggestions for practice seem premature given that BJW both mediates and amplifies the social gradient.

Conclusion

Overall, our findings suggest that BJW can contribute to our understanding of the social gradient in adolescent mental health. In particular, we found that BJW (both personal and general) partially explains why perceived family wealth is related to emotional symptoms and peer problems. Also, higher personal BJW was found to amplify the association between perceived family wealth and adolescent peer problems. This study should be seen as a first step in understanding the role of adolescents' beliefs about society in the social gradient in adolescent mental health, and our findings suggest that further exploration of these ideas would be a fruitful and important avenue for research.





Chapter 4

The role of social cognitions in the social gradient in adolescent mental health: A longitudinal mediation model

Based on: Weinberg, D., Stevens, G. W. J. M., Peeters, M.,
Visser, K., Frankenhuis, W. E., & Finkenauer, C. (2021).

*The role of social cognitions in the social gradient in adolescent mental health:
A longitudinal mediation model.* Manuscript submitted for publication.

Abstract

The social gradient in adolescent mental health is well established: adolescents' socioeconomic status (SES) is negatively associated with their mental health. However, despite changes in social cognition during adolescence, and theory and evidence that SES, social cognitions, and adolescent mental health are associated, little is known about whether social cognitions mediate this gradient. This study used three data waves, each six months apart, from a socioeconomically diverse sample of 1,429 adolescents ($M_{\text{age}} = 17.9$) in the Netherlands. With a longitudinal mediation model, we examined whether three social cognitions (self-esteem, sense of control, and optimism) mediated the associations between perceived family wealth and four indicators of adolescent mental health problems (emotional symptoms, conduct problems, hyperactivity, and peer problems). Adolescents with lower perceived family wealth reported more emotional symptoms and peer problems concurrently and an increase in peer problems six months later. Adolescents with lower perceived family wealth reported a decrease in sense of control six months later, and lower sense of control predicted increases in emotional symptoms and hyperactivity six months later (though not in the multivariate model with all three social cognitions). Perceived family wealth predicted neither later self-esteem nor optimism, though we found concurrent positive associations between perceived family wealth and all three social cognitions, and concurrent negative associations between social cognitions and mental health problems. Our findings indicate that social cognitions may be an overlooked mediator of the social gradient in adolescent mental health. Future research on this social gradient may benefit from incorporating a focus on social cognition.

Keywords: social gradient; adolescent mental health; socioeconomic status; social cognitions; sense of control; longitudinal mediation

Author contributions: **DW** *Conceptualization, Data Curation, Formal analysis, Methodology, Visualisation, Writing – original draft, Writing – review & editing.* **GWJMS** *Conceptualization, Project administration, Funding acquisition, Investigation, Supervision, Writing – original draft, Writing – review & editing.* **MP** *Methodology, Writing – review & editing.* **KV** *Methodology, Writing – review & editing.* **WF** *Methodology, Writing – review & editing.* **CF** *Conceptualization, Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.*

The social gradient in adolescent mental health is persistent and robust: adolescents with lower socioeconomic status (SES) have worse mental health than adolescents with higher SES (Devenish et al., 2017; Reiss, 2013). A solid understanding of this social gradient is vital to improving adolescents' mental health. Furthermore, this social gradient persists into adulthood and has enormous social and economic costs (Mackenbach et al., 2011; Patton et al., 2016; Vigo et al., 2016). Research on the mediators of this gradient has generally focused on the family context, documenting several factors that may explain the worse mental health of adolescents with lower SES. These include having fewer material resources, experiencing fewer stable and supportive relationships, and facing more stressful and threatening family and neighborhood environments (R. D. Conger & Donnellan, 2007; McLoyd et al., 2009). Less attention has been paid to adolescent-level factors, such as social cognitions – the psychological processes that adolescents use to make sense of themselves and others (Fiske & Taylor, 2013). Social cognitions are influenced by the socio-economic context in which people develop (Kraus et al., 2012; Stephens et al., 2014). Furthermore, three social cognitions – self-esteem, sense of control, and optimism – are deemed fundamental to mental health (Taylor & Brown, 1988). In combination, these two propositions suggest that people with lower SES have more negative social cognitions, and those with more negative social cognitions have worse mental health, and thus that social cognitions may mediate the social gradient in mental health.

However, little is known about whether, and which, social cognitions mediate this social gradient in adolescence (Adler & Tan, 2017; E. Chen et al., 2002; Heberle & Carter, 2015). This gap in the literature is striking because social cognitions are formed by making social comparisons and internalizing the views of others (Gecas, 1982), which are pronounced features of adolescence (Crone & Dahl, 2012; Jacobs et al., 2003). Furthermore, adolescence is an important phase in the preparation for adulthood and a critical juncture in the attainment of social status. During this life stage, the role of parental SES in social cognitions may increase because adolescents are reorienting from parents to peers (Brown & Larson, 2009; Prinstein, 2017) while also contemplating their own educational and occupational futures (Flanagan et al., 2014; Hagquist, 2007; Schoon & Lyons-Amos, 2017). Furthermore, these developmental changes may also increase the extent to which social cognitions play a role in the social gradient in mental health, so associations between SES, social cognitions, and mental health may be greater for adolescents than for children and adults. Therefore, this study explored whether three social cognitions – self-esteem, sense of control, and optimism – mediated the social gradient in adolescent mental health.

Mediation by social cognitions: self-esteem, sense of control, and optimism

Several reviews have emphasised the role of SES in the development of adaptive and contextually-appropriate social cognitions (Frankenhuis & Nettle, 2020; Kraus et al., 2012; Pepper & Nettle, 2017; Piff et al., 2017; Sheehy-Skeffington, 2020; Stephens et al., 2014). Adolescents with lower SES, who are likely to face more stressful and threatening family,

school, and neighborhood environments, develop social cognitions which correspond with the uncertainty and stress of these contexts (Kraus et al., 2012; Sheehy-Skeffington, 2020; Stephens et al., 2014). We expect that SES influences three important social cognitions: self-esteem – the evaluation of one’s importance, worth, or value (Blascovich & Tomaka, 1991); sense of control – the belief that one’s actions determine outcomes (Lachman & Weaver, 1998; Whitehead et al., 2016); and optimism – a generalised feeling of confidence in positive future outcomes (Carver et al., 2010). Taylor and Brown’s (1988) landmark paper identified these three social cognitions to be fundamental for maintaining positive mental health. Subsequent reviews have corroborated the evidence that adult mental health is indeed predicted by self-esteem (Mann et al., 2004), sense of control (Orton et al., 2019), and optimism (Carver et al., 2010). However, less is known about the role of these three social cognitions in adolescent mental health. Below, we outline both overlapping and distinct reasons why each of the three social cognitions may mediate the social gradient in adolescent mental health.

First, adolescents with lower SES may be more likely to feel inferior to their counterparts with higher SES and receive stigmatizing treatment (Bosma et al., 2012; McLoyd et al., 2009), experiences expected to lead to lower self-esteem (Falci, 2011; Heberle & Carter, 2015; Rosenberg & Pearlin, 1978). In turn, adolescents with lower self-esteem than their peers may have more mental health problems, perhaps through processes of seeking and receiving less social support, experiencing more stress, and applying detrimental coping cognitions and behaviors (Donnellan et al., 2005; Orth et al., 2012). A meta-analysis has found robust evidence that SES is positively related to self-esteem during adolescence (Twenge & Campbell, 2002). Individuals with lower self-esteem in early adolescence, as compared to those with higher self-esteem, showed greater increases in mental health problems later in adolescence (Ciarrochi et al., 2007; Masselink et al., 2018; Orth et al., 2008). One cross-sectional study in late adolescents found that SES was positively related to self-esteem and self-esteem positively related to life satisfaction (Yan et al., 2020). Yet, to our knowledge, no longitudinal research has considered self-esteem as a mediator of the social gradient in adolescent mental health.

Second, we expect adolescents with lower SES to have fewer social and material resources to exercise control over their environment than adolescents with higher SES (Marmot, 2004; Stephens et al., 2014). They may also be socialised into holding autonomy-limiting beliefs, through their greater likelihood of experiencing authoritarian parenting or living in disadvantaged neighborhoods (K. J. Conger et al., 2009; Lareau, 2003). Adolescents with lower SES are thus expected to have a lower sense of control (Bosma et al., 2014; Shifrer, 2019; Wheaton, 1980). Adolescents with lower sense of control, are more likely than adolescents with higher sense of control to feel trapped, frustrated, and anxious, and be at risk of mental health problems (Bosma et al., 2014; Chorpita & Barlow, 1998; Whitehead et al., 2016). Evidence from two longitudinal studies in mid-late adolescence has shown, independently, that SES was positively associated with sense of control six years later (Ahlin & Antunes, 2015), and that sense of control was negatively associated with mental health problems two years later (Sullivan et al., 2017).

We know of only one longitudinal study examining sense of control as a mediator of the social gradient in adolescent mental health, which found that sense of control at age 16 mediated the association between SES at age 5 and depression at age 18 (Culpin et al., 2015).

Third, we expect adolescents with lower SES to be less optimistic than adolescents with higher SES, because they have fewer resources to achieve their future goals (Brumley et al., 2017; McLoyd et al., 2009) and experience more stressful events that can be projected onto their own futures (Boehm et al., 2015; Gallo & Matthews, 2003). Optimism helps adolescents cope with threat and stress, motivates persistence and agentic action (Hitlin et al., 2015), and supports the maintenance of social relationships (McWhirter & McWhirter, 2008), all of which are key drivers of positive mental health (S. Cohen & Wills, 1985). Indeed, some evidence suggests that less optimistic adolescents are at greater risk of developing mental health problems (Patton et al., 2011). Two cross-sectional studies in late adolescence found optimism to mediate the association between SES and depression (Piko et al., 2013; Zou et al., 2020), but longitudinal research is lacking.

Although the studies described above provide insight into the mediating role of social cognitions in the social gradient in adolescent mental health, they do not give a complete picture. First, they studied self-esteem, sense of control, and optimism in isolation, yet, these three social cognitions are interrelated (Ben-Zur, 2003; Hitlin & Johnson, 2015; Kim et al., 2019). Establishing the robustness of each of these mediational contributions is a stepping-stone towards selecting the most efficacious of the interventions and services which aim to establish better mental health and more positive social cognitions in adolescents with lower SES (Goyer et al., 2017; Yeager et al., 2018). Second, existing studies have used only one indicator of adolescent mental health (depression or life satisfaction), and we are unaware of research which includes both internalizing and externalizing problems, despite differences in the strength of the social gradient by adolescent mental health outcome (Devenish et al., 2017; Quon & McGrath, 2014; Reiss, 2013). Third, existing studies either did not test mediation with longitudinal data or did not control for stability in the constructs over time, which are important facets in establishing evidence for causal effects (MacKinnon et al., 2007). Our study addresses all three issues.

The current study

The current study extends the literature by investigating three potential mediators of the association between SES and different indicators of adolescent mental health: self-esteem, sense of control, and optimism. The study uses a sample of adolescents in vocational education, who followed a range of study paths that are likely to influence their educational and occupational futures. Furthermore, it uses autoregressive path analysis, specifically a lagged panel model design with three waves of longitudinal data spanning one year (Cole & Maxwell, 2003). This design is well-suited to testing the between-person effects outlined above (Orth et al., 2021). We expected that all three social cognitions would mediate the association between SES and adolescent mental

health. This study focused on subjective SES (perceived family wealth) based on recent findings that it is more strongly associated with adolescent mental health than objective measures of SES (Chapter 2). We included four indicators of mental health problems: emotional symptoms, conduct problems, hyperactivity, and peer problems.

Methods

We preregistered an analysis plan at the Open Science Framework, although the eventual analyses deviated from this plan.³ The preregistration and analysis scripts are available at <https://osf.io/fsw3j/>.

Sample

We used data from the Youth Got Talent project, an ongoing longitudinal study investigating the SES-mental health gradient in adolescence. Adolescents (aged 16+) attended classes ($n = 72$) in three vocational schools in the region of Utrecht in the Netherlands and participated in training mainly in creative, technical, and health education. Adolescents ($N = 1,429$) filled out questionnaires on three occasions: in autumn 2019/winter 2020 (T1, $n = 1,231$); roughly six months later in late spring 2020 (T2, $n = 830$); and roughly one year after the first wave, in autumn 2020/winter 2021 (T3, $n = 576$). There was substantial attrition, with only about a quarter of the adolescents (386) participating at all three time-points. Structural changes made to the project necessitated by the Covid-19 pandemic and education transitioning to being (largely) online in spring 2020 were substantially responsible for the attrition. We were also unable to reach participants that had dropped out of school between measurements. Roughly a quarter of the classes that participated in Wave 1 did not participate in Wave 2. Within classes that participated, the adolescent response rate was over 65% and about 15% of the non-responding adolescents had dropped out of school before Wave 2. In Wave 3, one school dropped out of the study, so nearly half of the classes that participated in Wave 1 did not participate in Wave 3. Within classes that participated, the adolescent response rate was over 60% and roughly 20% of the non-responding adolescents had dropped out of school before Wave 3. Researchers administered self-report questionnaires in the classroom (T1) or during online lessons (T2 and T3) and these took about 20-30 minutes to complete. Adolescents gave active consent and were informed that data would be anonymised.

We included all participants in this study. Just over half of the adolescents were girls (57%) and 19% had a non-western migration background. The mean age of all participants at T1 was 17.9 years (ranging from 15-30). There was missing data based on attrition, but very little missing data per time-point when an adolescent participated:

3 After submitting a preregistration, which described a cross-sectional study, it became possible to address the research questions more thoroughly using longitudinal data. The analytic plan described in this chapter therefore differs somewhat from the plan in the preregistration.

in all three waves, over 90% of participants answered over 95% of the questions. Demographic characteristics of adolescents who participated at all three time-points ($n = 386$) were compared to those of adolescents who participated in fewer than three time-points ($n = 1,043$). Adolescents who participated in all waves: were younger ($M_{age} = 17.4$ vs $M_{age} = 18.0$), less often had a non-western migration background (9% vs 23%), and at T1 had higher family affluence (.55 vs. 48), higher perceived family wealth (3.12 vs. 2.98), lower self-esteem (4.61 vs. 4.84), and lower levels of conduct problems (0.81 vs. 1.00). All these differences between adolescents who participated at all three time-points, and those who did not, were small (J. Cohen, 1992), and we found no differences between the groups at T1 in sense of control, optimism, or the other mental health problems measured. The project was approved by the Ethics Assessment Committee of the Faculty of Social Sciences at Utrecht University in 2018 (FETC18-070; updated in 2020).

Measures

Socioeconomic status

At all three time-points, adolescents reported *perceived family wealth* by answering the question, “How well off do you think your family is?” The item had a 5-point response scale from 1 (*very well off*) to 5 (*not at all well off*) and we reversed the scale so that higher scores indicated higher perceived family wealth. The measure is easy to answer for adolescents and reflects the subjective dimension of SES (Inchley et al., 2017).

Adolescent social cognitions

Social cognitions were measured with the same instruments at all three time-points. Adolescents reported *self-esteem* using the single item self-esteem scale (Robins et al., 2001). The item, “I have high self-esteem”, was measured on a 5-point Likert scale, ranging from 1 (*not very true of me*) to 7 (*very true of me*). Higher scores indicated higher self-esteem. The item is reliable, valid in older adolescents, has convergent correlation with the most widespread instrument for measuring self-esteem, and is widely-used and considered to be an appropriate brief instrument for measuring global self-esteem in longitudinal (online) studies (Brailovskaia & Margraf, 2020; Robins et al., 2001)

Adolescents reported *sense of control* using the sense of control scale (Lachman & Weaver, 1998). The scale consists of 12 questions, covering two subscales of personal mastery (four questions) and perceived constraints (eight questions), measured on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items are “I can do just about anything I really set my mind to” (personal mastery) and “What happens in my life is often beyond my control” (perceived constraints). We decided a priori to omit one item (in the constraints subscale, “I sometimes feel I am being pushed around in my life”), due to the lack of a suitable Dutch translation, leaving 11 questions. In line with previous research, we reverse-coded the perceived constraints subscale, and then computed the mean of the two scales to create a measure of control, with

higher scores indicating higher sense of control (Lachman & Agrigoroaei, 2010).⁴ The scale has good psychometric properties (Lachman & Weaver, 1998), including in adolescents (B. Chen et al., 2021). In the current study, the scale had good internal consistency ($\alpha = .79/.79/.81$ at T1/T2/T3).

Adolescents reported *optimism* using the future emotions questions scale (Hektner, 1995; Liebenberg et al., 2015). The scale asked, “when thinking about the future, to what extent do you feel any of the following?”. The scale listed seven emotions, with responses measured on a 5-point Likert scale running from 1 (*not at all*) to 5 (*very much*). The scale has good internal as well as convergent and divergent validity in adolescents (Liebenberg et al., 2015). In line with previous research, we calculated the mean of the three positive emotions – confident, enthusiastic, powerful – as our measure of optimism (Boden et al., 2016). In the current study, the items had good internal consistency ($\alpha = .82/.79/.83$ at T1/T2/T3).

Adolescent mental health problems

Mental health problems were measured with the same instruments at all three time-points. Adolescents reported *emotional symptoms*, *conduct problems*, *hyperactivity*, and *peer problems* using the SDQ-R: a revised version of the self-report Strengths and Difficulties Questionnaire (SDQ) that has better psychometric properties in adolescents than the original (Duinhof et al., 2019; R. Goodman, 1997). The SDQ-R asks about behavior and feelings over the past six months – sample items are “I get very angry and often lose my temper” and “I worry a lot”. The SDQ-R has a 3-point ordinal response scale: 0 (*not true*), 1 (*somewhat true*), 2 (*certainly true*). The SDQ-R consists of 15 items measuring four subscales: emotional symptoms (5 items); conduct problems (4 items); hyperactivity–inattention problems (3 items); and peer relationship problems (3 items). In this study, two subscales, emotional symptoms (ordinal $\alpha = .82/.82/.84$ at T1/T2/T3) and hyperactivity–inattention problems (ordinal $\alpha = .79/.80/.81$ at T1/T2/T3), had good internal consistency (Gadernann et al., 2012), though internal consistency for conduct problems (ordinal $\alpha = .58/.71/.67$ at T1/T2/T3) and peer problems subscales (ordinal $\alpha = .53/.51/.59$ at T1/T2/T3) was less adequate, in line with former research (Duinhof et al., 2019). For participants who completed more than half of the subscale items, we computed mean scores, which were then multiplied by five to retain comparability with the original SDQ, such that higher subscale scores indicated more problems (ranging from 0 to 10).

Potential confounding variables

We included four confounding variables, given the likely effect of gender, age, migration background, and family affluence on adolescent mental health in the Netherlands (Duinhof et al., 2020). At T1 (or later, if missing at T1), adolescents reported: whether

4 A slightly different approach to calculating the sense of control scale was outlined in our pre-registration. The change, made at the stage of examining descriptive statistics, was made to preserve scale values (whereas the approach outlined in the preregistration included standardisation, and thus did not).

they were a girl (coded 0) or boy (coded 1); month and year of birth (used to calculate age at the date of data collection); parents' birth countries; and family affluence. We also considered adding dummy variables for the three schools, but these were not associated with any of the social cognitions or mental health problems, thus were not included in the models.

Conforming with previous research in the Netherlands, and Dutch statistical agencies, we measured migration background by distinguishing between: adolescents with both parents born in the Netherlands; adolescents with at least one parent with a western immigration background; and adolescents with at least one parent with a non-western immigration background (Duijnhof et al., 2020; Statistics Netherlands, CBS, 2020). Only 6% of adolescents had a western immigration background, so we merged this group with adolescents whose parents were born in the Netherlands, as both groups are western. Adolescents reported *family affluence* using the Family Affluence Scale (FAS), which consists of six items about family material assets: car(s)/van(s), own bedroom, holiday(s) abroad, computer(s), dishwasher, and bathroom(s) (Torsheim et al., 2016). For participants who completed all scale items, we summed item scores, then r-dit-transformed the sum score into a continuous family affluence score (range = 0-1; mean = 0.5), with a higher score indicating more material assets (Elgar et al., 2017). The FAS is a reliable and valid instrument that enables adolescents to report their family affluence (Torsheim et al., 2016).

Data analysis

We investigated descriptive statistics to see whether school, gender, age, migration status, school, and family affluence were associated with perceived family wealth and mental health and thus needed to be treated as confounders. We followed guidelines for using path analysis to test mediational hypotheses with longitudinal data, accounting for stability of, and prior associations between, the variables (Cole & Maxwell, 2003). Confounders were included in all models, and error covariances and autoregressive paths were constrained to be time-invariant. We used R, version 4.0.3 (R Core Team, 2020), and the lavaan package, version 0.6-5 (Rosseel, 2012). We modelled missing data using Full Information Maximum Likelihood (FIML) and evaluated goodness-of-fit using two measures, with good model fit indicated by CFI \geq .95 and RMSEA $<$.06 (Hu & Bentler, 1999).

In our initial model (Model 1), we specified a longitudinal model to examine whether SES predicted later increases in mental health problems (see Figure 4.1 for diagram showing results). Next, we investigated mediation of the path from perceived family wealth to mental health through social cognitions, entering one social cognition at a time (Models 2a-c; see Figures 4.2-4.4 for diagrams showing results). Finally, we investigated a multiple mediation model with all three social cognitions (Model 2d; see also Figures 4.2-4.4). To examine mediation, we tested the significance of indirect effects (i.e., the product of the path from perceived family wealth at T1 to social cognition at T2, and the path from social cognition at T2 to mental health problem at T3). To control for inflation of Type I

error rates based on multiple testing, we applied the Benjamini-Hochberg procedure with a false discovery rate of 0.05 (Benjamini & Hochberg, 1995). We interpreted standardised regression coefficients as negligible ($|r| < 0.1$), small ($|r| = 0.1-0.3$), medium ($|r| = 0.3-0.5$), or large ($|r| > 0.5$) (J. Cohen, 1992).

Results

Descriptive statistics

Table 4.1 shows variable means and standard deviations, all correlations between confounders and the main study variables, and concurrent correlations between the variables. Compared to scale midpoints, adolescents' perceptions of their family wealth remained fairly average over the three time-points, and they reported relatively high self-esteem, sense of control, and optimism, all of which were fairly stable across time. The mean levels of mental health problems were relatively low, except for hyperactivity, which was somewhat higher, and there was substantial variation in all mental health problems. Emotional symptoms and hyperactivity increased from T1 to T3. Associations between the confounders and the main study variables were fairly stable over time. There were several exceptions to this: slight changes in associations between the confounders and optimism from T1 to T3, and changes in associations between migration background, and to some extent, family affluence, and the main study variables at T3. These changes may have been due to changes in the sample characteristics across the time-points (see the sample description above).

Concurrent associations between the main study variables were generally stable over time. At all time-points, perceived family wealth was positively associated with social cognitions (r s ranged from .11 to .21), and negatively associated with emotional symptoms and peer problems (r s range from -.11 to -.18). At all time-points, the social cognitions were positively associated with each other (r s range from .43 to .53) and negatively associated with mental health problems (r s range from -.13 to -.60), with one exception: self-esteem was not associated with conduct problems ($r = -.05/-.07/.00$ at T1/T2/T3). Apart from hyperactivity and peer problems, which had a small, or no, association ($r = .11/.07/.05$ at T1/T2/T3), all other associations between mental health problems were positive (r s range from .21 to .36).

Associations between confounders, perceived family wealth and mental health problems

In Model 1, when we included confounding variables and perceived family wealth only, we found that older adolescents reported higher levels of emotional symptoms and peer problems at T1; girls reported higher levels of emotional symptoms at T1 than boys, and boys reported higher levels of conduct problems at T1 than girls; adolescents with a Dutch/western migration background reported more emotional symptoms and more hyperactivity at T1 than adolescents with a non-western migration background; and adolescents with higher family affluence reported fewer emotional symptoms at T1.

Perceived family wealth at T1 was associated with emotional symptoms and peer problems at T1. All autoregressive paths for perceived family wealth and the mental health problems were significant, indicating stability in these constructs. Perceived family wealth at T1 was only associated with peer problems at T3 (one year later; see Figure 4.1).

Mediation of associations between perceived family wealth and mental health problems

Models 2a-d examined indirect effects of perceived family wealth on mental health problems. Considering the three social cognitions one at a time, the results of the model with single mediators (2a-c) were compared to those of the multiple mediation model (which included the three social cognitions in concert, 2d). Mediation paths were constrained to be time-invariant (i.e., T1-T2 paths were equal to T2-T3 paths), so results showed whether perceived family wealth predicted change in social cognitions six months later, and whether social cognitions predicted change in mental health six months later.

Testing mediation through self-esteem

Models 2a and 2d showed that perceived family wealth at T1 was positively associated with self-esteem at T1, but there was no evidence perceived family wealth predicted change in self-esteem six months later (see Figure 4.2). Self-esteem at T1 was concurrently negatively associated with emotional symptoms, hyperactivity, and peer problems (i.e., at T1). Lower self-esteem also predicted increases in emotional symptoms six months later, a result which attenuated slightly, but still held, in the multiple mediation model (2d). In this model, lower self-esteem also predicted increases in later conduct problems. There was no evidence for indirect effects of perceived family wealth on mental health problems through self-esteem. In sum, we found no mediation, because perceived family wealth did not predict changes in self-esteem, though lower self-esteem did predict increases in later emotional symptoms and decreases in later conduct problems.

Testing mediation through sense of control

Models 2b and 2d showed that perceived family wealth at T1 was concurrently positively associated with sense of control, and perceived family wealth also positively predicted sense of control six months later (see Figure 4.3). Sense of control at T1 was concurrently negatively associated with all four mental health problems. Lower sense of control also predicted increases in emotional symptoms and hyperactivity six months later, though the former result did not hold in the multiple mediation model (2d). There were indirect effects of perceived family wealth on both emotional symptoms and hyperactivity through sense of control, though both findings disappeared in the multiple mediation model. In sum, we found evidence for mediation: lower perceived family wealth predicted a decrease in sense of control, and lower sense of control predicted increases in later emotional symptoms and hyperactivity (though only in univariate model but not in a multivariate model with all three social cognitions).

Table 4.1 Descriptive statistics (means, standard deviations, ranges, *ns* and correlations) for study variables

	1	2	3	4	5	6	7	8	9	10	11	Mean	SD	Range	n
1. Age ^a												17.85	1.95	15-30	1423
2. Gender ^b	.04											0.43	0.49	0-1	1427
3. Migration background ^c	.19**	-.06*										0.19	0.39	0-1	1377
4. Family affluence	-.16**	.07*	-.25**									0.50	0.28	0-1	1273
	T1														
T1	5. Perceived family wealth	-.18**	.08**	-.21**	.41**							3.02	0.74	1-5	1199
	6. Self-esteem	.07*	.16**	.19**	.06*	.11**						4.77	1.49	1-7	1196
	7. Sense of control	-.04	.14**	-.01	.11**	.21**	.47**					3.70	0.51	2-5	1186
	8. Optimism	-.01	.05	.07*	.10**	.16**	.44**	.52**				3.80	0.75	1-5	1183
	9. Emotional symptoms	.04	-.29**	-.12**	-.10**	-.15**	-.57**	-.45**	-.41**			3.08	2.53	0-10	1192
	10. Conduct problems	.04	.09**	-.02	-.01	-.04	-.05	-.18**	-.21**	.25**		0.94	1.35	0-10	1191
	11. Hyperactivity	-.06*	-.02	-.16**	.09**	.01	-.20**	-.19**	-.19**	.32**	.28**	4.46	3.02	0-10	1193
	12. Peer problems	.14**	-.03	-.01	-.05	-.11**	-.16**	-.21**	-.36**	.21**	.11**	2.61	1.94	0-10	1192
	T2														
T2	5. Perceived family wealth	-.18**	.08*	-.17**	.40**							3.17	0.75	1-5	798
	6. Self-esteem	.07	.23**	.07*	.08*	.17**						4.64	1.39	1-7	805
	7. Sense of control	-.03	.17**	-.05	.14**	.18**	.43**					3.60	0.48	2-5	802
	8. Optimism	-.02	.07*	.04	.07*	.20**	.44**	.48**				3.77	0.71	1-5	800
	9. Emotional symptoms	.01	-.32**	-.03	-.11**	-.16**	-.56**	-.48**	-.37**			3.54	2.55	0-10	805
	10. Conduct problems	.05	.03	.10**	-.08*	-.04	-.07*	-.27**	-.16**	.27**		1.03	1.49	0-10	806
	11. Hyperactivity	-.07	-.03	-.08*	-.03	-.05	-.15**	-.21**	-.13*	.33**	.29**	5.07	3.04	0-10	806
	12. Peer problems	.10**	-.05	.01	-.06	-.10**	-.21**	-.19**	-.15**	.31**	.24**	2.84	1.96	0-10	806

T3

T3	5. Perceived family wealth	-.14**	.06	-.19**	.39**		3.22	0.77	1-5	555
	6. Self-esteem	.03	.26**	.02	.09*	.16**	4.62	1.42	1-7	559
	7. Sense of control	-.09*	.16**	-.01	.08	.19**	.47**	3.56	0.51	1.8-5
	8. Optimism	-.13**	.11*	-.01	.05	.14**	.53**	.51**	3.71	0.79
	9. Emotional symptoms	.02	-.36**	.05	-.14**	-.18**	-.60**	-.50**	-.44**	3.67
	10. Conduct problems	.06	.09*	.10*	-.04	-.05	.00	-.24**	-.14**	.25**
	11. Hyperactivity	-.07	-.06	.03	.02	-.06	-.17**	-.22**	.35**	.22**
	12. Peer problems	.13**	-.04	.07	-.14**	-.12**	-.16**	-.24**	.33**	.24**
							.05	2.72	1.93	0-10
									0-10	558

Notes. Correlations between main study variables are shown per time-point. ^a Participants under 16 at the start of data collection were not included at T1, but participated in T2 and/or T3 once they had reached 16. ^b Reference category: girl. ^c Reference category: Dutch/western. * $p < .05$. ** $p < .01$.

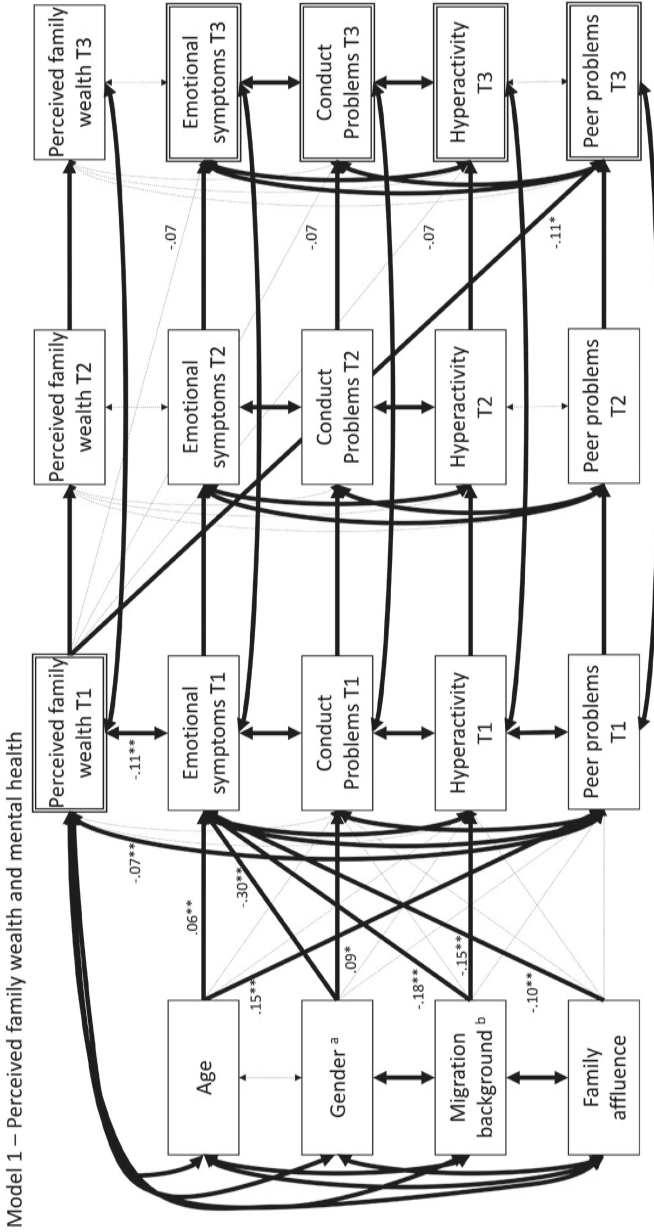


Figure 4.1 Model showing associations between confounders, perceived family wealth, and adolescent mental health problems (Model 1).

Notes. Standardised coefficients. Continuous thick lines indicate significant paths ($p < .05$); dashed thin lines indicate insignificant paths ($p > .05$). Only significant coefficients for confounders, and associations between perceived family wealth at T1 and mental health at T1 and T3 (one year later), are shown. This model was the basis for Models 2a-d. Model fit – $\chi^2(111) = 400.3, p < .001, CFI = 0.942, RMSEA = 0.043$. ^a Reference category: girl. ^b Reference category: Dutch/western. * $p < .05$. ** $p < .01$.

Testing mediation through optimism

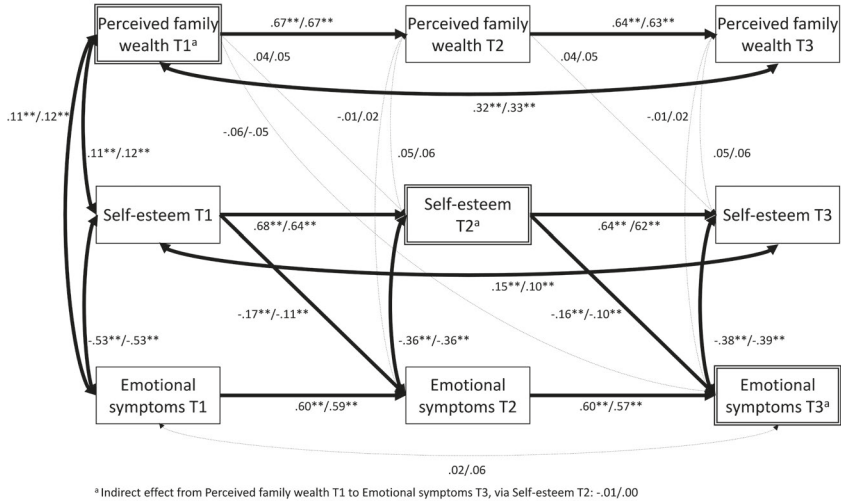
Finally, Models 2c and 2d showed that perceived family wealth at T1 was positively associated with optimism at T1, but we found no evidence that perceived family wealth predicted later optimism (see Figure 4.4). Optimism at T1 was concurrently negatively associated with all four mental health problems, and less optimism also predicted increases in all four mental health problems six months later. However, these findings all attenuated, and were not found in the multivariate model which included all three social cognitions (2d). There was no evidence of indirect effects of perceived family wealth on mental health through optimism. In sum, we found no mediation, because perceived family wealth did not predict changes in optimism, though less optimism did predict increases in later mental health problems (but not once self-esteem and sense of control were also taken into account).

Discussion

This study was the first, to our knowledge, to explore whether three social cognitions – self-esteem, sense of control, and optimism – mediated the social gradient in adolescent mental health. Using longitudinal models, thereby controlling for stability in the constructs over time, we found evidence that sense of control mediated this social gradient. Adolescents with lower perceived family wealth reported a decrease in sense of control six months later, and lower sense of control predicted increases in emotional symptoms and hyperactivity six months later (though this was not seen in the multivariate model with all three social cognitions). In contrast, perceived family wealth predicted neither later self-esteem nor later optimism, so there was no longitudinal evidence for mediation through either self-esteem or optimism. However, these two social cognitions did predict later mental health: adolescents with lower self-esteem reported a later increase in emotional symptoms and a decrease in conduct problems, while adolescents with less optimism reported a later increase in all four mental health problems.

To better understand possible links between perceived family wealth, social cognitions, and adolescent mental health, we also considered concurrent associations, which helped to contextualise previous cross-sectional research findings. At T1, adolescents with lower perceived family wealth reported more negative social cognitions (lower self-esteem, lower sense of control, and less optimism), more emotional problems, and more peer problems. Additionally, adolescents with more negative social cognitions – lower self-esteem, lower sense of control, and less optimism – had worse mental health (for all four outcomes).

Model 2a/Model 2d – Self-esteem and Emotional symptoms



Model 2a/Model 2d - Self-esteem and Hyperactivity

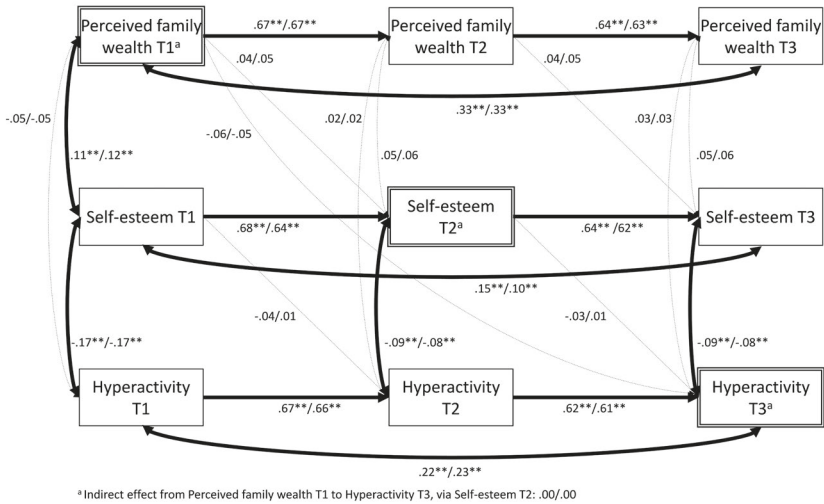
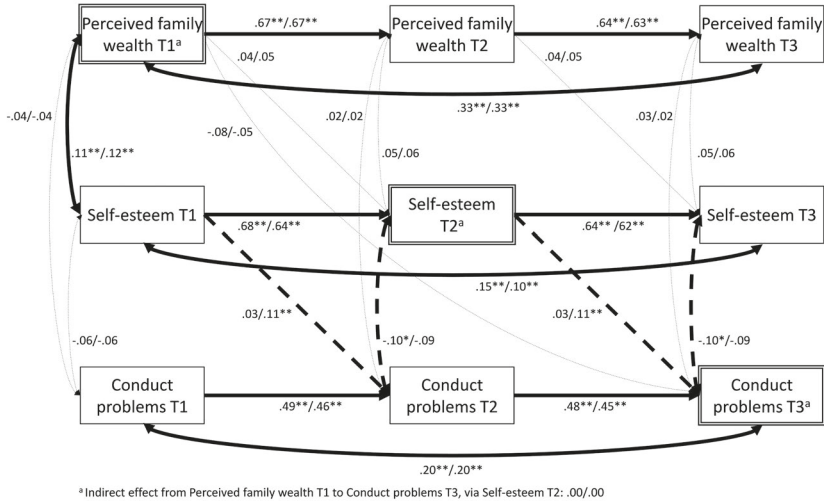


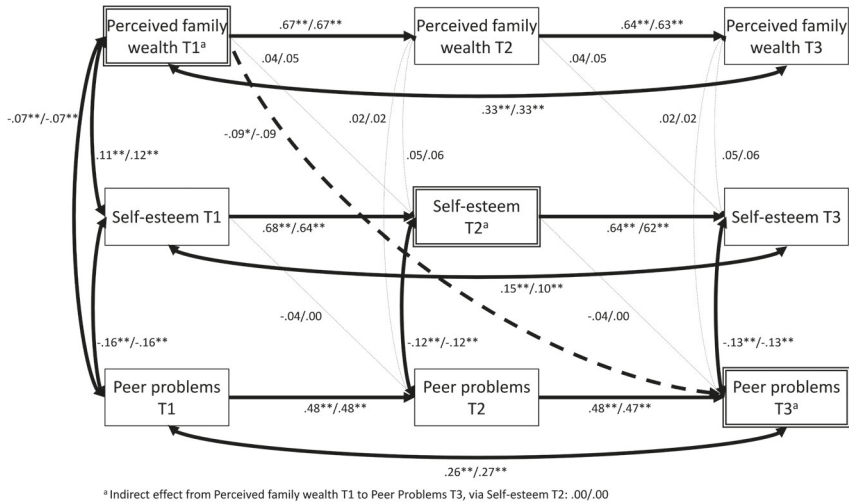
Figure 4.2 The association between SES and adolescent mental health problems mediated by self-esteem (Models 2a and 2d).

Notes. Standardised coefficients (same values constrained to equality may differ slightly after standardization). The first coefficient indicates Model 2a result (self-esteem only), the second coefficient indicates the Model 2d result (all three social cognitions included in the model). Continuous thick lines indicate significant paths ($p < .05$); dashed thin lines indicate insignificant paths ($p > .05$). Dashed thick lines indicate significance of path differs between Models 2a and 2d. All paths were estimated in the

Model 2a/Model 2d - Self-esteem and Conduct problems

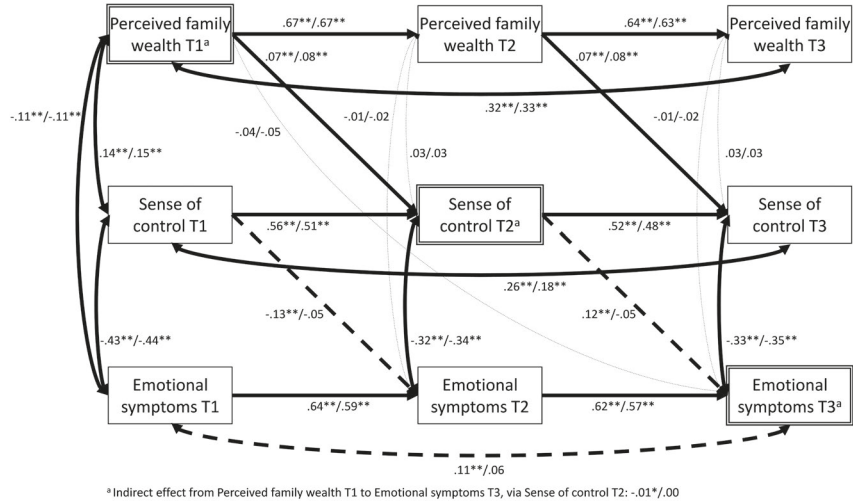


Model 2a/Model 2d - Self-esteem and Peer problems



same models, but results are presented in four panels (i.e., for each mental health outcome) for clarity. Associations with confounders and covariances between mental health problems are not shown. Key variables in the hypothesised mediation path are highlighted with a double border. Model fit 2a - $\chi^2(150) = 500.0, p < .001, CFI = 0.946, RMSEA = 0.040$. Model fit 2d - $\chi^2(249) = 766.4, p < .001, CFI = 0.943, RMSEA = 0.038$.

Model 2b/Model 2d – Sense of control and Emotional symptoms



Model 2b/Model 2d – Sense of control and Hyperactivity

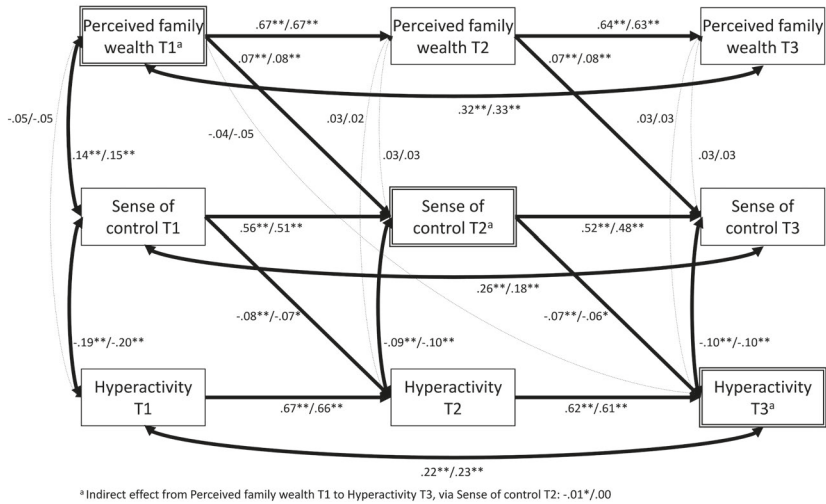
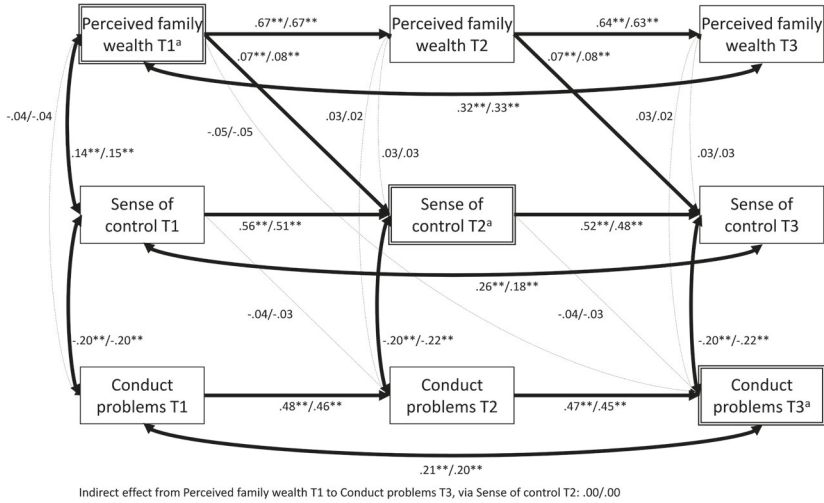


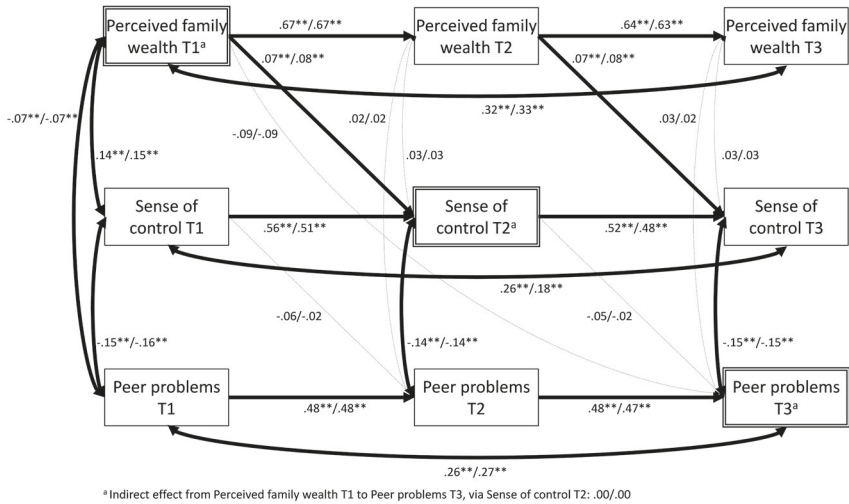
Figure 4.3 The association between SES and adolescent mental health problems mediated by sense of control (Models 2b and 2d).

Notes. Standardised coefficients (same values constrained to equality may differ slightly after standardization). The first coefficient indicates Model 2b result (sense of control only), the second coefficient indicates the Model 2d result (all three social cognitions included in the model). Continuous thick lines indicate significant paths ($p < .05$); dashed thin lines indicate insignificant paths ($p > .05$). Dashed thick lines indicate significance of path differs between Models 2b and 2d. All paths were

Model 2b/Model 2d – Sense of control and Conduct problems

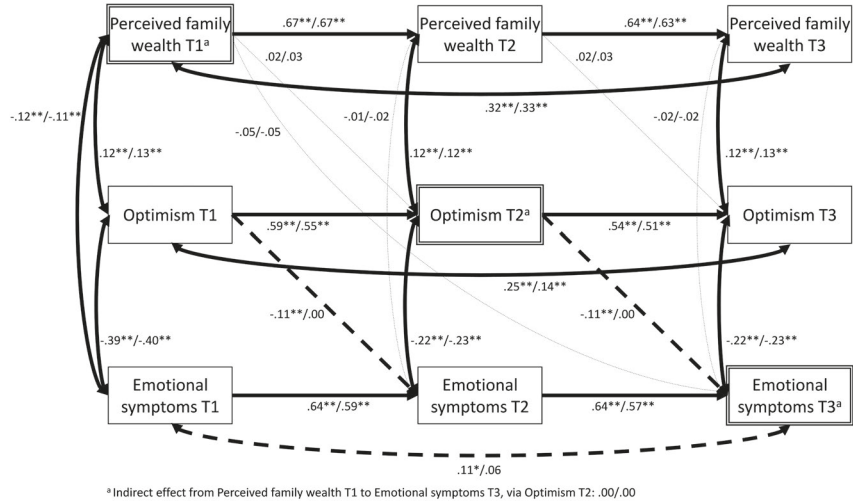


Model 2b/Model 2d – Sense of control and Peer problems



estimated in the same models, but results are presented in four panels (i.e., for each mental health outcome) for clarity. Associations with confounders and covariances between mental health problems are not shown. Key variables in hypothesised mediation path highlighted with double border. Model fit 2b – $\chi^2(150) = 484.6, p < .001, CFI = 0.945, RMSEA = 0.040$. Model fit 2d – $\chi^2(249) = 766.4, p < .001, CFI = 0.943, RMSEA = 0.038$.

Model 2c/Model 2d – Optimism and Emotional symptoms



Model 2c/Model 2d – Optimism and Hyperactivity

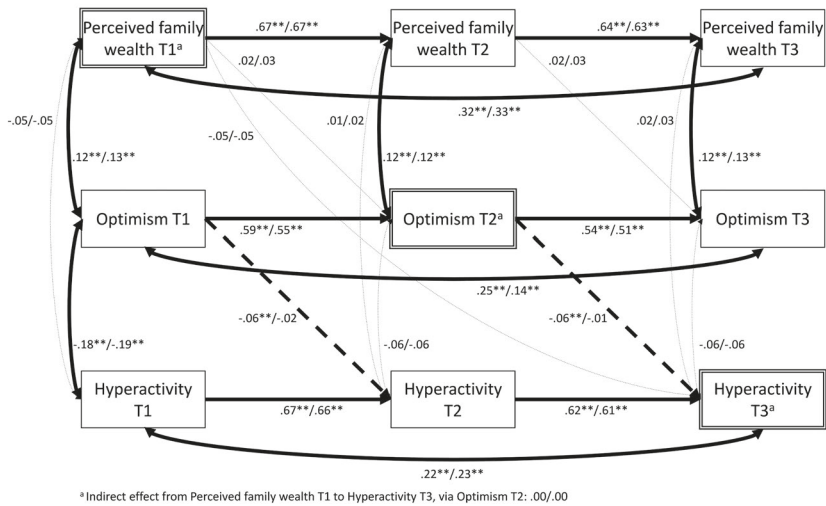
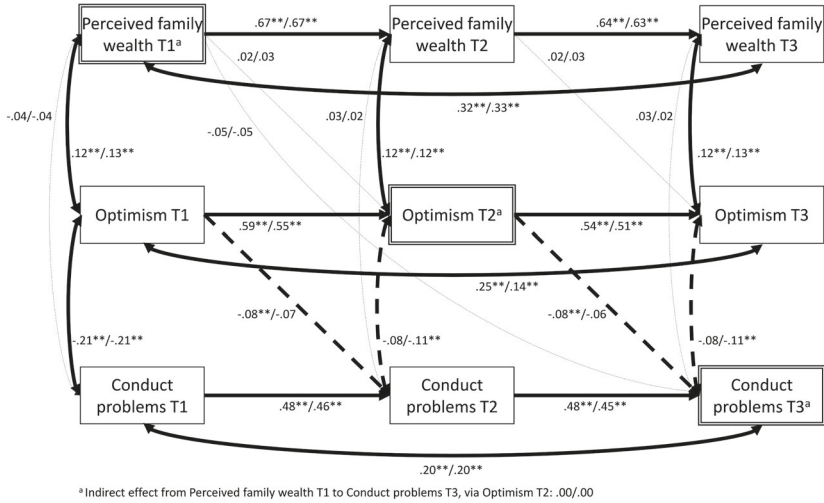


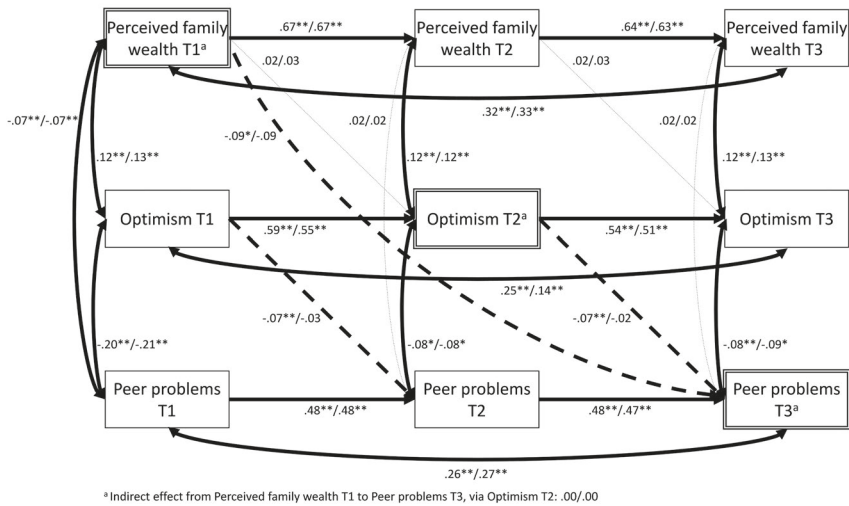
Figure 4.4 The association between SES and adolescent mental health problems mediated by optimism (Models 2c and 2d).

Notes. Standardised coefficients (same values constrained to equality may differ slightly after standardization). The first coefficient indicates Model 2c result (optimism only), the second coefficient indicates the Model 2d result (all three social cognitions included in the model). Continuous thick lines indicate significant paths ($p < .05$); dashed thin lines indicate insignificant paths ($p > .05$). Dashed thick lines indicate significance of path differs between Models 2c and 2d. All paths were estimated

Model 2c/Model 2d – Optimism and Conduct problems



Model 2c/Model 2d – Optimism and Peer problems



in the same models, but results are presented in four panels (i.e., for each mental health outcome) for clarity. Associations with confounders and covariances between mental health problems are not shown. Key variables in hypothesised mediation path highlighted with double border. Model fit 2c – $\chi^2(150) = 473.6, p < .001, CFI = 0.945, RMSEA = 0.039$. Model fit 2d – $\chi^2(249) = 766.4, p < .001, CFI = 0.943, RMSEA = 0.038$.

Our finding that adolescents with lower perceived family wealth (compared to adolescents with higher perceived family wealth) reported higher levels of emotional symptoms and peer problems, and reported a relative increase in peer problems six months later, builds on previous cross-sectional findings in the Netherlands (Chapter 2). The longitudinal design enabled us to test more stringently the directionality of the association between perceived family wealth and adolescent mental health (see also E. Goodman et al., 2007; Rahal et al., 2020). Further longitudinal research could replicate our finding that subjective SES precedes adolescent peer problems or explore this relationship in another country or over a different length of time.

We found evidence that sense of control was a mediator: it was concurrently associated with perceived family wealth and all four adolescent mental health outcomes; and was a longitudinal mediator of paths from perceived family wealth to emotional symptoms and hyperactivity. Our findings built on previous research, which measured SES, sense of control, and depression at a single time point (Culpin et al., 2015). Adolescents with a lower sense of control tend to have more feelings of anxiety, frustration, powerlessness, and being trapped, than their peers with higher sense of control, and these emotional responses may explain why adolescents with lower sense of control have higher levels of mental health problems (Bosma et al., 2014; Chorpita & Barlow, 1998; Jung et al., 2018; Whitehead et al., 2016). Most previous research on the role of sense of control in mental health has been focused on adults and been based on experiences of control in the workplace (Whitehead et al., 2016); our results support proposals to pay further attention to how sense of control develops in adolescence and its role in the social gradient in adolescent mental health (Pearce et al., 2019). For example, research could explore mechanisms that link SES and sense of control.

We found no longitudinal evidence that self-esteem mediated the social gradient in adolescent mental health, because perceived family wealth did not predict self-esteem six months later. Possibly, the absence of findings was due to the stability in these constructs during the one year of this study, and further longer-term research into these associations may be fruitful given we found concurrent associations between perceived family wealth, self-esteem, and mental health problems, which supported existing research (Yan et al., 2020). We did find that adolescents with lower self-esteem than their peers reported an increase in later emotional symptoms. Additionally, and intriguingly, once we had taken sense of control and optimism into account, higher self-esteem predicted *more* conduct problems six months later. This result supports suggestions that higher self-esteem can be a risk factor for conduct problems when it indicates narcissism – insecure and inauthentic self-esteem which is vulnerable to ego threats (Menon et al., 2007).

Similarly, we found no longitudinal evidence that optimism mediated the social gradient in adolescent mental health. Though perceived family wealth was concurrently associated with optimism, it did not predict change in optimism six months later. Optimism is relatively stable over time (Carver et al., 2010), and an alternative explanation for this cross-sectional association is that optimism is a precursor to perceived family

wealth. Being optimistic may help adolescents perceive their SES more positively, and may also help them improve educational outcomes and other markers of SES (Ciarrochi et al., 2007), which could also increase future perceptions of status. This possibility was not modelled in our study, nor in prior research on optimism's role in the social gradient (Piko et al., 2013; Zou et al., 2020). However, though we found no evidence optimism mediated the social gradient, we found that adolescents with less optimism, as compared to adolescents with more optimism, reported a later increase in all four mental health problems. This finding supports evidence that optimism can reduce mental health problems (Patton et al., 2011), perhaps because it helps adolescents cope with stress, persist in the face of challenges, and develop good relationships (S. Cohen & Wills, 1985; Patton et al., 2011).

Along with specific findings for each social cognition, the study provides some support for our general hypothesis that adolescents' social cognitions mediate the social gradient in adolescent mental health. The results showed that adolescents with lower perceived family wealth had more negative social cognitions, perhaps in response to the uncertainty and stress of their developmental context (Kraus et al., 2012; Sheehy-Skeffington, 2020; Stephens et al., 2014). We also found, in general, that adolescents with more negative social cognitions had worse mental health (cf., Taylor & Brown, 1988). Notably, several longitudinal associations between the social cognitions and mental health problems disappeared in the multivariate model which took all three social cognitions into account. Alongside the medium-large correlations we saw between the social cognitions, this suggests that the three social cognitions share pathways to mental health, perhaps through processes such as adaptive coping, persistence, and relationship maintenance (Carver et al., 2010; Hitlin et al., 2015; McWhirter & McWhirter, 2008). These social cognitions may be particularly important during adolescence.

Much existing research on the social gradient in adolescent mental health has focused on family factors (R. D. Conger & Donnellan, 2007; Devenish et al., 2017), yet our findings emphasise that adolescents' internal cognitions – particularly, how adolescents interpret and make sense of themselves (Adler & Tan, 2017; E. Chen et al., 2002; Fiske & Taylor, 2013) – may also be relevant to this social gradient. During this age period, when adolescents orient towards peers, think about their future, and reflect on social status, links between SES, social cognitions, and mental health may be greater, and further research attention on this topic is warranted (Brown & Larson, 2009; Crone & Dahl, 2012; Flanagan et al., 2014). Future research could look at dynamic relations between social cognitions and family factors during adolescence and their role in the social gradient in adolescent mental health (see also Boylan et al., 2018; R. D. Conger & Donnellan, 2007; Kim et al., 2019). It may also be important to use person-centered approaches, given evidence that positive social cognitions may be inappropriate for some adolescents in some social contexts (Pepper & Nettle, 2017; Stephens et al., 2014).

Strengths and limitations

This study has several strengths, including its longitudinal mediation model design with three waves of data, which could distinguish effects over time after taking into account the stability in constructs. It also used a socioeconomically diverse sample of adolescents in vocational education and included multiple indicators of adolescents' social cognitions and mental health problems. However, our study also has limitations. First, though longitudinal data gives an indication of the temporal precedence necessary for studying mediation, our results do not rule out that personality and genetic factors may confound these associations (Hoebel & Lampert, 2018). Furthermore, our panel model design is unable to disentangle the between-person effects (our focus) and within-person effects (Orth et al., 2021). Future studies using alternative strategies, such as using random-intercept cross-lagged panel models (Hamaker et al., 2015) to investigate within-person mediation, would provide further insight into the links between SES, social cognitions, and mental health during adolescence. Second, we were restricted to studying associations over a one-year period, which may not have been long enough for some associations (e.g., between perceived family wealth and optimism) to evolve. Third, there were fairly low levels of mental health problems in the sample. However, the SDQ has shown adequate psychometric properties in other studies with older adolescents and young adults, so is appropriate for assessing mental health in this sample (Brann et al., 2018). Fourth, self-esteem was measured with the single-item self-esteem scale, which may have lower test-retest reliability than multi-item measures of self-esteem, and be unable to distinguish between different dimensions of self-esteem (Donnellan et al., 2015). However, the item has convergent correlation with the most widespread scale for measuring self-esteem and is therefore expected to be appropriate brief instrument. Fifth, the representativeness of our sample was limited in that there was more attrition of adolescents with lower SES backgrounds and of those with a non-western migration background. Additionally, these results for adolescents in vocational education in the Netherlands may not generalise to adolescents in pre-university education or in other cultural contexts. For example, research in adults suggests social cognitions may play a different role in social gradients in health in more collectivistic countries (Kan et al., 2014). Future work could explore the mediating role of social cognitions in late adolescence across several countries. Sixth, the study coincided with the Covid-19 pandemic, which began between T1 and T2. However, given that the effects of the pandemic have been experienced by our entire sample (G. W. J. M. Stevens et al., 2021), it is unlikely that the pandemic influenced the generalizability of the findings.

Conclusion

Overall, by studying three mediating social cognitions, four adolescent mental health problems, and using longitudinal modelling, the results of this study illuminate the social gradient in adolescent mental health. In particular, adolescent's sense of control appears to be an important mediator of this social gradient. Interventions which can weaken the associations between SES and social cognitions, or between

social cognitions and mental health, may be effective in reducing the social gradient in adolescent mental health (Yeager et al., 2018). Our results serve as a valuable starting point for further investigation into the role of adolescent social cognitions in the pathways between SES and adolescent mental health.





Chapter 5

Country-level meritocratic beliefs moderate the social gradient in adolescent mental health: A multilevel study in 30 European countries

Based on: Weinberg, D., Stevens, G. W. J. M., Currie, C., Delaruelle, K., Dierckens, M., Lenzi, M., Main, G., & Finkenauer, C. (2020). Country-level meritocratic beliefs moderate the social gradient in adolescent mental health: A multilevel study in 30 European countries. *Journal of Adolescent Health*, 68(3), 548–557. <https://doi.org/10.1016/j.jadohealth.2020.06.031>

Abstract

Adolescents with higher socioeconomic status (SES) report better mental health. The strength of the association – the ‘social gradient in adolescent mental health’ – varies across countries, with stronger associations in countries with greater income inequality. Country-level meritocratic beliefs (beliefs that people get what they deserve) may also strengthen the social gradient in adolescent mental health; higher SES may be more strongly linked to adolescent’s perceptions of capability and respectful treatment. Using data from 11-15-year-olds across 30 European countries participating in the 2013/2014 Health Behaviour in School-aged Children (HBSC) study ($n = 131,101$), multilevel regression models with cross-level interactions examined whether country-level meritocratic beliefs moderated the association between two individual-level indicators of SES (family affluence and perceived family wealth) and three indicators of adolescent mental health (life satisfaction, psychosomatic complaints, and aggressive behaviour). For family affluence, in some countries, there was a social gradient in adolescent mental health, but in others the social gradient was absent or reversed. For perceived family wealth, there was a social gradient in adolescent life satisfaction and psychosomatic complaints in all countries. Country-level meritocratic beliefs moderated associations between SES and both life satisfaction and psychosomatic complaints: in countries with stronger meritocratic beliefs associations with family affluence strengthened, while associations with perceived family wealth weakened. Country-level meritocratic beliefs moderate the associations between SES and adolescent mental health, with contrasting results for two different SES measures. Further understanding of the mechanisms connecting meritocratic beliefs, SES, and adolescent mental health is warranted.

Keywords: adolescent mental health; socioeconomic status; health inequalities; Europe; international comparison; meritocratic beliefs

Author contributions: **DW** *Conceptualization, Formal analysis, Methodology, Visualisation, Writing – original draft, Writing – review & editing.* **GWJMS** *Conceptualization, Methodology, Project administration, Investigation, Supervision, Writing – original draft, Writing – review & editing.* **CC** *Project administration, Writing – review & editing.* **KD** *Writing – review & editing.* **MD** *Writing – review & editing.* **ML** *Writing – review & editing.* **GM** *Writing – review & editing.* **CF** *Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing.*

In almost all European countries, adolescents with higher socioeconomic status (SES) have better mental health (Elgar et al., 2015; Inchley et al., 2016). However, the strength of this association (the ‘social gradient in adolescent mental health’) varies across countries (e.g., Zaborskis et al., 2018). Previous studies have focused on the moderating role of country-level economic and policy factors, and consistently found stronger social gradients in adolescent mental health in countries with greater income inequality (Bjarnason et al., 2012; Elgar et al., 2015). However, other country-level economic and policy factors have produced less consistent findings: some studies showed a stronger social gradient in countries with lower national income (Elgar et al., 2015; Zaborskis et al., 2018) and lower welfare expenditure (Zambon et al., 2006); others indicated no such moderating effects (Bjarnason et al., 2012; Rathmann et al., 2015).

The absence of country-level sociocultural factors from existing research may have limited our understanding of cross-country variation in the social gradient in adolescent mental health. Given the expansion of education and opportunities for upward social mobility, one such factor that may be important is meritocratic beliefs – the extent to which people believe that people get what they deserve (Bosma et al., 2012; Young, 2017). The proportion of the population that holds such a view varies substantially between countries (from 19% of adults in Greece to 61% of adults in Austria; European Commission, 2018), and the indicator has been used in previous cross-country research (e.g., Colagrossi et al., 2019).

Individuals, including adolescents, are expected to internalise country-level meritocratic beliefs. For at least two reasons, this may lead to stronger social gradients in adolescent mental health in countries with stronger meritocratic beliefs. Firstly, in such countries, adolescents may be more likely to believe that SES indicates levels of talent and effort (Bosma et al., 2015; Jost & Hunyady, 2003). The higher an adolescent’s SES, the more they may perceive that they (and their family) are relatively talented and hardworking and thus capable of achieving their goals, which can have a positive effect on their mental health (Bandura et al., 1999; Orton et al., 2019). Secondly, in countries with stronger meritocratic beliefs, people may more strongly perceive adolescents (and their family) to be deserving of their SES and treat them accordingly. The higher an adolescent’s SES, the more they may feel respected and socially valued, with positive effects for their mental health (Bosma et al., 2012; Hatzenbuehler et al., 2013).

Using nationally representative samples of adolescents from 30 countries, this study examined two research questions: (1) Does the social gradient in adolescent mental health vary across countries? (2) Does the strength of a country’s meritocratic beliefs moderate the association between SES and adolescent mental health? We hypothesised that the social gradient in adolescent mental health would vary across countries (1) and would be stronger in countries with stronger meritocratic beliefs (2). We included two measures of SES – family affluence and perceived family wealth – as research has indicated that they are moderately correlated and associated with adolescent mental health through different, though related, mechanisms (Devenish et al., 2017; Quon & McGrath, 2014). We included three indicators of mental health – life satisfaction,

psychosomatic complaints, and aggressive behaviour – incorporating positive mental health as well as emotional and behavioural problems (Antaramian et al., 2010).

Methods

Sample

Individual-level data were obtained from the 2013/2014 Health Behaviour in School-aged Children (HBSC) study (Inchley et al., 2016). Adolescents in 42 countries/regions completed surveys conducted in classrooms. All countries/regions adhered to a standard international protocol to ensure consistency of measures, sampling, and implementation procedures (Currie et al., 2014). Each country/region used cluster sampling for selecting schools (both public and private) and classes to generate a representative sample of boys and girls aged 11, 13 and 15. Appropriate ethical approval for the survey was granted in each country/region, participation was voluntary, and passive or active consent was sought from school administrators, parents, and adolescents (Currie et al., 2014).

Two inclusion criteria were applied. First, only adolescents from countries/regions with complete data on country-level variables were included, comprising 152,171 individuals from 30 European countries. Individual-level data from three constituent countries of the United Kingdom (England, Wales, and Scotland) were collected in independent HBSC surveys so we analysed these countries separately, using available country-level measures applying to the United Kingdom for all three. For the same reason, individual-level data from the French and Flemish regions of Belgium were analysed separately, using country-level data from Belgium for both. Second, we included only individuals with complete data on all analysis measures ($n = 131,101$). Missingness was spread across variables: age (0.8%); family affluence (9.0%); perceived family wealth (4.1%); life satisfaction (2.7%); psychosomatic complaints (2.5%); and aggressive behaviour (2.6%). Compared with excluded adolescents, included adolescents were significantly more likely to be older ($M_{age} = 13.6$ vs. $M_{age} = 13.3$), girls (51.5% vs. 44.6%), and score higher on family affluence (0.50 vs. 0.49) and perceived family wealth (3.59 vs. 3.56).

Measures

Socioeconomic status

Family affluence was assessed as an indicator of *objective SES*. The Family Affluence Scale (FAS) consisted of six items that indicated family material assets: car/van ownership, having own bedroom; holidays abroad; computer ownership; dishwasher ownership; bathrooms (Torsheim et al., 2016). For participants who completed all scale items, the item scores were summed to compute a FAS score (range, 0-13); higher scores indicated more material assets. FAS has been shown to be a reliable instrument, easily answered by adolescents, with greater response rates than other adolescent SES indicators (Torsheim et al., 2016). In line with previous HBSC research, each adolescent's absolute FAS score was r-dit-transformed to a country-specific relative score (range, 0-1, with a mean of 0.5

in each country), measuring adolescents' relative family affluence in their country of residence (Elgar et al., 2017).

Perceived family wealth was assessed as an indication of *subjective SES* using the question, "How well off do you think your family is?" The item included a 5-point response scale, ranging from 1 (*very well off*) to 5 (*not at all well off*). The scale was reversed so that higher scores indicated higher levels of perceived family wealth. The measure has been found to be easy to answer for adolescents.

Adolescent mental health

Life satisfaction was measured using the Cantril Ladder, an 11-point ladder with steps for reporting how participants feel about their life, ranging from 0 (*worst possible life*) to 10 (*best possible life*). The Cantril Ladder is easily understood and has shown high reliability among adolescents (Levin & Currie, 2014).

Psychosomatic complaints were measured using the HBSC-symptom checklist (Gariépy & Elgar, 2016), comprising: headache, abdominal pain, backache, dizziness, feeling low, irritability/bad temper, feeling nervous, and sleeping difficulties. Each item included a 5-point response scale for reporting how often during the past 6 months the complaint was experienced: 0 (*rarely or never*), 1 (*about every month*), 2 (*about every week*), 3 (*more than once a week*), 4 (*about every day*). We computed a sum score for participants who completed at least six of the eight subscale items; higher scores indicated more problems (range, 0-32). The checklist had good internal consistency in all survey years (Cronbach's $\alpha = .76-.82$) and has convergent validity with indicators of emotional symptoms and emotional well-being (Gariépy & Elgar, 2016).

Aggressive behaviour was assessed with two items: the frequency of physical fights and the frequency of bullying others [22]. The first item, "During the past 12 months, how many times were you in a physical fight?" was assessed using a 5-point scale: 0 (*I have not been in a physical fight*), 1 (*1 time*), 2 (*2 times*), 3 (*3 times*), 4 (*4 times or more*). The item has been validated in adolescents. The second item, "How many times have you bullied others at school in the previous months?" was assessed using a 5-point scale: 0 = (*I haven't*), 1 (*once or twice*), 2 (*2 or 3 times a month*), 3 (*about once a week*), 4 (*several times a week*). This item has been validated across multiple cultural contexts. In line with previous research, the two items were combined into a mean score with higher scores indicating more aggressive behaviour (Hendriks et al., 2020).

Other individual-level variables

Given gender and age differences in adolescent mental health problems, we controlled for these variables. We asked whether the participant was a girl (coded 0) or boy (coded 1). We asked about month and year of birth, which was used to calculate age at the date of data collection.

Country-level indicators

Country-level data for *meritocratic beliefs* were aggregated from individual-level data collected by Eurobarometer 88.4 in 2017 (European Commission, Brussels, 2019). Over 1,000 participants in 31 countries (500 participants for Cyprus, Luxembourg and Malta) responded to the statement “People get what they deserve in [country name]” on a scale (1 = *strongly agree*, 5 = *strongly disagree*). The percentage of participants who indicated *strongly agree* or *agree* was summed for each country so that a higher value indicated stronger meritocratic beliefs. The mean rater reliability for this aggregated measure was .97, suggesting meritocratic beliefs was a country-level phenomenon shared by individuals within a country (Glick, 1985).

Data on *income inequality* (the Gini coefficient of equivalised disposable income) were obtained from Eurostat for 2014 (Eurostat, 2019c). The Gini coefficient theoretically ranges from 0 (everyone having equal income) to 100 (one person having all the income). Data on *national income* – Gross Domestic Product (GDP) per capita in Purchasing Power Standards (PPS) – were obtained from Eurostat for 2014 (Eurostat, 2019b). PPS is a common currency that allows comparisons of GDP between countries. Data on *welfare expenditure* (% of GDP spent on social protection) were obtained from Eurostat for 2014 (Eurostat, 2019a).

Data analysis

Analyses were conducted with Mplus version 8 using the maximum likelihood estimator with robust standard errors (Muthén & Muthén, 1998). Associations between individual-level mental health outcomes and country-level variables were tested by fitting two-level linear regression models, with individuals clustered within countries ($n = 30$). Individual- and country-level variables were added to models using a stepwise approach. Individual-level variables were group mean centred and country-level variables were grand mean centred (Aguinis et al., 2013). Model 1 included random slopes for family affluence (1a), perceived family wealth (1b), and both family affluence and perceived family wealth (1c) to assess the strength of the social gradient in adolescent mental health (adjusting for age and gender) and examine variation between countries in their social gradients. We interpreted random slopes using the 95% prediction interval (PI), indicating the range of the estimated slope across countries. Model 2 added all four country-level variables, and cross-level interaction terms between both SES indicators and each country-level indicator. We used an α -level of .05. The model building sequence was followed separately for life satisfaction, psychosomatic complaints, and aggressive behaviour.

Results

Descriptive results

Table 5.1 shows correlations between individual-level variables: family affluence and perceived family wealth had small positive associations with life satisfaction and negligible to small negative associations with psychosomatic complaints and aggressive behaviour, and a small positive association with each other. Psychosomatic complaints and aggressive behaviour had a small positive association and the former had a small negative and the latter a medium negative association with life satisfaction. Country-level variable correlations ($n = 30$) were medium to large: meritocratic beliefs positively correlated with national income ($r = .60, p < .001$), was borderline significantly positively correlated with welfare expenditure ($r = .35, p = .058$), and negatively correlated with income inequality ($r = -.39, p = .032$). Table 5.2 shows variance across countries for all outcome and country-level variables (except for family affluence, which was constructed to have a country-specific mean of 0.5).

Individual-level associations

Tables 5.3-5.5 display results of life satisfaction, psychosomatic complaints, and aggressive behaviour analyses respectively. Models showed higher life satisfaction, fewer psychosomatic complaints, and more aggressive behaviour among boys and younger adolescents. Life satisfaction showed a small positive association with family affluence (Model 1a) and a stronger small positive association with perceived family wealth (1b). When examining both SES indicators simultaneously the association with family affluence attenuated to become negligible in size, while the association with perceived family wealth remained small and positive (1c). There was significant cross-country variance in both associations: the family affluence-life satisfaction association ranged across countries from a negligible negative association to a small positive association (95% PI); and the associations between perceived family wealth and life satisfaction were positive in all countries and ranged from small to medium in size (95% PI).

Table 5.1 Correlations between individual-level variables (N = 131,101).

Variables	2	3	4	5	6	7
1. Gender ^a	.00	.00	.06**	.09**	-.21**	.25**
2. Age		.00	-.14**	-.19**	.18**	-.04**
3. Family affluence			.28**	.12**	-.03**	.00
4. Perceived family wealth				.27**	-.14**	-.01**
5. Life satisfaction					-.41**	-.10**
6. Psychosomatic complaints						.15**
7. Aggressive behaviour						

Note. ^a Reference category: girl. * $p < .01$, ** $p < .001$

Table 5.2 Descriptive characteristics of the individual- and country-level sample ($N = 131,101$).

Sample		Individual-Level Characteristics						Country-Level Characteristics			
Country	N	Girls (%)	Age (M)	Perceived family wealth (M)	Life satisfaction (M)	Psych. complaints (M)	Aggressive behaviour (M)	Meritocratic beliefs	Income inequality	National income	Welfare expenditure
Austria	3037	53.7	13.4	3.9	7.9	6.5	0.7	61.2	27.6	130	29.8
Belgium (Flemish)	3890	46.1	13.6	3.1	7.1	7.1	0.4	44.7	25.9	119	30.2
Belgium (French)	5288	51.1	13.5	3.4	7.5	9.1	0.7	44.7	25.9	119	30.2
Bulgaria	4202	49.4	13.8	3.9	7.8	8.5	0.7	27.6	35.4	47	18.5
Croatia	4375	51.0	13.7	3.9	7.9	7.7	0.5	24.3	30.2	59	21.8
Czech Republic	4766	52.7	13.5	3.5	7.2	8.3	0.5	42.1	25.1	86	19.7
Denmark	3351	54.1	13.8	3.2	7.6	7.8	0.5	58.0	27.7	128	32.8
England	4211	49.5	13.6	3.6	7.3	7.9	0.4	46.6	31.6	109	27.5
Estonia	3908	50.2	13.8	3.8	7.8	7.9	0.5	38.2	35.6	77	14.9
Finland	5574	51.7	13.8	4.0	7.7	9.0	0.3	57.2	25.6	110	31.9
France	4912	50.8	13.6	3.7	7.3	9.9	0.6	28.8	29.2	107	34.5
Germany	5280	49.6	13.5	3.7	7.4	7.5	0.5	40.3	30.7	126	29.0
Greece	3931	50.7	13.7	3.4	7.7	7.6	0.5	19.1	34.5	71	26.0
Hungary	3586	50.7	13.4	3.6	7.5	9.0	0.6	37.9	28.6	68	19.8
Ireland	3424	61.5	13.7	3.5	7.6	8.1	0.3	58.1	31.1	136	20.6
Italy	3817	50.4	13.7	3.5	7.4	10.4	0.4	36.3	32.4	96	29.9
Latvia	5298	53.0	13.6	3.6	7.4	8.6	0.9	22.8	35.5	63	14.5
Lithuania	5398	50.4	13.6	3.2	7.9	7.7	0.8	32.1	35.0	75	15.3
Luxembourg	2663	53.6	13.6	3.5	7.5	9.5	0.6	53.0	28.7	269	22.5
Malta	1993	51.2	13.6	3.4	7.6	9.4	0.5	41.9	27.7	89	18.2
Netherlands	3823	51.7	13.5	3.1	7.7	7.6	0.4	40.3	26.2	131	30.6
Poland	4113	51.3	13.6	3.3	7.4	8.8	0.6	47.4	30.8	67	19.3
Portugal	4368	52.7	13.6	3.4	7.4	5.7	0.4	35.0	34.5	77	26.9
Romania	3407	54.3	13.3	3.8	8.1	8.6	0.7	33.5	35.0	55	14.7
Scotland	5240	51.1	13.7	3.7	7.7	7.8	0.4	46.6	31.6	109	27.5
Slovakia	5053	51.4	13.5	4.0	7.4	8.6	0.7	25.9	26.1	77	18.5
Slovenia	4652	51.6	13.6	3.7	7.7	7.3	0.5	27.1	25.0	82	23.9
Spain	6189	52.3	13.7	3.0	7.8	6.9	0.4	28.1	34.7	90	25.4
Sweden	6768	51.5	13.6	4.2	7.3	9.6	0.3	37.5	26.9	124	29.8
Wales	4584	49.7	13.7	3.5	7.4	7.9	0.4	46.6	31.6	109	27.5
Mean	4370	51.5	13.6	3.6	7.6	8.2	0.5	39.4	30.2	100	24.4

Note. N = sample size. M = mean. Psych. = Psychosomatic.

Psychosomatic complaints showed a negligible negative association with family affluence (1a) and a somewhat stronger negative association with perceived family wealth (1b). In Model 1c, the association with family affluence reversed to become positive, though still negligible in size, while the association with perceived family wealth remained small and negative. Again, there was significant cross-country variance in both associations: associations between family affluence and psychosomatic complaints ranged from positive to negative associations that were negligible in size (95% PI); the associations between perceived family wealth and psychosomatic complaints was negative in all countries and ranged from negligible to small in size (95% PI).

Aggressive behaviour showed no association with family affluence (1a) and a negligible negative association with perceived family wealth (1b). In Model 1c, the association with family affluence was negligible in size and positive, and the association with perceived family wealth remained negligible and negative. Associations varied across countries, ranging from positive to negative, but were negligible in size in all countries (95% PIs).

Cross-level interactions

Country-level variables explained 45-53% of the cross-country variance in the association between family affluence and the mental health indicators and 25-37% of the cross-country variance in the association between perceived family wealth and mental health (Model 2). Main effects of country-level variables are not discussed, because the inclusion of cross-level interaction terms confounds the interpretation of main-effects terms.

Meritocratic beliefs moderated the associations between both SES indicators and life satisfaction and psychosomatic complaints, but not aggressive behaviour. For life satisfaction, as country-level meritocratic beliefs increased, the positive association with family affluence strengthened, while the positive association with perceived family wealth weakened (Figure 5.1A). Given the generally weaker associations of family affluence compared to perceived family wealth, the more meritocratic countries were, the more similar associations of family affluence and perceived family wealth became. A corresponding picture was found for psychosomatic complaints (Figure 5.1B). As country-level meritocratic beliefs increased, the association with family affluence changed in sign from positive to negative, while the negative association with perceived family wealth became less strong, and so the two associations became more similar.

Results for income inequality generally paralleled those for meritocratic beliefs: for life satisfaction there was a significant cross-level interaction between family affluence and country-level income inequality (Figure 5.1C), while for psychosomatic complaints there were interactions between both family affluence and perceived family wealth and country-level income inequality (Figure 5.1D). For these two mental health indicators, associations with family affluence were stronger, or only present, in more income unequal countries, while in contrast, associations with perceived family wealth were weaker, or unchanged, in more income unequal countries.

Table 5.3 Multilevel models for life satisfaction with unstandardised and standardised fixed effects at individual- and country-level ($N = 131,101$).

		Model 1a (FA only)		
		b (SE)	p	β
Fixed effects (individual -level)	Intercept	7.568 (0.043)	<0.001	0.004
	Gender ^a	0.339 (0.023)	<0.001	0.089
	Age	-0.222 (0.013)	<0.001	-0.190
	Family affluence	0.782 (0.044)	<0.001	0.117
	Perceived family wealth			
Fixed effects (country-level)	Meritocratic beliefs			
	Income inequality			
	National income			
	Welfare expenditure			
Cross-level interactions	Family affluence × Meritocratic beliefs			
	Family affluence × Income inequality			
	Family affluence × National income			
	Family affluence × Welfare expenditure			
	Perceived family wealth × Meritocratic beliefs			
	Perceived family wealth × Income inequality			
	Perceived family wealth × National income			
	Perceived family wealth × Welfare expenditure			
Residual variance	Family affluence	0.049 (0.014)	0.001	0.001
	Perceived family wealth			
Variance components	Individual-level	3.384 (0.076)	<0.001	0.927
	Country-level	0.055 (0.011)	<0.001	0.015
95% PIs (std)	Family affluence	[0.052 / 0.182]		
	Perceived family wealth			
Model statistics	Free parameters	7		
	AIC	532059.11		
	BIC	532127.59		

Note. ^a Reference category: girl. $p < .05$ and lowest AIC and BIC in bold type. Explained cross-country variance in family affluence slope = $(0.067...-0.037...)/0.067... = 0.45$. Explained cross-country variance in perceived family wealth slope = $(0.009...-0.006...)/0.009... = 0.31$.

Model 1b (PFW only)			Model 1c (both SES variables)			Model 2 (second-level predictors)		
<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β
7.568 (0.043)	<0.001	0.004	7.568 (0.043)	<0.001	0.004	7.568 (0.040)	<0.001	0.003
0.281 (0.024)	<0.001	0.073	0.284 (0.023)	<0.001	0.074	0.284 (0.023)	<0.001	0.074
-0.174 (0.014)	<0.001	-0.149	-0.176 (0.014)	<0.001	-0.150	-0.176 (0.014)	<0.001	-0.150
			0.301 (0.052)	<0.001	0.045	0.304 (0.040)	<0.001	0.044
0.588 (0.019)	<0.001	0.257	0.556 (0.020)	<0.001	0.243	0.555 (0.017)	<0.001	0.244
						0.003 (0.005)	0.560	0.016
						0.017 (0.013)	0.201	0.032
						-0.001 (0.001)	0.225	-0.017
						-0.006 (0.007)	0.361	-0.019
						0.011 (0.003)	<0.001	0.017
						0.039 (0.014)	0.004	0.021
						0.001 (0.001)	0.555	0.003
						-0.014 (0.007)	0.059	-0.012
						-0.004 (0.002)	0.043	-0.018
						-0.005 (0.006)	0.360	-0.008
						0.000 (0.000)	0.267	-0.004
						-0.002 (0.003)	0.462	-0.006
			0.067 (0.022)	0.002	0.001	0.037 (0.022)	0.095	0.001
0.008 (0.003)	0.003	0.002	0.009 (0.003)	0.001	0.002	0.006 (0.002)	0.005	0.001
3.195 (0.078)	<0.001	0.875	3.183 (0.078)	<0.001	0.872	3.183 (0.078)	<0.001	0.872
0.055 (0.011)	<0.001	0.015	0.055 (0.011)	<0.001	0.015	0.047 (0.008)	<0.001	0.013
			[-0.031 / 0.121]					
			[0.162 / 0.324]					
7			9			21		
524534.88			524128.73			524125.00		
524603.37			524216.78			524330.46		

Table 5.4 Multilevel models for psychosomatic complaints with unstandardised and standardised fixed effects at individual- and country-level ($N = 131,101$).

		Model 1a (FA only)		
		<i>b</i> (SE)	<i>p</i>	β
Fixed effects (individual -level)	Intercept	8.195 (0.186)	<0.001	0.001
	Gender ^a	-2.840 (0.065)	<0.001	-0.211
	Age	0.728 (0.034)	<0.001	0.177
	Family affluence	-0.583 (0.127)	<0.001	-0.025
	Perceived family wealth			
Fixed effects (country-level)	Meritocratic beliefs			
	Income inequality			
	National income			
	Welfare expenditure			
Cross-level interactions	Family affluence × Meritocratic beliefs			
	Family affluence × Income inequality			
	Family affluence × National income			
	Family affluence × Welfare expenditure			
	Perceived family wealth × Meritocratic beliefs			
	Perceived family wealth × Income inequality			
	Perceived family wealth × National income			
	Perceived family wealth × Welfare expenditure			
Residual variance	Family affluence	0.372 (0.119)	0.002	0.001
	Perceived family wealth			
Variance components	Individual-level	40.802 (0.831)	<0.001	0.901
	Country-level	1.031 (0.266)	<0.001	0.023
95% PIs (std)	Family affluence	[-0.075 / 0.026]		
	Perceived family wealth			
Model statistics	Free parameters	7		
	AIC	858464.95		
	BIC	858533.43		

Note. ^a Reference category: girl. $p < .05$ and lowest AIC and BIC in bold type. Explained cross-country variance in family affluence slope = $(0.513... - 0.239...)/0.513... = 0.53$. Explained cross-country variance in perceived family wealth slope = $(0.051... - 0.032...)/0.051... = 0.37$.

Model 1b (PFW only)			Model 1c (both SES variables)			Model 2 (second-level predictors)		
<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β
8.195 (0.186)	<0.001	0.001	8.195 (0.186)	0.000	0.001	8.195 (0.178)	<0.001	0.000
-2.736 (0.066)	<0.001	-0.203	-2.733 (0.066)	0.000	-0.203	-2.732 (0.066)	<0.001	-0.203
0.642 (0.038)	<0.001	0.156	0.639 (0.038)	0.000	0.155	0.639 (0.038)	<0.001	0.155
			0.342 (0.158)	0.031	0.014	0.333 (0.120)	0.005	0.016
-1.031 (0.043)	<0.001	-0.128	-1.063 (0.054)	0.000	-0.132	-1.064 (0.046)	<0.001	-0.133
						-0.016 (0.020)	0.431	-0.026
						-0.070 (0.060)	0.244	-0.038
						0.006 (0.003)	0.089	0.029
						-0.034 (0.040)	0.397	-0.030
						-0.043 (0.012)	<0.001	-0.020
						-0.137 (0.043)	0.001	-0.021
						0.000 (0.003)	0.965	0.000
						0.008 (0.022)	0.705	0.002
						0.011 (0.005)	0.015	0.015
						0.030 (0.012)	0.012	0.014
						-0.001 (0.001)	0.513	-0.003
						-0.005 (0.007)	0.454	-0.004
			0.513 (0.130)	<0.001	0.001	0.239 (0.076)	0.002	<0.001
0.036 (0.015)	0.015	0.001	0.051 (0.019)	0.008	0.001	0.032 (0.014)	0.022	<0.001
40.069 (0.854)	<0.001	0.885	40.018 (0.857)	<0.001	0.884	40.018 (0.857)	<0.001	0.884
1.031 (0.266)	<0.001	0.023	1.031 (0.266)	<0.001	0.023	0.943 (0.255)	<0.001	0.021
			[-0.045 / 0.074]					
[-0.174 / -0.082]			[-0.187 / -0.077]					
7			9			21		
856084.99			855977.89			855973.92		
856153.47			856065.94			856179.38		

5

Chapter 5

Table 5.5 Multilevel models for aggressive behaviour with unstandardised and standardised fixed effects at individual- and country-level ($N = 131,101$).

		Model 1a (FA only)		
		<i>b</i> (SE)	<i>p</i>	β
Fixed effects (individual -level)	Intercept	0.525 (0.026)	<0.001	0.001
	Gender ^a	0.408 (0.019)	<0.001	0.254
	Age	-0.016 (0.004)	<0.001	-0.033
	Family affluence	0.001 (0.012)	0.915	0.000
	Perceived family wealth			
Fixed effects (country -level)	Meritocratic beliefs			
	Income inequality			
	National income			
	Welfare expenditure			
Cross-level interactions	Family affluence × Meritocratic beliefs			
	Family affluence × Income inequality			
	Family affluence × National income			
	Family affluence × Welfare expenditure			
	Perceived family wealth × Meritocratic beliefs			
	Perceived family wealth × Income inequality			
	Perceived family wealth × National income			
	Perceived family wealth × Welfare expenditure			
Residual variance	Family affluence	0.002 (0.001)	0.020	0.000
	Perceived family wealth			
Variance components	Individual-level	0.580 (0.029)	<0.001	0.900
	Country-level	0.020 (0.005)	<0.001	0.031
95% PIs (std)	Family affluence	[-0.033 / 0.034]		
	Perceived family wealth			
Model statistics	Free parameters	7		
	AIC	300848.17		
	BIC	300916.65		

Note. ^a Reference category: girl. $p < .05$ and lowest AIC and BIC in bold type. Explained cross-country variance in family affluence slope = $(0.0030... - 0.0014...)/0.0030... = 0.52$. Explained cross-country variance in perceived family wealth slope = $(0.0006... - 0.0005...)/0.006... = 0.25$.

Model 1b (PFW only)			Model 1c (both SES variables)			Model 2 (second-level predictors)		
<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β	<i>b</i> (SE)	<i>p</i>	β
0.525 (0.026)	<0.001	0.001	0.525 (0.026)	<0.001	0.001	0.525 (0.021)	<0.001	0.000
0.411 (0.019)	<0.001	0.256	0.411 (0.019)	<0.001	0.256	0.411 (0.019)	<0.001	0.256
-0.019 (0.004)	<0.001	-0.038	-0.019 (0.004)	<0.001	-0.039	-0.019 (0.004)	<0.001	-0.039
			0.028 (0.013)	0.035	0.010	0.026 (0.011)	0.022	0.010
-0.027 (0.005)	<0.001	-0.028	-0.030 (0.006)	<0.001	-0.031	-0.030 (0.005)	<0.001	-0.032
						-0.003 (0.003)	0.256	-0.041
						-0.001 (0.005)	0.850	-0.005
						0.000 (0.000)	0.400	0.011
						-0.012 (0.004)	0.002	-0.087
						-0.001 (0.001)	0.385	-0.005
						-0.001 (0.003)	0.768	-0.001
						-0.001 (0.000)	0.024	-0.012
						0.001 (0.002)	0.562	0.002
						0.000 (0.001)	0.621	0.004
						0.003 (0.002)	0.100	0.010
						0.000 (0.000)	0.115	0.008
						-0.001 (0.001)	0.390	-0.005
			0.003 (0.001)	0.017	0.000	0.001 (0.001)	0.130	0.000
0.001 (0.000)	0.004	0.001	0.001 (0.000)	0.005	0.001	0.000 (0.000)	0.005	0.001
0.579 (0.029)	<0.001	0.898	0.579 (0.029)	<0.001	0.898	0.579 (0.029)	<0.001	0.898
0.020 (0.005)	<0.001	0.031	0.020 (0.005)	<0.001	0.031	0.013 (0.004)	<0.001	0.021
			[-0.028 / 0.048]					
			[-0.076 / 0.019]					
7			9			21		
300667.52			300638.66			300633.44		
300736.01			300726.71			300838.89		

5

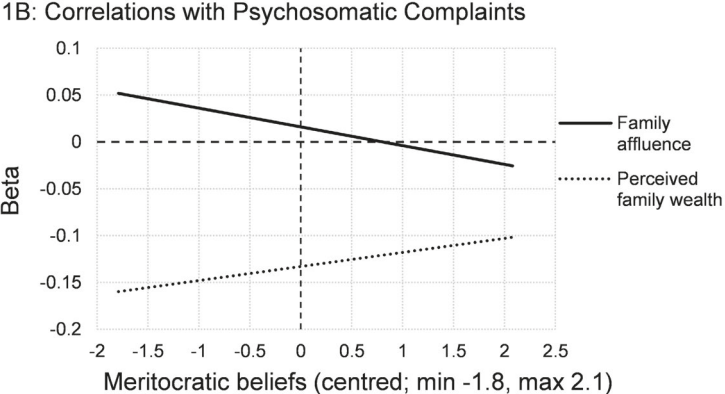
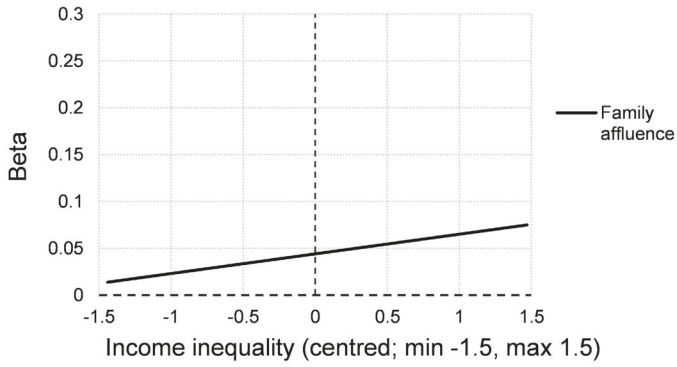
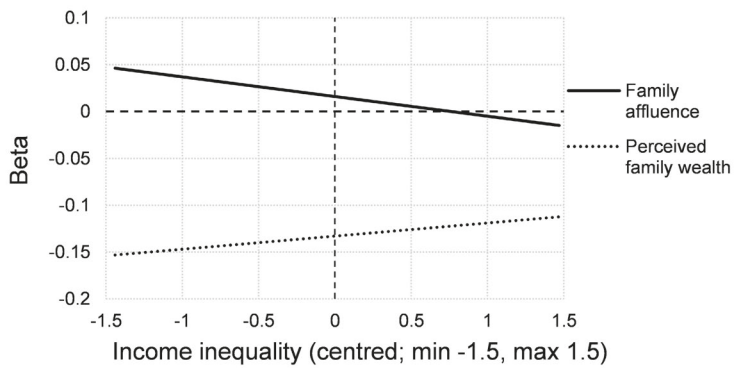


Figure 5.1 (A-E) Cross-level interactions between SES and country-level variables

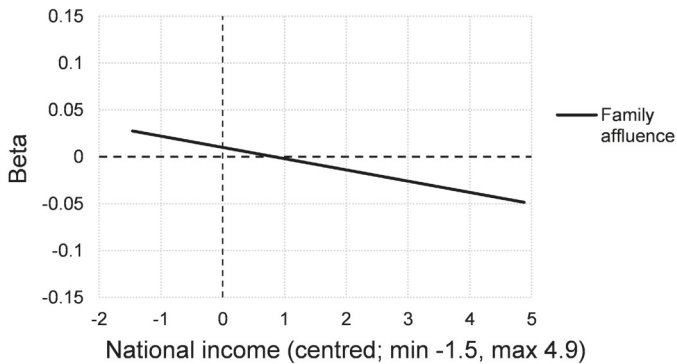
1C: Correlations with Life Satisfaction



1D: Correlations with Psychosomatic Complaints



1E: Correlations with Aggressive Behaviour



Furthermore, national income moderated the slope of family affluence on aggressive behaviour, such that as national income level increased, the association between family affluence and aggressive behaviour became more negative, though negligibly small at all levels of national income (Figure 5.1E).

Discussion

Associations between both family affluence and perceived family wealth and adolescent mental health vary across European countries, in line with our hypotheses and existing research (Elgar et al., 2015; Rathmann et al., 2015; Zaborskis et al., 2018). There was a social gradient for family affluence (adolescents from less affluent families showed lower life satisfaction, slightly more psychosomatic complaints and slightly more aggressive behaviour) in some countries, while the social gradient was absent or even slightly reversed in other countries. The association between perceived family wealth and aggressive behaviour showed similar cross-country variance. In contrast, a social gradient in adolescent life satisfaction and psychosomatic complaints as assessed by perceived family wealth was found in all countries, with associations ranging from negligible to medium in size. In addition, country-level strength of meritocratic beliefs moderated the association between the two SES measures and both life satisfaction and psychosomatic complaints, independent from country-level national income, income inequality, and welfare expenditure. More specifically, in countries with stronger meritocratic beliefs the associations between family affluence and adolescent mental health gained strength while associations with perceived family wealth weakened.

These findings were in line with our hypothesis that in countries with stronger meritocratic beliefs, the differential in perceived capability and respectful treatment according to family affluence may be more pronounced, with attendant mental health effects (Bandura et al., 1999; Hatzenbuehler et al., 2013; Orton et al., 2019). Future studies could test these proposed mechanisms, perhaps by using longitudinal studies to explore the role of adolescents' own meritocratic beliefs in the social gradient in adolescent mental health. Another explanation for this finding may be that in countries with stronger meritocratic beliefs, material assets (such as assessed with the Family Affluence Scale) are seen to be earned through merit (Bosma et al., 2015; Jost & Hunyady, 2003), more salient as symbols of success and status (Mijs, 2016; Littler, 2017), and thus more strongly linked to adolescent mental health.

Unexpectedly, associations between perceived family wealth and life satisfaction and psychosomatic complaints decreased when country-level meritocratic beliefs became stronger. Adolescents' perceptions of family wealth are likely to be far less visible to others than their material family affluence and may have little bearing on whether adolescents are treated respectfully or not. The finding that associations with family affluence and perceived family wealth became more similar in countries with stronger meritocratic beliefs may be explained by the Muhammad Ali effect (Allison et al., 1989). This effect suggests that subjective states are less influential when they cease to be

credible in the face of objective realities. Applying this effect to the current study, it may be that in countries with stronger meritocratic beliefs, family affluence is more visibly evident in concrete outcomes such as material assets and purchasing power than in countries with weaker meritocratic beliefs, and thus perceptions of one's family wealth may have less room to influence adolescents' mental health. Perhaps in such countries, personality traits, which may be confounded with perceived family wealth, are less important to whether individuals report psychosomatic complaints. Future studies could test this mechanism, and research on alternative explanations necessary for different aspects of mental health would be promising, given the different relations we found for the indicators studied.

Two additional study findings also deserve further reflection. Firstly, adolescent mental health was more strongly associated with perceived family wealth than with family affluence, replicating findings in single-country studies (e.g., Chapter 2 of this dissertation; Rivenbark et al., 2020). This suggests that status perceptions and social comparisons are crucially important for mental health during adolescence (E. Goodman et al., 2015), especially in countries with relatively high standards of living, such as those in this study. Secondly, and possibly relatedly, in countries with greater income inequality, there was a stronger association between family affluence and mental health. Income inequality may increase the relative importance of material factors for adolescent mental health by driving the consumption of 'positional' material assets to signal higher social status (Frank, 2013), making material assets more salient and reducing their availability.

This study has many strengths, including its use of multiple country-level predictors and comparable individual-level data from adolescents in 30 European countries, with multiple SES measures and indicators of mental health. However, there are also some limitations. Firstly, the cross-sectional nature of our data limits our ability to draw causal conclusions. In particular, the association between perceived family wealth and adolescent mental health may be due to either reverse causation (good mental health may cause adolescents to perceive their family status more favourably) or confounding by a third variable (personality traits may influence both adolescent mental health and their subjective SES; Hoebel & Lampert, 2018). Secondly, the HBSC dataset has several limitations. The current instruments used neither enable us to study gender nonconforming adolescents, nor capture important facets of adolescent mental health, such as depression, anxiety, attention deficit hyperactivity disorder, and trauma. Reports from other informants and diagnoses would strengthen the results. Additionally, the included sample may have overlooked vulnerable young people with missing SES data and adolescents not attending school. We encourage future research to include such adolescents and adolescents in countries with lower average living standards and greater income inequalities. Thirdly, the single-item measure of meritocracy may mask important cultural and linguistic differences in people's conception of 'getting what is deserved'. Our indicator correlated strongly ($r = .65$) with a measure devised by the World Economic Forum on social mobility (World Economic Forum, 2020), suggesting getting what is deserved is associated with the possibility of movement in the social order, but further

Chapter 5

work could add to our understanding of cross-country differences in conceptions of merit. Fourthly, a more complete understanding of the social gradient in adolescent mental health may require including additional adolescent characteristics, such as gender, immigrant status, or educational level, and using an intersectional approach (Duinhof et al., 2020).

This chapter sheds important new light on social gradients in adolescent mental health. Extending existing work showing cross-country variation in the social gradient in adolescent mental health, we found that societal meritocratic beliefs moderated associations between SES and life satisfaction and psychosomatic complaints, strengthening the social gradient for family affluence and weakening the social gradient for perceived family wealth. Replication of these findings and further understanding of why country-level meritocratic beliefs moderate social gradients in adolescent mental health may help to reduce these gradients and improve adolescent mental health. More generally, the role of sociocultural factors, such as individualism, in the social gradient may be an important avenue for future research. Furthermore, the different findings for family affluence and perceived family wealth emphasise the importance of studying multiple indicators of adolescent SES.





Chapter 6

The pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment: An examination of the role of cognitive ability, teacher assessment, and educational expectations

Based on: Weinberg, D., Stevens, G. W. J. M., Finkenauer, C., Brunekreef, B., Smit, H. A., & Wijga, A. H. (2019). The pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment: An examination of the role of cognitive ability, teacher assessment, and educational expectations. *PLOS ONE*, 14(5), e0216803. <https://doi.org/10.1371/journal.pone.0216803>

Abstract

Adolescents with high educational attainment generally have better outcomes across the lifespan than adolescents with lower educational attainment. This study investigated how three measures of socioeconomic status (SES) – maternal education, paternal education, and neighbourhood SES – combined to predict adolescent educational attainment (track level at age 17). We proposed three mechanisms for this pathway: cognitive ability (at age 11), primary school teacher assessment (stating the secondary education level suitable for a child at age 11), and educational expectations (at age 14). Using the data of 2,814 Dutch adolescents from the Prevention and Incidence of Asthma and Mite Allergy (PIAMA) study, logistic regressions tested associations between SES and educational attainment. Structural equation modelling (SEM) tested mediational pathways between SES and educational attainment. In models with three SES measures, having a medium-educated mother was associated with higher educational attainment relative to having a low-educated mother (OR; 95% CI: 1.83; 1.41–2.38), and having a high-educated mother was associated with higher educational attainment relative to having a low-educated mother (OR; 95% CI: 3.44; 2.59–4.55). The odds ratios for paternal education showed a similar pattern. We found no association between neighbourhood SES and adolescent educational attainment, so neighbourhood SES was removed from further analyses. Mediational analyses revealed that cognitive ability (30.0%), teacher assessment (28.5%), and educational expectations (1.2%) explained 59.8% of the total association between parental SES and educational attainment. The results showed that maternal education and paternal education were both important for understanding the strong association between parental SES and adolescent educational attainment. In the Netherlands, the association between parental SES and educational attainment can be largely explained by cognitive ability and teacher assessments.

Keywords: educational attainment; socioeconomic status; parental education; teacher assessment; cognitive ability

Author contributions: **DW** *Conceptualization, Formal analysis, Methodology, Visualisation, Writing – original draft, Writing – review & editing.* **GWJMS** *Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing.* **CF** *Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing.* **BB** *Data curation, Writing – review & editing.* **HAS** *Data curation, Writing – review & editing.* **AHW** *Data curation, Methodology, Writing – review & editing.*

Educational attainment is a key goal of adolescence (Zarrett & Eccles, 2006). High educational attainment is associated with, and expected to have a causal effect on, positive outcomes later in life through many economic, health-behavioural, and social-psychological mechanisms. These outcomes include getting a stable, well-paid, high-status job, healthier behaviour and longer life expectancy, and increased political engagement and trust (Easterbrook et al., 2016; Feinstein et al., 2006; Hout, 2012; Mirowsky & Ross, 2003; Zajacova & Lawrence, 2018). In sharp contrast, adolescents with low educational attainment are more likely than those with high attainment to end up in cycles of poverty, ill-health, and deprivation (R. D. Conger & Donnellan, 2007; Conroy et al., 2010; Mirowsky & Ross, 2003). Processes of globalisation, technological development, and labour market polarisation further increase the importance of educational attainment for outcomes throughout life (Atkinson, 2015; OECD, 2017); highly educated citizens can best take advantage of these processes (Autor, 2014). It is therefore important to better understand the predictors and pathways which are related to educational attainment during adolescence.

An ‘ecological’ perspective on development emphasises the interactions between individuals and the familial, community and societal contexts they are embedded within (Bronfenbrenner & Evans, 2000; Holt-Lunstad, 2018; Sameroff, 2010). The perspective provides a theoretical framework for understanding how different levels of the social context are related to adolescent educational attainment (Dupéré et al., 2010; Schoon & Polek, 2011). Socioeconomic status (SES), which comprises material and social resources and assets, as well as status in the social hierarchy, is a central component of the social context (Krieger et al., 1997). To better understand how SES is related to adolescent educational attainment, it is important to not only consider different contextual indicators of SES, but also investigate pathways which may explain the SES-attainment association.

SES and educational attainment

Parental SES is strongly and persistently linked to adolescent educational attainment: on average, high-SES parents have children with higher educational levels than low- or medium- SES parents (Breen & Jonsson, 2005; Hertz et al., 2008; Shavit & Blossfeld, 1993). The relation between parental SES and educational attainment, described by sociologists as ‘social reproduction’ (Bourdieu & Passeron, 1990), and by economists as the ‘intergenerational transmission of human capital’ (Black et al., 2005), contributes to limited social mobility between generations. Parental education is considered a stable measure of parental SES, because it is established at an early age and is fairly constant over time (Sirin, 2005).

Evidence from recent decades across many countries has shown that both parents’ education levels are similarly predictive of adolescent educational attainment, though the relative importance of the mother and the father may depend on who has the highest education level (Korupp et al., 2002; Marks, 2008). Assortative mating, whereby highly educated individuals are more likely to also have highly educated partners, may

further limit social mobility between generations (Schwartz & Mare, 2005). Changes in educational levels, especially among women, with consequences for assortative mating, suggest that current research on the impact of parental education on adolescent educational attainment should include the education levels of both parents (Buis, 2013; Greenwood et al., 2014).

As they grow older, adolescents increasingly spend time outside the home in their neighbourhoods and are influenced by the social space where many of their interactions occur (Leventhal et al., 2009). Neighbourhoods may vary in their social cohesion, physical surroundings, and the level of resources provided by public services, all of which are related to adolescent development and consequently educational attainment (Galster, 2012; Wilson, 1987). As such, adolescent outcomes may not only be related to their parental SES, but also to the SES of their neighbourhood. Indeed, adolescents who grow up in a neighbourhood where the population has a low average SES (i.e., low neighbourhood SES) have lower educational attainment, and living for longer in higher SES neighbourhoods during childhood and adolescence is related to higher educational attainment (Chetty et al., 2016; Harding, 2011; Sykes & Kuyper, 2009).

Many studies have found that the relation between neighbourhood SES and adolescent achievement outcomes holds over and above the relation between parental education and adolescent achievement, but less is known about how parental education and neighbourhood SES interact (Nieuwenhuis & Hooimeijer, 2016). One study in England found that the negative relationship between living in low SES neighbourhoods and educational attainment was stronger for adolescents with high-educated parents than for adolescents with low-educated parents (McDool, 2017). Another study in the UK found that adolescents with low-educated parents, neighbourhood SES was a more important predictor than parental SES for adolescent educational attainment (Patacchini & Zenou, 2011). In light of these differing findings, we sought to explore the interaction between parental and neighbourhood SES on educational attainment in adolescence.

Pathways from SES to educational attainment

Although the link between SES and educational attainment is well-established, questions remain about which mechanisms, related to parental and neighbourhood SES, predict adolescent educational outcomes. The ecological perspective emphasises that SES may be associated with adolescent development through several levels: adolescents' individual characteristics, their developing agency, and contextual processes (Bronfenbrenner & Evans, 2000; Schoon & Polek, 2011). The principal individual mechanism by which SES may be related to educational attainment is adolescent cognitive ability (Deary, 2011). Parental education is strongly positively associated with adolescent cognitive ability: both are related to parental cognitive ability and they share genetic and environmental influences (Deary, 2011; Nisbett et al., 2012). Neighbourhood SES also shows associations with adolescent cognitive ability, possibly because of poorer quality teaching, fewer resources, less challenging curricula, or the inaccessibility of learning materials in low compared to high SES neighbourhoods, though these

mechanisms may be stronger in the USA than in Europe (Ainsworth, 2002; Jencks & Mayer, 1990; Minh et al., 2017; Nieuwenhuis & Hooimeijer, 2016). Adolescent cognitive ability is positively associated with educational attainment (Schulz et al., 2017). Thus, we expected that cognitive ability would mediate the association between SES and educational attainment.

The ecological perspective also emphasises that schools and teachers are a particularly important context for development (Bronfenbrenner & Evans, 2000; Holt-Lunstad, 2018). Therefore, a second mechanism by which parental and neighbourhood SES may be associated with adolescent educational attainment is through teacher assessment of adolescent capabilities. Social reproduction theory suggests that higher educated parents transmit to their children not only their genes but also more cultural capital – status-based cultural signals, such as attitudes, preferences and behaviours (Bourdieu & Passeron, 1990; de Graaf et al., 2000). This gives children of higher educated parents ways of interacting with peers and adults that teachers judge positively (de Graaf et al., 2000). Additionally, higher educated parents have the resources and knowledge to effectively advocate for teachers to support the academic ambitions of their children, who may then make more positive assessments of the capabilities of those adolescents than is justified by evidence of their cognitive ability alone (Lareau, 2003; Stephens et al., 2014). In contrast, teachers have lower than justified assessments of the educational potential of adolescents of lower educated parents (P. A. J. Stevens et al., 2011). Parental education level may also be associated with non-cognitive traits such as personality, which may be genetically transmitted to children and subsequently influence teacher assessments (Krapohl et al., 2014). In addition, neighbourhood SES may also be related to teacher assessment of adolescent capabilities. By definition, low-SES neighbourhoods contain a relative concentration of students with lower educated parents and this concentration is usually reflected in the school population, in turn negatively affecting the expectations of teachers for all students (Owens, 2010; Sykes & Musterd, 2011). Evidence from the Netherlands has shown that teachers had higher educational assessments for students in classes where there were fewer students from low-SES families (Timmermans et al., 2015). Teacher assessment of educational capabilities is thus expected to be an important second mediator of the association between SES and educational attainment in the Netherlands because of its impact on the education track adolescents can follow (de Boer et al., 2010).

A third mechanism by which parental education and neighbourhood SES may be associated with adolescent educational attainment is through adolescent educational expectations. Adolescents' visions of their future career and lifestyle are an important part of their identity development and are important for the choices adolescents make in life (S. R. L. Johnson et al., 2014; Nurmi, 1991). Parents may act as 'expectancy socializers', encouraging and moulding their children's own expectations (Frome & Eccles, 1998, p. 437). Several studies have found that higher educated parents have children with more ambitious educational expectations (for a review, see Massey et al., 2008). Neighbourhood SES may also be related to adolescent educational expectations, because adolescents

typically feel a sense of belonging to, and pride in, their neighbourhood and thus their attitudes and beliefs develop in interaction with people living nearby (Baars, 2014; Sykes & Musterd, 2011; Visser et al., 2015). In higher SES neighbourhoods, higher levels of people in employment can encourage adolescents to be school-focused (Oyserman et al., 2011). In low SES neighbourhoods, there is greater heterogeneity in educational expectations and adolescents may be influenced by neighbours with either educational or alternative goals (Harding, 2011). Thus, adolescents from low-SES neighbourhoods are expected to have lower educational expectations than their peers in high-SES neighbourhoods. Educational expectations are related to adolescent educational attainment, possibly through choices, decisions, and activities (Beal & Crockett, 2010; Schoon & Polek, 2011). Thus, our final mediational hypothesis was that educational expectations would also mediate the association between SES and educational attainment.

Evidence suggests that all three mediational pathways – cognitive ability, teacher assessment, and educational expectations – at least partly explain the relation between parental education and neighbourhood SES and educational attainment, but to our knowledge no studies have tested these three mediators in one model. There is evidence that all three mediators included in the study are related to each other (Dubow et al., 2009; Timmermans et al., 2015; Wood et al., 2007). These associations suggest that the effects of each proposed mediator may attenuate once other pathways are included. By examining these mediators together in one model, we will shed light on the relative importance of each mediator in explaining the relation between SES and educational attainment.

The present study: pathways from SES to educational attainment in the Netherlands

Using data from a large prospective study in the Netherlands, this study first investigated whether parental SES, comprising maternal education and paternal education as separate indicators, and neighbourhood SES predicted adolescent educational attainment. We took a stepwise approach: initially modelling the effect of these factors individually, then including all three effects simultaneously, then adding interactions between them. We expected significant effects for all three measures of SES, even after controlling for the other measures (Bradley & Corwyn, 2002).

Secondly, we analysed three mechanisms expected to explain the pathway from SES to educational attainment: cognitive ability, teacher assessment, and educational expectations. For mediation analysis, we combined maternal education, paternal education, and neighbourhood SES into one latent SES measure (Fergusson et al., 2008). Based on research in other countries, we expected that higher SES would predict greater cognitive ability, higher teacher assessment, and higher educational expectations, and these, in turn, would predict higher educational attainment in adolescents (Schoon & Polek, 2011; Sorhagen, 2013). We analysed the effects of the three proposed mediators individually and then in combination to assess whether they continued to play a role once other possible mechanisms were considered.

This study took place in the Netherlands, where the education system is characterised by its strong and early stratification, with academic tracking into educational trajectories at age 12 (OECD, 2016; Van de Werfhorst & Mijs, 2010). In theory, parents and children are free to choose the secondary school (although some schools need to do a lottery whenever they have too many student applications) and schools are free to select any students. However, in practice, most secondary schools consider two pieces of information at the end of primary education as an entry requirement, which they can weigh as they choose: scores on a national (Cito) school leaver test and a teacher assessment of the appropriate school level (Timmermans et al., 2015).

The teacher assessment, provided by the main teacher of the child's primary school, is based on cognitive ability (e.g., Cito Test score), non-cognitive abilities (i.e., an evaluation of children's motivation, characteristics, and capacities), and judgements about their home situation (Driessen et al., 2008; Ruijsbroek et al., 2015; P. A. J. Stevens et al., 2011). According to a survey of schools by the Dutch Inspectorate of Education, when giving assessments, more than three-quarters of schools take into account the home situation, such as how stable it is and the extent of parental support for their child's education (Inspectorate of Education (The Netherlands), 2014). The teacher's assessment ranges through six educational tracks from lowest to the highest, two of which are 'bridge class' assessments. In bridge classes, students spend the first year or two of secondary education in mixed classes (i.e., a combination of two educational levels) which could lead to either of two adjacent levels. The teacher's assessment often corresponds with the secondary school level indicated by the Cito Test (van der Heide et al., 2016). Yet, in roughly 35% of cases, when teachers believe that students are better off in a track other than the one indicated by the Cito Test, they give alternative assessments (Inspectorate of Education (The Netherlands), 2014). Mobility between tracks is possible during secondary education: national registry-based data from 2012/13 (when our participants were 17/18) showed that, compared to the teacher assessment: 16% of adolescents finished in a lower track; 16% in the lower of two bridge class tracks; 45% in the corresponding track; 14% in the higher of two bridge class tracks; and 10% in a higher track (Inspectorate of Education (The Netherlands), 2018). Despite relatively low levels of inequality in the Netherlands, there is evidence that inequity is growing, perhaps due to the Great Recession (OECD, 2016; Schoon & Bynner, 2017; WRR, Netherlands Scientific Council for Government Policy, 2014). The relation between parental education and neighbourhood SES with adolescent educational attainment may be relatively strong in the Netherlands; decisions about educational tracking are made early in the students' school career, when less is known about their academic potential in comparison with parental SES (OECD, 2016; Schnabel et al., 2002; Van de Werfhorst & Mijs, 2010).

Method

Sample

Data on Dutch adolescents were obtained from the Prevention and Incidence of Asthma and Mite Allergy (PIAMA) study, originally designed to investigate the influence of lifestyle and environment on the development of asthma, allergy, and lung function in children and adolescents (Wijga et al., 2014). The study recruited pregnant women from the general population in three parts of the Netherlands (North: provinces Groningen, Friesland, and Drenthe; Central: Utrecht and Gelderland; West: Rotterdam and surrounding municipalities). Their children ($N = 3,963$), born in 1996/1997, have been followed from birth onwards. Data were collected across several waves, including yearly from 1 to 8 years of age and at the age of 11, 14, and 17, using questionnaires on family characteristics, lifestyle, physical, and psychosocial health. The PIAMA study population, in comparison with the Dutch population at the time, was more highly educated (35% compared to 22%) and had fewer non-western immigrant parents (3.6% compared to 15%), which reflects the fact that higher educated native speakers are more likely to participate in research involving lengthy questionnaires (Wijga et al., 2014). The study population was similar to the general population with respect to maternal age at childbirth.

The Medical Ethical Committees of the participating institutes approved the study (Rotterdam, start project MEC 132.636/1994/39 and 137.326/1994/130; Groningen, start project MEC 94/08/92; Utrecht, start project MEC-TNO judgement 95/50; Utrecht, age 4 years CCMO P000777C; Utrecht, age 8 years CCMO P04.0071C, protocol number 04-101/K; Rotterdam, age 8 years MEC 2004-152; Groningen, age 8 years M 4.019912; Utrecht, age 12 years METC protocol number 07-337/K). Parents, carers or guardians gave written informed consent on behalf of all the minors/children involved in the study (Wijga et al., 2014).

Analyses were based on participants for whom both maternal education and paternal education were assessed when the child was 1 year old, and at least one further (mediating or outcome) measure was available ($N = 2,814$). Compared to the original PIAMA study population, the analysis sample under-represented adolescents with low SES ($\chi^2_{\text{Maternal education}}(2, N = 3807) = 115.32, p < .001$; $\chi^2_{\text{Paternal education}}(2, N = 3,761) = 75.10, p < .001$); and $t_{\text{Neighbourhood SES}}(3907) = 6.91, p = .045$). Missing data were modelled with the WLSMV estimator (see below), allowing for missing observations instead of pairwise or listwise removal of participants. Sensitivity analysis using multiple imputation revealed that any bias due to study dropout related to participant characteristics (such as parental education) did not have a substantial effect on the findings.

Measures

Socioeconomic status

Information about the highest level of education attained by the mother and the father was obtained when their children were roughly 1 year old. *Maternal education* and

paternal education were categorised as low (primary school, lower vocational, or lower secondary education), medium (intermediate vocational education or intermediate/higher secondary education), or high (higher vocational education and university), in accordance with prior research (e.g., Ruijsbroek et al., 2015). In the Netherlands, education correlates strongly with other indicators of SES (e.g., one study found a correlation of .49 with income; de Graaf et al., 2000).

Information on *neighbourhood socioeconomic status (SES)* was obtained from The Netherlands Institute for Social Research (SCP; Knol et al., 2012). The SCP's indicator of neighbourhood-level (four-digit postal code) SES represents the educational, occupational, and economic status of the neighbourhood (i.e., average income, the percentage of people with a low income, the percentage of low-educated people and the percentage of people who do not work) and was collected in 2006. Each participants' score was based on their reported postal code in 2006, when children were aged 9 or 10.

Educational attainment

Adolescents reported their education level at age 17, with responses coded ordinally: 1 = VMBO/MBO (vocational education track); 2 = HAVO/HBO (general secondary education track); 3 = VWO/University (university education track). Students in other education were coded as missing (e.g., studying abroad, $n = 14$).

Proposed mechanisms

In the February of their final year of primary education (i.e., aged 11-12), most Dutch students take the Cito Eindtoets Basisonderwijs ("Cito Final Test Primary Education"), designed to assess *cognitive ability* (OECD, 2016). The Cito Test is a good instrument for assessing individual differences in cognitive ability, with scores ranging from 501 to 550, and it provides guidance for the appropriate secondary educational level. Parents were sent a short questionnaire asking about the overall standardised Cito Test score and the teacher's assessment of the child's educational abilities (see below; van der Heide et al., 2016). The Cito Test is a valid instrument for assessing individual differences in cognitive ability: research finds that the Cito score correlates with IQ at age 12 ($r = .63$) (Bartels et al., 2002). The test comprises 240 multiple choice items assessing language, mathematics, information processing, and world orientation (Cito, 2014).

The primary school *teacher assessment* is provided in the spring of the final year of primary education, once teachers know the results of the Cito Test. The assessment states the secondary education level(s) suitable for a child according to the teacher. We coded this variable (based on the highest level stated by the teacher): 1 = preparing for labour market (VMBO-lbk); 2 = preparing for vocational education (VMBO-gt); 3 = combination class of preparing for vocational education and secondary general education (VMBO/HAVO); 4 = preparing for secondary general education (HAVO); 5 = combination class of preparing for secondary general or pre-university education (HAVO/VWO); 6 = preparing for university education (VWO). In 3 cases teachers gave an assessment of "VMBO", which was coded 1.

Adolescents reported their *educational expectations* at age 14 in response to the following question: “What are your plans after this education?” Based on the extent to which they indicated expectations for further educational attainment, the responses were coded ordinally: 0 = “I don’t know yet”; 1 = “I’m going to work”; 2 = “I’m going to attend a course where I partly work and partly go to school”; 3 = “I will start with further or other education or study”.

Data analysis

To test the independent associations between maternal education, paternal education and neighbourhood SES with adolescent educational attainment, we ran ordinal logistic regressions in SPSS (version 24) based on the three ordered educational attainment categories. We fitted a logit model, entering maternal education and paternal education into the regressions as ordinal predictors (Models 1a and 1b) and neighbourhood SES as a continuous predictor (Model 1c). Next, a regression was run with all the predictors added simultaneously (Model 1d). Interaction terms (i.e., maternal education x paternal education, maternal education x neighbourhood SES, paternal education x neighbourhood SES, and maternal education x paternal education x neighbourhood SES) were added to the final model (Model 1e).

To test mediational pathways between the SES measures and educational attainment, relationships between the variables were examined with structural equation modelling (SEM), using Mplus (Version 8; Muthén & Muthén, 1998). Models were estimated using weighted least squares mean and variance adjusted estimation (WLSMV), which is suited to categorical data (Flora & Curran, 2004). Following recommendations to reduce variance in complex models to improve model convergence and identification we centred cognitive ability scores and divided them by 10 (Muthén & Muthén, 1998, p. 720). We bootstrapped effects 2,000 times with bias-corrected standard errors and used theta parameterisation due to the presence of categorical predictors (MacKinnon et al., 2002; Muthén & Muthén, 1998). Goodness-of-fit was evaluated using two indices, with excellent model fit indicated by CFI \geq .95 and RMSEA $<$.05 (Hu & Bentler, 1999).

We conceptualised SES as caused by parental education and neighbourhood SES, so our SES variable was modelled as a formative indicator (i.e., a weighted combination of the parental education and neighbourhood SES variables, which reduces measurement error; Bollen et al., 2001; Diamantopoulos et al., 2008). Adding an interaction term between maternal education and paternal education to Model 2 made no difference to the results and was therefore removed to make the model more parsimonious (Diamantopoulos, 2006). Models 2a-c successively included paths for the three hypothesised mediators (cognitive ability, teacher assessment, and educational expectations) between the SES indicator and educational attainment, as well as including a direct path from SES to educational attainment. Model 2d tested all three mediators concurrently, with these variables allowed to correlate. Evidence for mediational pathways was established based on the Mplus estimation of indirect effects, which uses Sobel’s (1982) asymptotic z test.

Results

Descriptive statistics

Table 6.1 gives the correlations between the observed variables: all variables were related positively to each other, except for neighbourhood SES ($M = 0.40$, $SD = 0.81$), which was not related to adolescent educational expectations or teacher assessment. Mean levels of maternal education and paternal education were similar and the variables moderately correlated ($r = .50$). Table 6.2 gives the frequencies of the categorical measures: parents were mostly medium or high educated (80.3% of mothers and 77.2% of fathers); the most common teacher assessment was ‘preparing for university education’; and most adolescents (67.8%) expected to go into further education. The educational attainment of the adolescents was equally split between the three education tracks, with one-third in the vocational education track, one-third in the general secondary education track, and one-third in the university education track. These findings indicate that adolescents in this sample were more highly educated than the average Dutch population; over 50% of adolescents in this birth cohort were in the lowest (vocational) education track at age 14 (Centraal Bureau voor de Statistiek (CBS), 2018). Their cognitive ability scores ($M = 538.91$, $SD = 7.92$) were also above average (535.4; Cito, 2008).

Table 6.1 Correlations between SES measures, mediators, and educational attainment

Variables		2	3	4	5	6	7
SES	1. Maternal education	.50**	.06**	.29**	.33**	.06**	.36**
	2. Paternal education		.13**	.29**	.35**	.06**	.39**
	3. Neighbourhood SES			.05* ^a	.04 ^a	.02	.05*
Mediators	4. Cognitive ability				.86** ^a	.09**	.69**
	5. Teacher assessment					.11**	.73**
	6. Educational expectations						.13**
Outcome	7. Educational attainment						

Note. ^a Correlation coefficients between Neighbourhood SES, Cognitive ability, and Teacher assessment are Pearson’s (all other correlations are Spearman’s). *ns* vary due to missing data, ranging from 1,236-2,814. * $p < .05$, ** $p < .01$.

Table 6.2 Frequencies of parental education and categorical mediators

	%
Maternal education (<i>n</i> =2,814)	
Low	19.7
Medium	41.4
High	38.9
Paternal education (<i>n</i> =2,814)	
Low	22.8
Medium	34.1
High	43.1
Teacher assessment (<i>n</i> =2,096)	
Preparing for labour market	7.5
Preparing for vocational education	13.5
Combination class of preparing for vocational education and secondary general education	13.2
Preparing for secondary general education	16.4
Combination class of preparing for secondary general or pre-university education	20.1
Preparing for university education	29.3
Educational expectations (<i>n</i> =2,474)	
I don't know	22.8
Work	1.6
Partly work, partly school	7.8
Further education	67.8

SES and adolescent educational attainment at age 17

Table 6.3 presents the number and proportion of adolescents in each educational track, broken down by parental education. Among adolescents with low-educated mothers, 61% of adolescents had the lowest level of educational attainment, 27% had a medium level of educational attainment and only 13% had the highest level of educational attainment. In contrast, among adolescents with high-educated mothers, only 17% had the lowest level of educational attainment, 34% had a medium level, and 49% the highest level. Adolescents with medium-educated mothers were more evenly split between the three groups: 39% had the lowest level of educational attainment, 36% had a medium level, and 25% the highest level. The proportions based on paternal education paralleled those for maternal education.

Table 6.3 Percentage of adolescents with each educational attainment level by parental education level ($n = 1,978$)

	<i>N</i>	% in educational track		
		VMBO/ MBO	HAVO/ HBO	VWO/ University
Maternal education				
Low	336	60.4	26.8	12.8
Medium	805	38.9	36.0	25.1
High	837	17.6	33.9	48.5
Paternal education				
Low	402	61.2	25.9	12.9
Medium	652	41.0	34.7	24.4
High	924	16.2	36.1	47.6
Total	1,978	33.5	33.6	32.9

Table 6.4 shows the relation between parental education and educational attainment, with low-educated parents as the reference category. The first three models (1a-1c) showed that maternal education (Wald $\chi^2(2) = 258.37, p < .001$) and paternal education (Wald $\chi^2(2) = 298.70, p < .001$), but not neighbourhood SES (Wald $\chi^2(1) = 3.84, p = .050$), were associated with adolescent educational attainment. When all three measures of SES were included together in one model, maternal education (Wald $\chi^2(2) = 80.72, p < .001$) and paternal education (Wald $\chi^2(2) = 131.14, p < .001$) remained statistically significant, and neighbourhood SES (Wald $\chi^2(1) = 0.00, p = .965$) was still not statistically significant (Model 1d). The results of this last model showed that adolescents with medium-educated mothers had nearly 2 times the odds of having higher educational attainment relative to adolescents with low-educated mothers, and adolescents with high-educated mothers had over 3 times the odds of having higher attainment relative to adolescents with low-educated mothers. The odds ratios for paternal education showed a similar pattern. Supplementary analysis showed that, in a model with all three measures of SES, when medium-educated mothers was used as a reference category, adolescents with high-educated mothers had nearly 2 times the odds of having higher educational attainment relative to adolescents with medium-educated mothers (OR = 1.88, 95% CI [1.54-2.29], $p < .001$). The equivalent odds ratio for adolescents with high-educated fathers relative to medium-educated fathers was slightly higher (OR = 2.36, 95% CI [1.92-2.90], $p < .001$). The results showed that both maternal education and paternal education remained independently associated with higher adolescent educational attainment when the other parent's education was included. There were no main or interaction effects for neighbourhood SES, so we included only interactions between maternal education and paternal education in our final model (Model 1e). The interaction model showed that there was no significant interaction between maternal education and paternal education (Wald $\chi^2(4) = 4.728, p = .316$).

Table 6.4 Odds ratios of higher educational attainment from logistic regression models with SES measures

		Odds Ratio (95% Confidence Interval)			
		Model 1a (Mother)	Model 1b (Father)	Model 1c (Neighbourhood)	Model 1d (Simultaneous)
Maternal education	Low	1			1
	Medium	2.39 (1.86 - 3.06)			1.83 (1.41 - 2.38)
	High	6.94 (5.38 - 8.95)			3.44 (2.59 - 4.55)
Paternal education	Low		1		1
	Medium		2.31 (1.81 - 2.95)		1.81 (1.41 - 2.34)
	High		7.20 (5.68 - 9.14)		4.28 (3.28 - 5.57)
Neighbourhood SES				1.11 (1.00 - 1.23)	1.00 (0.90 - 1.11)

Note. Maternal education (Low) and Paternal education (Low) is the reference group. Model 1d included Maternal education, Paternal education, and Neighbourhood SES simultaneously. Bold figures indicate significant relations, where group members had a greater chance for higher educational attainment relative to the reference group.

Pathways from SES to adolescent educational attainment at age 17

Neighbourhood SES did not predict adolescent educational attainment at age 17, and because sensitivity analyses revealed that including Neighbourhood SES in the SES indicator made no substantial difference to subsequent models (see Table A6.1), we used only maternal education and paternal education for the formative indicator for SES. Table 6.5 shows the results of models which tested the hypothesised mediators of the SES indicator on educational attainment. Model 2a showed that, consistent with our hypothesis, SES predicted adolescent cognitive ability at age 11, and cognitive ability at age 11, in turn, predicted educational attainment. A test of mediation found that cognitive ability mediated the relationship between SES and adolescent educational attainment at age 17, explaining 50.3% of the total association. Models 2b and 2c showed similar results for teacher assessment (at age 11) and educational expectations (at age 14); both were predicted by SES and in turn predicted adolescent educational attainment at age 17. Separate mediation tests found that each significantly mediated the path from SES to educational attainment, with teacher assessment explaining 59.7% of the total association and educational expectations 2.2% of the total association. Finally, Model 2d showed that these associations remained significant once all hypothesised mediators were included in a model concurrently, with the combined mediational effects of cognitive ability (30.0%), teacher assessment (28.5%), and educational expectations (1.2%) explaining 59.8% of the total association between SES and educational attainment. Figure 6.1 shows the paths for Model 2d, which had excellent model fit: CFI=1, RMSEA <.01.

Table 6.5 Standardised associations from structural equation models for mediational pathways between SES and educational attainment ($N = 2,814$)

	Model 2a		Model 2b		Model 2c		Model 2d		
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	
Formative SES	SES ← Maternal education	0.52 (0.05)	< .001	0.50 (0.05)	< .001	0.52 (0.05)	< .001	0.51 (0.05)	< .001
	SES ← Paternal education	0.63 (0.04)	< .001	0.65 (0.04)	< .001	0.64 (0.05)	< .001	0.64 (0.04)	< .001
SES → Attainment Pathways	SES → Cognitive ability	0.35 (0.02)	< .001					0.35 (0.02)	< .001
	Cognitive ability → Educational attainment	0.69 (0.02)	< .001					0.41 (0.05)	< .001
SES → Teacher assessment			0.41 (0.02)	< .001			0.41 (0.02)	< .001	
Teacher assessment → Educational attainment			0.70 (0.02)	< .001			0.34 (0.04)	< .001	
SES → Educational expectations					0.07 (0.03)	0.004	0.07 (0.03)	0.004	
Educational expectations → Educational attainment					0.15 (0.03)	< .001	0.08 (0.03)	0.002	
SES → Educational attainment	0.24 (0.02)	< .001	0.19 (0.02)	< .001	0.47 (0.02)	< .001	0.19 (0.02)	< .001	
Mediation Tests	SES → Cognition → Attainment	0.24 (0.02)	< .001					0.14 (0.02)	< .001
SES → Teacher → Attainment			0.29 (0.02)	< .001			0.14 (0.02)	< .001	
SES → Expectations → Attainment					0.01 (0.00)	0.017	0.01 (0.00)	0.048	

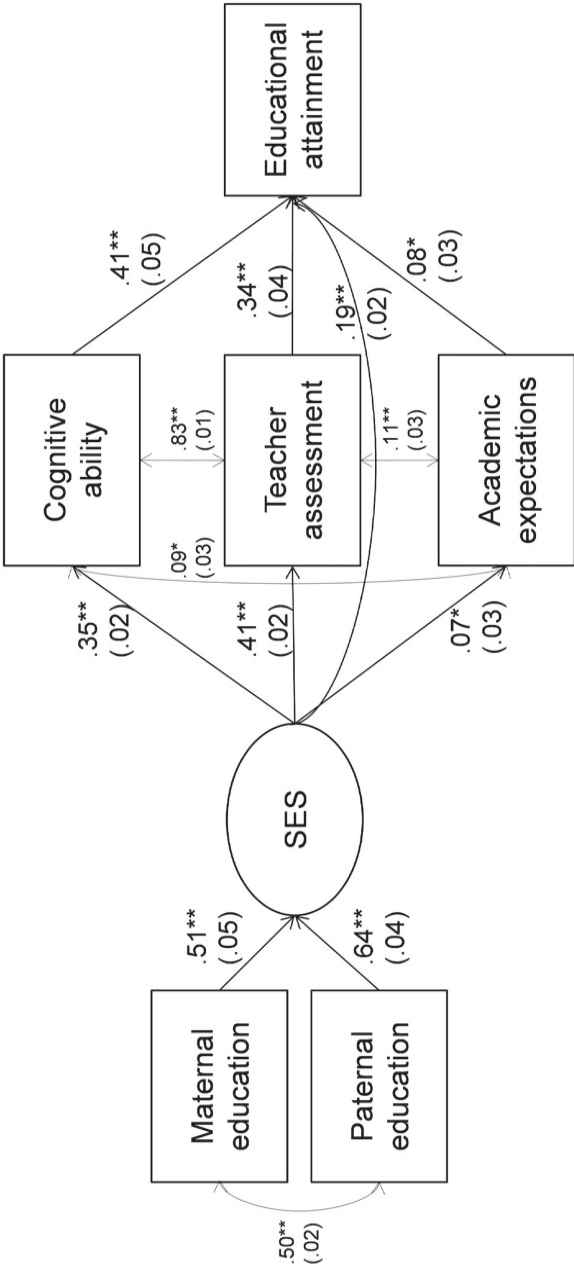


Figure 6.1 Standardised path coefficients from structural equation model 2d. * $p < .01$. ** $p < .001$.

Discussion

This study set out to understand whether different indicators of socioeconomic status – maternal education, paternal education, and neighbourhood SES – were related to adolescent educational attainment at age 17. Maternal education and paternal education moderately correlated, as found in other studies (Conley et al., 2015; Moreno-Maldonado et al., 2018), yet they were independently and positively related to adolescent educational attainment. Adolescents with high-educated mothers had a significantly greater chance of higher educational attainment at age 17 than adolescents with a medium-educated mother, who themselves had a greater chance of higher educational attainment than those with low-educated mothers. The same results held for paternal education levels. We found no link between neighbourhood SES and adolescent educational attainment, nor evidence of interactions between parental education levels.

The second aim of the study was to explore whether three mediators – adolescent cognitive ability, primary school teacher assessment, and adolescent educational expectations – could explain the relation between SES (conceptualised as a composite maternal education and paternal education score) and adolescent educational attainment. All three mediators contributed to explaining the relation between SES and educational attainment. The relations remained when all mediators were included in the same model, with over half the total relation between SES and educational attainment explained by a combination of the mediators.

Maternal education and paternal education both predict educational attainment

The results support a considerable body of knowledge which has found strong links between parental education and adolescent educational attainment (e.g., Hertz et al., 2008). Adding to the literature, our findings showed that the education level of both parents matters: regardless of the education of the other parent, having a more highly educated parent, mother or father, is linked to higher adolescent educational attainment. We found no evidence of an interaction effect, suggesting that the positive relation between each parent's education and adolescent educational attainment does not depend on the educational level of the other parent. A corollary of these results is that adolescents with neither parent having attained more than a basic education are the most likely (compared to adolescents who have at least one more highly educated parent) to themselves attain the lowest education level, perpetuating intergenerational cycles of low educational attainment. Our results emphasise the importance of both parents to their children's educational attainment. This finding should be of interest to policy-makers and practitioners interested in reducing educational inequalities and highlights the benefits to researchers of considering the education level of both parents. Cruder measures of SES which only include the education level of the mother, the father, or the highest-educated parent, do not fully capture parental educational associations with adolescent educational attainment (Buis, 2013; Korupp et al., 2002).

We found no relation between neighbourhood SES and adolescent educational attainment, both before and after parental SES was taken into consideration. In light of previous findings of neighbourhood effects in the Netherlands, we consider several explanations at different levels for our discrepant results. Firstly, government funding and policies may have over time reduced neighbourhood differences in the quality of learning environments (Ladd & Fiske, 2011). Secondly, neighbourhood effects in the Netherlands may be most pronounced for adolescents from lower-SES families and those who are less academically committed, who are relatively underrepresented in the PIAMA dataset (Nieuwenhuis & Hooimeijer, 2016; Sykes & Kuypers, 2009). Thirdly, adolescents' positive perceptions and experiences of their neighbourhood may attenuate adverse neighbourhood effects (Visser et al., 2015). Fourthly, there may just be no neighbourhood effect in our study population. Some previous evidence of neighbourhood effects may be based on publication bias and statistical artefacts, because unmeasured variation in the composition of neighbourhood residents confounds the neighbourhood effect (Nieuwenhuis, 2016). Due to redistributive policies concerning housing, income, and public education in the Netherlands, parental education and neighbourhood SES may not be strongly related and neighbourhoods may not be associated with individual educational outcomes (Sykes & Kuypers, 2009). Future research examining these different explanations, ideally in different regions or countries, is needed.

It is also possible that our measure of neighbourhood SES might not have fully captured the variation in neighbourhood effects. Our data did not include the full postcode of participants (i.e., only 4-digits) so we may have found weaker relations than with a more granular postcode (i.e., 6-digits), which may also explain the low correlations with parental education measures (Nieuwenhuis et al., 2015). Neighbourhood effects are likely to accumulate during childhood and depend on duration of exposure, and families may move; our snapshot indicator of neighbourhood SES may be inadequate to capture such dynamic relations (de Vuijst et al., 2017; van Ham & Clark, 2009). Finally, our neighbourhood indicator did not measure social embeddedness, which could be more relevant to the relation between neighbourhoods and adolescents. Social embeddedness reflects a neighbourhood's cohesion, trust, social capital, and collective socialisation, which are related to support for educational attainment and conformity to educational norms (Kalff et al., 2001; Nieuwenhuis & Hooimeijer, 2016).

Mediation effects of cognitive ability, teacher assessment, and educational expectations

The mediation analyses provided evidence that three mechanisms explain over half of the relation between SES and adolescent educational attainment. It is striking that cognitive ability and teacher assessment both play a similar and large role, each contributing to over a quarter of the total relation when included in the same model. We expect that genetics may partly be responsible for the three mediational pathways, because cognitive ability and non-cognitive traits such as personality are substantially heritable (Krapohl et al., 2014). In turn, these abilities and traits may be related to cognitive ability

and the teacher assessment at age 11 and educational expectations at age 14. However, it is also important to consider other explanatory mechanisms, since there is evidence that 40-60% of variation in educational attainment cannot be explained by genetics (Ayorech et al., 2017). Furthermore, there is increasing evidence that genetic influences interact with educational environments to predict educational attainment (Trejo et al., 2018). For example, the differential susceptibility model proposes that those adolescents most negatively affected by poor environments may also be most positively affected by wealthy environments (J. Belsky & Pluess, 2009). Given changes between generations in average educational levels, further studies to shed light on the relative roles of genetics and the environment in such changing socioeconomic contexts could be useful (D. W. Belsky et al., 2018).

These findings support theories which distinguish three types of mediational pathways linking SES and educational attainment: *primary effects* of cognitive and non-cognitive skills, *secondary effects* of educational choices and *tertiary effects* of teachers and schools (Blossfeld et al., 2015; Boudon, 1974; Esser & Relikowski, 2015). Our results, and these theories, suggest that, teacher assessments contribute to intergenerational educational inequality (i.e., the effect of SES on educational attainment). Research has identified several possible mechanisms to explain these tertiary effects. Firstly, teachers assess adolescents' cognitive ability, though importantly the mediation result also holds after controlling for cognitive ability. Secondly, teacher recommendations may be based on (partly genetically heritable) non-cognitive skills, such as self-control, motivation, and ability to plan, skills associated with adolescents who have higher SES parents (Boone & Van Houtte, 2013). Thirdly, teachers may have lower expectations for adolescents with low-SES parents due to, perhaps unconsciously, negatively evaluating how supportive their home environment is for their education (Tieben et al., 2010). Fourthly, low-SES parents are less able to effectively negotiate with teachers to raise their assessment levels (Elbers & de Haan, 2014; Timmermans et al., 2015). In comparison, high-SES parents may use their cultural capital to influence their children's educational trajectories by placing pressure on the teacher to change the assessment during parent-teacher meetings (Crul, 2018; Inspectorate of Education (The Netherlands), 2014). These mechanisms of social reproduction may explain why among children with the same cognitive ability (Cito Test) score, those with highly-educated parents were twice as likely to end up in a higher educational track (van der Heide et al., 2016). Future research could examine the role of teachers' perception of non-cognitive skills in teacher assessment and the relative influence of these skills on later educational attainment. This would contribute to our understanding of whether these skills are important, or if self-fulfilling prophecies – where teacher expectations merely lead students to perform to those expectations – are at work (Jussim & Harber, 2005).

Educational expectations also contributed to further explaining the pathway from SES to adolescent educational attainment. This result supports findings in other countries that higher educated parents encourage higher educational expectations, positive education-related behaviours, and subsequently successful educational

outcomes in their children (Dubow et al., 2009; Fergusson et al., 2008; Schoon & Polek, 2011). The size of the relation indicates that these educational expectations only played a small role in educational attainment relative to the other mediators. Yet the fact that educational expectations retain their mediation effect in the model with cognitive ability and teacher assessment, suggests that parents are ‘expectancy socializers’, affecting adolescent’s perceptions of their future over and above the reality of adolescent’s educational abilities (Frome & Eccles, 1998). Our measure of educational expectations possibly underestimated the differences in educational expectations within the sample, given that most adolescents (68%) reported the highest level of educational expectations (‘start with further or other education or study’). Future research would benefit from more fine-grained and multi-dimensional indicators of educational expectations, which reflect the complexities of adolescent future orientations and the importance of the theoretical distinction between aspirations, expectations, and plans (S. R. L. Johnson et al., 2014; Massey et al., 2008). This would shed light on whether Dutch adolescents are making and sticking to plans that will help them to reach their educational expectations, the compatibility of their expectations (i.e., beliefs about the future), aspirations (i.e., desires about the future) and current attainment level, and the importance they attach to educational expectations relative to other future outcomes (Buchmann & Park, 2009).

Strengths and limitations

Notwithstanding the strengths of this study – its longitudinal design, the inclusion of multiple mediators and the substantial number of adolescents who have contributed 17 years’ worth of data – several limitations need to be discussed. Firstly, without a genetically-informative study design it remains unknown to what extent the mediators can be explained by genetic or environmental variation in educational attainment (D. W. Belsky et al., 2018). Future studies that are able to disentangle genetic and environmental influences, explore gene-environment interactions, and include other possible mediators, such as child personality and parenting style, can enhance our understanding of the importance of the revealed mediators in the present study. Secondly, as discussed above in relation to educational expectations and neighbourhood SES, the measurement of some included variables may not have been optimal. Thirdly, to fully understand the relations and mechanisms of SES with adolescent educational attainment, research could examine the outcomes of (young) adults once they have completed their education. Later measures of attainment would show whether high-SES adolescents continue to benefit from their background later in life, perhaps through ambitious tertiary educational choices, leading to better educational, psychological, and labour market outcomes (Tieben & Wolbers, 2010). Fourthly, despite the longitudinal design of the study and timing of the measurements, which led us to hypothesise about mediational pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment, our methods are unable to show that these are causal effects. The question of causality depends, among other factors, on whether there are confounders or genetic effects which explain both predictor and outcome

(Black et al., 2005; Hernán, 2018; Krapohl et al., 2014). Finally, the study was conducted on a relatively high-SES cohort of adolescents born around the turn of the century in the Netherlands. However, given the consistency of these findings with existing results, it seems likely that they are generalisable to other developed countries in a broader period.

Conclusion

This study extends our understanding of the pathways from parental SES to adolescent educational attainment. We found that, in the Netherlands, maternal education and paternal education levels, but not neighbourhood SES, were related to educational attainment. For the first time, we included concurrently cognitive ability, teacher assessment, and adolescent expectations as mediators of parental SES on educational attainment. All three mediators were significant, with cognitive ability and teacher assessment explaining almost 60% of the variance. Our findings show that these are important mechanisms for understanding how the socioeconomic environment in which adolescents develop is related to their educational and health trajectories.

Appendix

Table A6.1 Standardised effects of structural equation models for mediational pathways between SES (including neighbourhood SES) and educational attainment ($N = 2,814$)

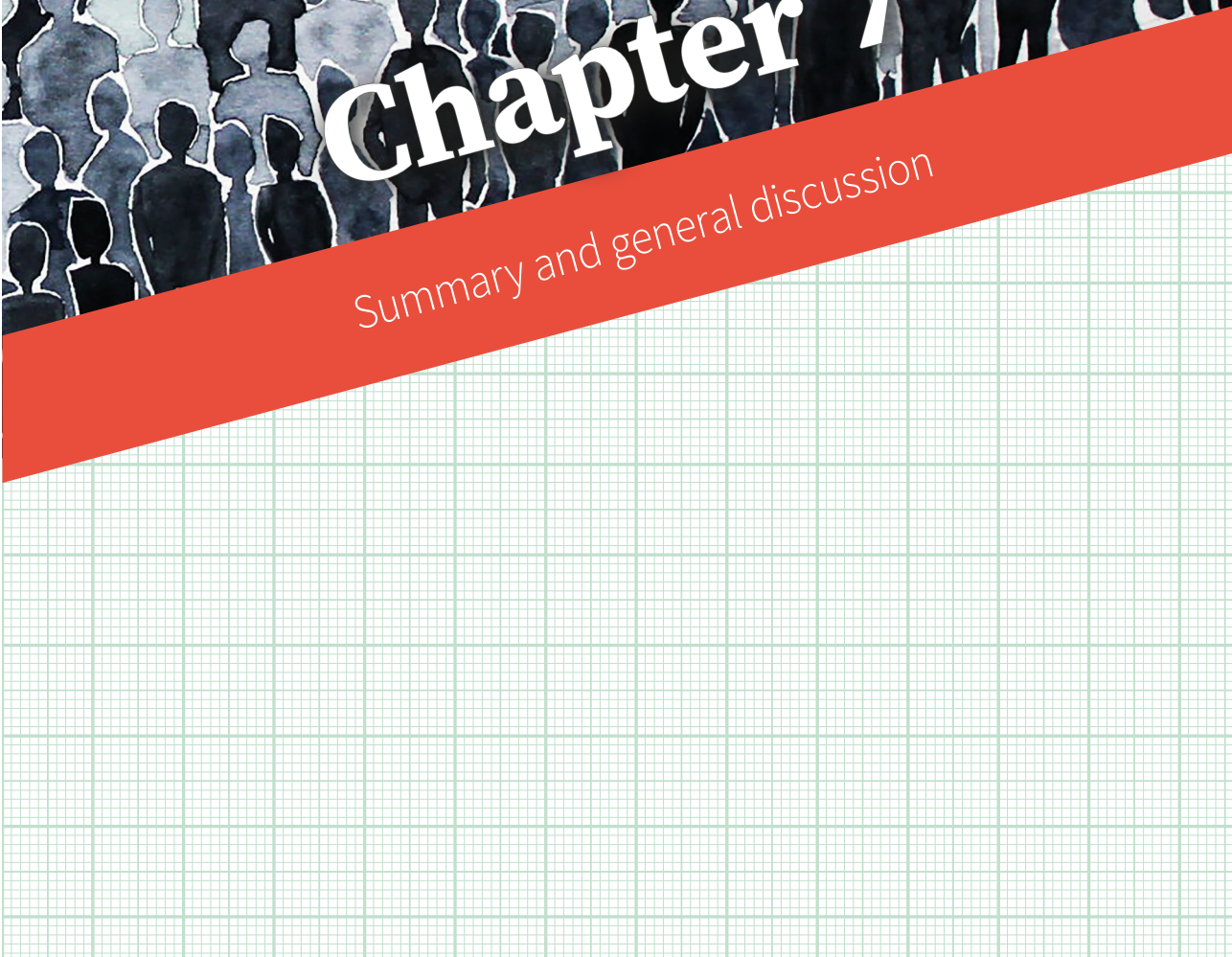
	Model 2a			Model 2b			Model 2c			Model 2d		
	<i>b</i> (SE)	<i>p</i>		<i>b</i> (SE)	<i>p</i>		<i>b</i> (SE)	<i>p</i>		<i>b</i> (SE)	<i>p</i>	
Formative SES	SES ← Maternal education	0.52 (0.05)	< .001	0.50 (0.05)	< .001		0.51 (0.05)	< .001		0.51 (0.05)	< .001	
	SES ← Paternal education	0.63 (0.05)	< .001	0.66 (0.04)	< .001		0.64 (0.05)	< .001		0.64 (0.04)	< .001	
	SES ← Neighbourhood SES	0.01 (0.05)	0.840	-0.01 (0.04)	0.833		-0.01 (0.05)	0.835		0.01 (0.04)	0.907	
SES → Attainment Pathways	SES → Cognitive ability	0.35 (0.02)	< .001							0.35 (0.02)	< .001	
	Cognitive ability → Educational attainment	0.69 (0.02)	< .001							0.42 (0.05)	< .001	
	SES → Teacher assessment			0.41 (0.02)	< .001					0.41 (0.02)	< .001	
Teacher assessment → Educational attainment	Teacher assessment → Educational attainment			0.70 (0.02)	< .001					0.33 (0.04)	< .001	
	SES → Educational expectations						0.07 (0.03)	0.006		0.07 (0.03)	0.006	
	Educational expectations → Educational attainment						0.15 (0.03)	< .001		0.08 (0.03)	0.003	
Mediation Tests	SES → Educational attainment	0.24 (0.02)	< .001	0.19 (0.02)	< .001		0.47 (0.02)	< .001		0.19 (0.02)	< .001	
	SES → Cognition → Attainment	0.24 (0.02)	< .001							0.15 (0.02)	< .001	
	SES → Teacher → Attainment			0.29 (0.02)	< .001					0.14 (0.02)	< .001	
SES → Expectations → Attainment						0.01 (0.00)	0.016		0.01 (0.00)	0.047		





Chapter 7

Summary and general discussion



Chapter 7

This dissertation investigated the social gradient in adolescent mental health. It explored the *what*, *why*, and *for whom* of the social gradient – shedding light on *what* this social gradient is, adding to the knowledge of *why* SES matters for adolescent mental health, and examining *for whom* the social gradient is strongest and weakest. Finally, the dissertation considered why parental SES matters for adolescent educational level. This discussion first summarises the main findings of the empirical chapters, then identifies key scientific and practical implications of these findings, while also suggesting directions for future research. A summary of each chapter is included in Table 7.1.

Summary of results

Chapter 2 primarily addressed the first aim of this dissertation: to understand how strongly different indicators of SES are associated with adolescent mental health. Using five representative samples of adolescents in the Netherlands (aged 11-16), collected across 16 years, this study established that parental SES (operationalised as family affluence in Chapters 2-5 of this dissertation), subjective SES, and adolescent educational level were all associated with adolescent mental health. There were small positive associations between both parental SES and subjective SES and life satisfaction, and small negative associations between parental SES and peer problems, between subjective SES and emotional symptoms, and between a high adolescent educational level (compared to a low educational level) and both hyperactivity and peer problems. There was also a medium-sized negative association between a high adolescent educational level and conduct problems. In a multivariate model, when all three SES indicators were taken into account, associations between parental SES and adolescent mental health attenuated to become negligible in size, while the results noted above for subjective SES and adolescent educational level remained, such that adolescents with higher subjective SES reported fewer emotional symptoms and higher life satisfaction, and adolescents with a higher educational level reported less hyperactivity, fewer conduct problems, and fewer peer problems than adolescents with a lower educational level.

Furthermore, the positive association between parental SES and life satisfaction and the negative association between parental SES and adolescent mental health problems (specifically, emotional symptoms, conduct problems, and psychosomatic complaints) was buffered by subjective SES, such that these associations were stronger for adolescents with lower subjective SES compared to adolescents with higher subjective SES. There was no evidence that adolescent educational level moderated the association between parental SES and adolescent mental health. This study also found no evidence that associations between SES and adolescent mental health changed between 2001 and 2017, indicating persistence in the strength of the social gradient over time.

The research reported in **Chapter 3** used a sample of adolescents (aged 16+) attending vocational schools in Utrecht, the Netherlands. Regarding the first aim of this dissertation, as in Chapter 2, there was a small negative association between subjective

SES and emotional symptoms. Two results differed slightly from those for Chapter 2: there was a small negative associations between parental SES and emotional symptoms and a small negative associations between subjective SES and peer problems (these two associations were negligibly small in size in Chapter 2). There was a small negative association between parental SES and emotional symptoms, and small negative associations between subjective SES and both emotional symptoms and peer problems. In the multivariate mediation model, where both SES indicators were taken into account, associations between parental SES and adolescent mental health attenuated and disappeared, while the results noted above for subjective SES remained. This chapter also provided relevant insights for the second aim of this dissertation, which was to understand mediators of the pathway from SES to adolescent mental health. Both personal and general belief in a just world (BJW) mediated the association between subjective SES and adolescent mental health: adolescents with lower subjective SES had lower personal and general BJW, which were, in turn, associated with more emotional symptoms and more peer problems. Furthermore, this chapter also investigated moderation of the social gradient, the third aim of this dissertation. The results showed only slight evidence of moderation: at higher levels of personal BJW, there was a stronger negative association between subjective SES and peer problems than at lower levels of personal BJW. No such moderation by personal BJW was found for the three other indicators of adolescent mental health in the study, nor did general BJW moderate the association between SES and adolescent mental health.

Chapter 4 was based on data from the same adolescent sample as Chapter 3, extended to three measurement points each six months apart. This chapter provided insights into the first and second aims of this dissertation by investigating longitudinal associations between subjective SES, adolescents' social cognitions (self-esteem, sense of control, and optimism), and adolescent mental health. Concerning the first aim, adolescents with lower subjective SES reported more emotional symptoms and peer problems concurrently, and an increase in peer problems six months later. Regarding mediation, there were concurrent positive associations between subjective SES and all three social cognitions, and concurrent negative associations between adolescents' social cognitions and all four indicators of mental health problems. However, longitudinal mediation was only seen through sense of control, and for only two indicators of adolescent mental health problems: adolescents with lower subjective SES reported a decrease in sense of control six months later, and lower sense of control, in turn, predicted increases in emotional symptoms and hyperactivity six months later. Subjective SES predicted neither self-esteem nor optimism six months later, though both social cognitions predicted later decreases in adolescent mental health problems. In a multivariate model, none of the three social cognitions independently mediated associations between subjective SES and adolescent mental health.

Chapter 5 addressed the first and third aims of this dissertation by investigating cross-country differences in the social gradient across 30 European countries. Overall, adolescents with lower parental SES reported lower life satisfaction and more

psychosomatic complaints, but in some countries these associations between parental SES and mental health were absent or even slightly reversed. Adolescents with lower subjective SES reported lower life satisfaction and more psychosomatic complaints in *all* countries, with these associations ranging across countries from negligible to medium in size. Associations between both SES indicators and a third indicator of mental health, aggressive behaviour, were negligible in most countries. Country-level strength of meritocratic beliefs (the extent to which people in a country generally believe that people get what they deserve) moderated the associations between both SES indicators and mental health. In countries with stronger meritocratic beliefs, the associations between parental SES and adolescent mental health (life satisfaction and psychosomatic complaints) were stronger than in countries with weaker meritocratic beliefs. In contrast, associations between subjective SES and adolescent mental health (life satisfaction and more psychosomatic complaints) were stronger in countries with weaker meritocratic beliefs than in countries with stronger meritocratic beliefs. These findings were independent from country-level national income, income inequality, and welfare expenditure.

Finally, **Chapter 6** used a longitudinal dataset to understand whether parental SES (indicated by maternal education and paternal education) and neighbourhood SES were associated with adolescent educational level (at age 17). Both higher maternal education and higher paternal education were independently associated with higher adolescent educational level, but there was no association between neighbourhood SES and adolescent educational level, nor evidence of interactions between maternal education and paternal education in predicting adolescent educational level. Three factors – adolescent cognitive ability and primary school teacher assessment (both key features of the tracking process in the Dutch educational system), and adolescent educational expectations – mediated the association between parental SES and adolescent educational level: parental SES was positively associated with these three factors, and they, in turn, were positively associated with adolescent educational level. These mediational effects remained when all three factors were included in a multivariate model, with over a quarter of the total relation between parental SES and educational level explained by adolescent cognitive ability, a similar proportion explained by teacher assessments, and a much smaller proportion (<2%) by educational expectations.

Major findings and their theoretical and practical implications

There is a social gradient in adolescent mental health, but associations vary by SES indicator and the analytical approach

This dissertation found evidence supporting the concept of the social gradient in adolescent mental health – in general, higher SES is associated with better mental health. However, the findings also add an important nuance: the strength of the association between SES and adolescent mental health depends upon the specific SES and adolescent mental health indicator examined, and upon whether univariate or

Multivariate analysis was conducted.

Regarding parental SES, adolescents with higher parental SES reported greater life satisfaction and fewer emotional symptoms. These associations between parental SES and adolescent mental health were small and were seen in several different samples in the Netherlands, in both early and late adolescents, and also found to be persistent over time, staying constant between 2001 and 2017. This association was also observed in a sample of adolescents from 30 European countries. These findings suggest that, even in countries with relatively high standards of living and strong welfare systems, where there are sufficient material resources to fulfil adolescents' needs, material resources generally still have small positive associations with adolescent mental health (cf., Mackenbach, 2012).

This dissertation also showed that higher subjective SES was associated with greater life satisfaction, fewer emotional symptoms, and fewer peer problems. These associations were consistent across several samples (with the slight exception that, in Chapter 2, the negative association between subjective SES and peer problems was negligible in size). The results support existing empirical research finding an association between subjective SES and (adolescent) mental health. With cross-sectional research, the direction of this association remains unclear, as it could be a confound based on personality traits, such as dispositional optimism, or due to reverse causation, whereby good mental health leads adolescents to perceive their SES position more favourably (Hoebel & Lampert, 2018). Therefore, the finding in Chapter 4 that higher subjective SES was associated with a decrease in peer problems six months later gives further weight to the notion that subjective SES precedes adolescent mental health (see also, E. Goodman et al., 2007). In sum, these results suggest that, alongside parental SES, the *perception* adolescents have of their SES is a second important indicator of SES to take into account when studying the social gradient in adolescent mental health (cf., Adler & Tan, 2017; E. Goodman et al., 2001; Wilkinson, 1999).

To fully put these findings for parental SES and subjective SES into context, it is important to also consider them in conjunction. The univariate association between subjective SES and adolescent mental health was *stronger* than the univariate association between parental SES and adolescent mental health, and this result was seen in all three chapters which included both SES indicators. How adolescents perceive their socioeconomic position appears to be more important to adolescent mental health than their parents' material resources. Two additional findings are also relevant to this point: associations between parental SES and adolescent mental health consistently attenuated when subjective SES was included in multivariate models; and there were small-to-medium-sized associations between parental SES and subjective SES. In combination, these results suggest that the association between parental SES and adolescent mental health may be partly mediated through subjective SES, whereby parental SES plays an important role in subjective SES, which, in turn, matters for mental health. Two cross-sectional studies have found that subjective SES mediates the path from parental SES to adolescent mental health (Moreno-Maldonado et al., 2019; Piko et

Table 7.1 Summary per chapter

	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
Research Questions	<ol style="list-style-type: none"> 1. Are three SES indicators (parental SES, subjective SES, and adolescent educational level) associated with adolescent mental health? 2. Are these associations independent? 3. Do subjective SES, and adolescent educational level, moderate the association between parental SES and adolescent mental health? 4. Have these associations (indicating the social gradient) changed from 2001 to 2017? 	<ol style="list-style-type: none"> 1. Are two SES indicators (parental SES and subjective SES) associated with adolescent mental health? 2. Is the social gradient in adolescent mental health mediated by general Belief in a Just World (BJW) or personal BJW? 3. Is the social gradient in adolescent mental health moderated by general BJW or personal BJW? 	<ol style="list-style-type: none"> 1. Does subjective SES predict changes in adolescent mental health six months later? 2. Are three social cognitions – self-esteem, sense of control, and optimism – (longitudinal) mediators of the association between subjective SES and adolescent mental health? 3. Are any mediation effects of these three social cognitions independent? 	<ol style="list-style-type: none"> 1. Are two SES indicators (parental SES and subjective SES) associated with adolescent mental health? 2. Are these associations independent? 3. Does the social gradient in adolescent mental health vary across countries? 4. Does country-level strength of meritocratic beliefs moderate the social gradient in adolescent mental health? 	<ol style="list-style-type: none"> 1. Are three SES indicators (maternal education, paternal education, and neighbourhood SES) associated with adolescent educational level? 2. Are three mechanisms (cognitive ability, teacher assessment, and educational expectations) mediators of the association between SES and adolescent educational level? 3. Are these mediation effects independent?
Methods	<ul style="list-style-type: none"> ▪ Nationally representative adolescents (aged 11-16; $n = 27,020$) ▪ The Netherlands HBSC study: 2001, 2005, 2009, 2013, 2017 ▪ Linear regression (SPSS) 	<ul style="list-style-type: none"> ▪ Adolescents (aged 16+) at vocational school (Utrecht, the Netherlands; $n = 1,130$) ▪ T1 of the Youth Got Talent project (2019/20) ▪ Path modelling (R) 	<ul style="list-style-type: none"> ▪ Adolescents (aged 16+) at vocational school (Utrecht, the Netherlands; $n = 1,429$) ▪ T1-T3 of the Youth Got Talent project (2019/20, mid 2020, 2020/21) ▪ Longitudinal mediation (R) 	<ul style="list-style-type: none"> ▪ Nationally representative adolescents (aged 11-15; $n = 131,101$) ▪ 30 European countries, HBSC study: 2013 ▪ Multilevel regression (Mplus) 	<ul style="list-style-type: none"> ▪ Adolescents in the Netherlands (longitudinal data at ages 11, 14, 17; $n = 2,814$) ▪ PIAMA (participants born in 1996/97) ▪ Logistic regression (SPSS) / Path modelling (Mplus)

Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
<p>1. All three SES indicators were associated with adolescent mental health (positively with life satisfaction, negatively with mental health problems).</p> <p>2. Subjective SES and adolescent educational level, but not parental SES, were independently associated with adolescent mental health.</p> <p>3. High subjective SES buffered the association between parental SES and adolescent mental health.</p> <p>4. There was no linear change in the social gradient (i.e., in any associations between SES and mental health indicators) between 2001 and 2017.</p>	<p>1. Parental SES was negatively associated with emotional symptoms, while subjective SES was negatively associated with emotional symptoms and peer problems.</p> <p>2. Subjective SES, but not parental SES, was independently negatively associated with these adolescent mental health problems.</p> <p>3. Both personal BJW and general BJW mediated the association between subjective SES and adolescent mental health.</p> <p>4. Higher personal BJW amplified the negative association between subjective SES and peer problems.</p>	<p>1. Subjective SES was associated with an increase in peer problems six months later.</p> <p>2. Subjective SES was concurrently positively associated with social cognitions, and social cognitions were concurrently negatively associated with mental health problems.</p> <p>3. The social gradient in mental health was longitudinally mediated by sense of control, but not by self-esteem nor optimism.</p> <p>4. In a multivariate model with all three social cognitions, none independently mediated the social gradient.</p>	<p>1. Both SES indicators were associated with adolescent mental health (positively with life satisfaction, negatively with psychosomatic complaints, but not with aggressive behaviour).</p> <p>2. Subjective SES, but not parental SES, was independently associated with mental health.</p> <p>3. Associations varied: in some countries there was no parental SES association; subjective SES associations were found in all countries, ranging in size.</p> <p>4. Stronger country-level meritocratic beliefs: increased associations between parental SES and mental health, and decreased associations between subjective SES and mental health.</p>	<p>1. Maternal education and paternal education, but not neighbourhood SES, were positively associated with adolescent educational level.</p> <p>2. The association between SES (a composite of maternal and paternal education) and educational level was mediated by cognitive ability, teacher assessment, and educational expectations.</p> <p>3. The mediation effects were independent, with the association largely mediated by cognitive ability and teacher assessment.</p>
<p>Main findings</p>	<p>In the Netherlands, BJW mediates the social gradient: adolescents with lower subjective SES have lower personal BJW and general BJW, and this can partly explain their worse mental health.</p> <p>Furthermore, for adolescents with high levels of personal BJW, their subjective SES is a stronger gauge of peer problems.</p> <p>Thus, adolescents' beliefs about society – specifically, whether people get what they deserve – can both mediate and moderate the social gradient in adolescent mental health.</p>	<p>In the Netherlands, controlling for stability in the constructs over time, subjective SES predicted later changes in peer problems.</p> <p>Sense of control is a longitudinal mediator of the association between subjective SES and adolescent mental health. Additionally, concurrent associations between subjective SES, self-esteem, optimism, and mental health problems suggest social cognitions may be a thus-far overlooked mediator of the social gradient in adolescent mental health.</p>	<p>Across 30 European countries, subjective SES was more consistently and positively associated with adolescent mental health than parental SES.</p> <p>The social gradient in adolescent mental health varies with the strength of country-level meritocratic beliefs. The interplay among meritocratic beliefs, SES, and adolescent mental health was complex, and depended on the SES indicator.</p> <p>More understanding of the mechanisms connecting meritocratic beliefs, SES, and mental health is warranted.</p>	<p>In the Netherlands, the education levels of both parents matter for adolescent educational level.</p> <p>Cognitive ability and teacher assessment (key features of the tracking process in the Dutch educational system) explained almost 60% of the variance of the association between parental SES and adolescent educational level; adolescents' educational expectations also played a small mediational role in this association.</p>
<p>Conclusion</p>	<p>In the Netherlands, there is a small social gradient in adolescent mental health. Subjective SES and adolescent educational level are important SES indicators in adolescence which predict mental health.</p> <p>For adolescents with high subjective SES, parental SES was no longer important for their mental health. Thus, the interplay between SES indicators is important for understanding adolescent mental health.</p> <p>Associations between SES and adolescent mental health have been consistent in recent years.</p>	<p>In the Netherlands, BJW mediates the social gradient: adolescents with lower subjective SES have lower personal BJW and general BJW, and this can partly explain their worse mental health.</p> <p>Furthermore, for adolescents with high levels of personal BJW, their subjective SES is a stronger gauge of peer problems.</p> <p>Thus, adolescents' beliefs about society – specifically, whether people get what they deserve – can both mediate and moderate the social gradient in adolescent mental health.</p>	<p>Across 30 European countries, subjective SES was more consistently and positively associated with adolescent mental health than parental SES.</p> <p>The social gradient in adolescent mental health varies with the strength of country-level meritocratic beliefs. The interplay among meritocratic beliefs, SES, and adolescent mental health was complex, and depended on the SES indicator.</p> <p>More understanding of the mechanisms connecting meritocratic beliefs, SES, and mental health is warranted.</p>	<p>In the Netherlands, the education levels of both parents matter for adolescent educational level.</p> <p>Cognitive ability and teacher assessment (key features of the tracking process in the Dutch educational system) explained almost 60% of the variance of the association between parental SES and adolescent educational level; adolescents' educational expectations also played a small mediational role in this association.</p>

al., 2013), but future longitudinal research would be useful to more stringently test this mediational hypothesis.

These findings, which show the importance of subjective SES for adolescent mental health, point to the need for more insight into this concept, raising the question of what adolescents base their judgements upon when determining their subjective SES. Little is known about which individual and contextual factors affect how adolescents perceive their family's SES. One perspective suggests that subjective SES is based on making social comparisons and is thus a measure of relative position in the social hierarchy. Under this perspective, perceiving oneself to be relatively disadvantaged compared to one's peers leads to stress and social anxiety, and ultimately worse mental health (E. Goodman et al., 2001; Melita et al., 2021). A second perspective on subjective SES, which is not exclusive of the relative position hypothesis and may complement it, suggests subjective SES is a cognitive average of various markers of SES (Singh-Manoux et al., 2005). From this perspective, subjective SES takes into account multiple factors – such as family affluence, parental educational level, and parental occupational level (Krieger et al., 1997) – and reflects a judgement of the importance of each factor to the individual's position in society. This perspective also offers an explanation for the stronger association, seen in this dissertation, between subjective SES and adolescent mental health, compared to between parental SES and adolescent mental health. When adolescents report their subjective SES, they may be taking into account SES markers over and above family affluence, the measure of parental SES used in these analyses. Further weight for this idea is given by studies showing that parental SES markers such as parental educational and occupational level are associated with subjective SES (E. Goodman et al., 2007; Moreno-Maldonado et al., 2018), and also associated with adolescent mental health, above and beyond family affluence (Iversen & Holsen, 2008; Koivusilta et al., 2006; Reiss et al., 2019). Future studies of the social gradient in adolescent mental health with multiple parental SES indicators could test this hypothesis.

One further result seen in this dissertation adds an alternative perspective to the interrelation between parental SES and subjective SES in their associations with adolescent mental health. Chapter 2 showed that subjective SES can also buffer the association between parental SES and adolescent mental health: for adolescents with lower subjective SES there was a positive association between parental SES and mental health, whereas for adolescents with higher subjective SES there was no such association (or it was only negligible in size). This result, also seen in a recent study of adolescents in Norway (Bøe et al., 2019), suggests that the effects of parental SES and subjective SES on adolescent mental health depend on each other. Perhaps higher subjective SES can (also) be a psychosocial resource that weakens the link between the stress and adversity of having low parental SES and adolescent mental health (Matthews & Gallo, 2011). Researchers interested in understanding the social gradient in adolescent mental health should consider parental SES and subjective SES indicators in combination; it is in considering the interplay between the perception of SES and (more objective indicators

of) parental SES that we may advance understanding of the social gradient in adolescent mental health.

Adolescent educational level also contributes to our understanding of the social gradient in adolescent mental health

In this dissertation, adolescent educational level was also shown to be associated with adolescent mental health, over and above the effects of parental SES and subjective SES. In the Netherlands, a country with strong and early educational stratification, such that academic tracking takes place at age 12 (Van de Werfhorst & Mijs, 2010), adolescents in lower (more vocational) educational tracks, compared to higher (more academic) tracks, reported more hyperactivity, more conduct problems, and more peer problems. These results, combined with those mentioned above, indicate that, for adolescents, both their own emerging SES (as indicated by adolescent educational level) and their parents' SES are associated with their mental health. This finding for mental health complements research on health risk behaviours showing that both SES of 'destination' (emerging SES) and SES of 'origin' (parental SES) are relevant indicators of the social gradient in adolescent health risk behaviours (Hagquist, 2007). This suggests that, for adolescents, both their own and their parents' positions in the societal hierarchy matter for mental health, complementing new research stressing the importance of conceptualising SES as a more dynamic concept (Phillips et al., 2020; Zilanawala et al., 2019). Future research on the social gradient in adolescent mental health could therefore benefit from including indicators of both emerging SES and parental SES.

Furthermore, this finding in the Netherlands that adolescent educational level was associated with adolescent mental health should be interpreted in light of a second result of this dissertation (also discussed below): the higher-educated their parents, the better the odds an adolescent has of attaining a higher educational level themselves. In combination, these results have implications for our understanding of the social gradient in adolescent mental health: another pathway from parental SES to adolescent mental health may be through adolescent educational level. Future research could test whether adolescent educational level is indeed a mediator of the social gradient in adolescent mental health. Research could also test possible mechanisms that may lead adolescents in higher educational tracks to have better mental health, such as through having a more supportive classroom climate, having fewer troubled peers, and gaining academic skills that can help with coping with stress (Delaruelle et al., 2019; Havas et al., 2010). However, the association between adolescent educational level and adolescent mental health may instead have an alternative explanation. The theory of health-related social selection suggests that mental health may influence educational level, because worse mental health during childhood (which persists into adolescence) can contribute to difficulties with coping in academic education and tracking into a lower educational level (Elstad, 2010). Longitudinal studies on the co-development of mental health and educational level during adolescence can help address the questions of how, and in which direction, these two concepts are associated.

Adolescents' psychological processes can mediate associations between SES and adolescent outcomes

This dissertation found evidence that subjective SES was positively associated with adolescent psychological processes, and that these processes were, in turn, positively associated with mental health. Specifically, adolescents with higher subjective SES had higher sense of control and more positive beliefs that the world was just, and these processes were associated with fewer emotional symptoms and peer problems. Several theories suggest that adolescents with higher subjective SES feel they have sufficient material and social resources, and may perceive less adversity and unpredictability in their lives, than their peers with lower SES, and consequently develop more positive social cognitions and beliefs about their social context (Heberle & Carter, 2015; Stephens et al., 2014). In turn, adolescents' social cognitions and beliefs about the world appear to be important for their mental health, specifically emotional symptoms and peer problems (Heberle & Carter, 2015; S. R. L. Johnson et al., 2014), perhaps because positive psychological processes help adolescents seek and receive social support and enable them to cope effectively with stress and threat (c.f., Lipkus et al., 1996; Taylor & Brown, 1988). Future research which could replicate the findings that psychological processes mediate the association between subjective SES and adolescent mental health, explore this hypothesis with other SES indicators, and test potential mechanisms of these associations, is warranted.

Furthermore, this dissertation also showed that another indicator of adolescent psychological processes – adolescents' educational expectations – was a mediator of the pathway between parental SES and adolescent educational level. Although the size of this effect was small, the finding remained after controlling for cognitive ability and teacher recommendations and thus it supports further research into the role of adolescents' educational expectations (and other similar psychological processes, such as their aspirations and plans; S. R. L. Johnson et al., 2014; Massey et al., 2008; Nurmi, 1991) in the link between parental SES and adolescent educational level. Adolescents with higher SES (conceptualised in this chapter as higher educational level) may have more positive educational expectations because, as suggested above, they develop more positive psychological processes in general, due to facing relatively less adversity and instability than their peers with lower SES. Another, related, explanation is that higher SES parents act as 'expectancy socializers', encouraging and moulding their children's own expectations (Frome & Eccles, 1998). This dissertation also showed that positive educational expectations (over and above two other hypothesised pathways of cognitive ability and teacher assessments) were associated with higher educational level. Perhaps, similarly to the mechanisms suggested above for mental health, adolescents with more positive educational expectations are more likely to seek and receive social support and cope better with educational setbacks, which may increase their chances of completing a higher educational level (Massey et al., 2008).

Above all, these findings emphasise that research on mechanisms linking SES with adolescent outcomes could give further attention to adolescents' psychological

processes (Burger et al., 2020; Devenish et al., 2017). Despite increasing interest in the role of SES in shaping adults' psychological processes (Kraus et al., 2012; Sheehy-Skeffington, 2020; Stephens et al., 2014) there has been little research on this topic among adolescents. This is surprising, given that adolescence is a period of growing awareness and knowledge of the world and the socioeconomic environment (Almås et al., 2010; Flanagan et al., 2014). Adolescence is therefore a period when naïve beliefs about oneself and the world may come into sharp contrast with objective reality. The extent of (mis)match between beliefs and reality may become an important predictor of mental health (and other outcomes) during adolescence. For example, heightened awareness (for example, of systemic injustice) may lead adolescents to question previously unconsidered assumptions that the world is fair (Godfrey et al., 2019; E. Goodman et al., 2015), with implications for their mental health. Several theories (Pepper & Nettle, 2017; Stephens et al., 2014) and evidence (Godfrey et al., 2019; E. Goodman et al., 2015; Greenaway et al., 2015) suggest that adolescents whose beliefs are *too* unrealistic given their context (e.g., where they have little control over their outcomes, or because their world is not so just) become increasingly problematic for mental health. Future research on the social gradient in adolescent mental health could therefore investigate not only adolescents' psychological processes, but also explore whether these processes are an appropriate match for the social context.

Both adolescents' beliefs and societal beliefs can moderate the social gradient in adolescent mental health

This dissertation also considered the possibility that beliefs may be moderators of the social gradient in adolescent mental health. Specifically, it addressed whether adolescents' beliefs about the justness of the world and societal-level meritocratic beliefs (the extent to which beliefs that the world is just are prevalent in society) influence the strength of the social gradient in mental health. Higher personal BJW *amplified* the negative association between subjective SES and peer problems. In other words, believing that “the world is fair, and I get what I deserve”, was a risk factor that increased the social gradient in peer problems. Furthermore, compared to countries with weaker meritocratic beliefs, in countries with stronger meritocratic beliefs there was a stronger positive association between parental SES and adolescent mental health. Adolescents with higher personal BJW and adolescents in countries with stronger meritocratic beliefs may be more likely to believe that people have opportunities to achieve whatever they want, and thus that fixed, inherent, individual characteristics (rather than external, structural factors) determine SES (Goudeau & Cimpian, 2021; Madeira et al., 2019). Holding such internal attributions and considering SES to be one's own personal responsibility is expected to intensify the relationship between SES and mental health because adolescents with higher SES may feel proud of their SES position, while adolescents with lower SES may feel ashamed of theirs (Bosma et al., 2012, 2015; Darnon et al., 2018; Pratto et al., 2006). Country-level meritocratic beliefs may also influence adolescent mental health through affecting adolescents' relationships.

Teachers and peers, important actors in the adolescent microsystem (Bronfenbrenner & Morris, 2007), can be expected to internalise meritocratic beliefs in countries where they are prevalent, so, in such countries, adolescents with higher parental SES may find they are treated with respect, while adolescents with lower parental SES may receive less respect, and even be stigmatised. Studies have shown that adults in the Netherlands with lower SES (measured by receipt of social benefits) experience stigmatisation (Simons et al., 2018), and there is robust evidence stigmatisation can be a risk factor for mental health problems (Hatzenbuehler et al., 2013), so adolescents with lower SES may too have worse mental health because they experience stigmatisation, and this mechanism may be exacerbated in countries with stronger meritocratic beliefs.

However, another result adds an additional level of complexity: compared to countries with weaker meritocratic beliefs, in countries with stronger meritocratic beliefs there was a weaker association between subjective SES and adolescent mental health. Possibly, adolescents in countries with stronger meritocratic beliefs may feel more in control of their own fate and capable of achieving their goals (Laurin et al., 2011; McCoy et al., 2013; Shane & Heckhausen, 2013) and these may be important stress-buffering mechanisms (Bandura et al., 1999; Day & Fiske, 2019; Taylor & Seeman, 1999). However, this explanation could also apply to BJW at the individual-level (adolescents with higher personal BJW may feel more in control of their own fate), and yet the moderation effect of personal BJW on the social gradient in adolescent mental health, as discussed above, was in the opposite direction (strengthening the gradient). In sum, the combination of results in these two dissertation chapters remains puzzling and raises several questions.

Further research is needed to replicate these findings and to advance different explanations for the results, perhaps by advancing different hypotheses for the specific SES indicator (parental SES versus subjective SES). For example, the proposed effect of meritocratic beliefs on experiencing stigmatisation, discussed above, is more plausible for parental SES than subjective SES, because parental SES is the more likely of the two to be outwardly visible to teachers and peers (Frank, 2013). Future research (perhaps across a broad range of countries) could also investigate whether adolescents attribute their own SES, as well as that of other adolescents, to individual or structural factors. While there is a growing body of work in this area (e.g., Elenbaas et al., 2020; Flanagan et al., 2014; Godfrey et al., 2019), more could be done to connect the literature on how attributions for SES develop during adolescence with research on the social gradient in adolescent mental health. A final consequence of this combination of results is to emphasise the importance of studying both individual- and contextual-level beliefs about the justness of the world: having a higher personal BJW does not necessarily have the same association with mental health as living in a country where most people have high levels of BJW (Diez-Roux, 1998; Duru-Bellat & Tenret, 2012; García-Sánchez et al., 2018).

Teacher assessments play a significant role in the association between parental SES and adolescent educational level

This dissertation added to the literature on how mediators at different levels of the ecological system contribute to explaining the positive association seen in the Netherlands between parental SES and adolescent educational level. In the Dutch educational system, adolescents aged 12 take a cognitive ability test and receive teacher assessments (based on cognitive ability, non-cognitive abilities and judgements about their home situation) and these are key features that contribute to tracking into different educational trajectories. This dissertation found that, even after controlling for cognitive ability, teacher recommendations were important mediators of the association between parental SES and adolescent educational level. This finding suggests that teachers, consciously or unconsciously, are responding to adolescents' parental SES and thus contributing to differences in educational outcomes for adolescents from different SES backgrounds. Perhaps teachers give higher educational recommendations to adolescents with higher parental SES because they have evidence that these adolescents have higher self-control, academic motivation, and the ability to plan (Boone & Van Houtte, 2013; Stephens et al., 2014), or perhaps they assume these academic traits are possessed by adolescents with higher parental SES regardless of evidence for or against this proposition. In the recommendations they make, teachers may also be identifying those adolescents with positive social cognitions (such as self-esteem, sense of control, and optimism, which this dissertation showed to be associated with higher parental SES), because teachers may perceive such positive social cognitions to be important for success in more academic educational tracks (see also, Burger et al., 2020; Holtmann et al., 2021). Clearly, further research attention to why teachers give higher educational recommendations to adolescents with higher parental SES is warranted, perhaps using methods (such as experimental research) that can help distinguish what motivates these recommendations and how consciously teachers are aware of these motivators.

Strengths and limitations

This dissertation has several strengths. First, the use of several different samples from the Netherlands (all of over 1,000 adolescents) and one international sample (of over 100,000 adolescents) ensures several conclusions can be drawn on the basis of results that have been replicated. One key finding, that subjective SES may be more important for adolescent mental health than parental SES, was consistent across time (between 2001 and 2017; Chapter 2), across developmental period (younger adolescents in Chapters 2 and 5, older adolescents in Chapters 3 and 4), and across countries (Chapter 5). Second, the inclusion of several mental health indicators – both of positive mental health and mental health problems – adds richness to the findings. The results showed that the strength of associations with SES differ slightly across mental health indicators, and suggest that future research on the social gradient can provide a more complete picture if it includes multiple indicators of mental health wherever possible. Third, during the process of assembling this dissertation, I adopted key principles of open science,

by publishing pre-registered analysis plans and using open source software for several chapters, and publishing studies in open access format. Fourth, this dissertation used insights from a wide range of disciplines, studying a core public health concept – the social gradient in adolescent mental health – using the longitudinal modelling found in development and life-course studies, and applying theories from social, health, and educational psychology, as well as sociology, economics, and geosciences.

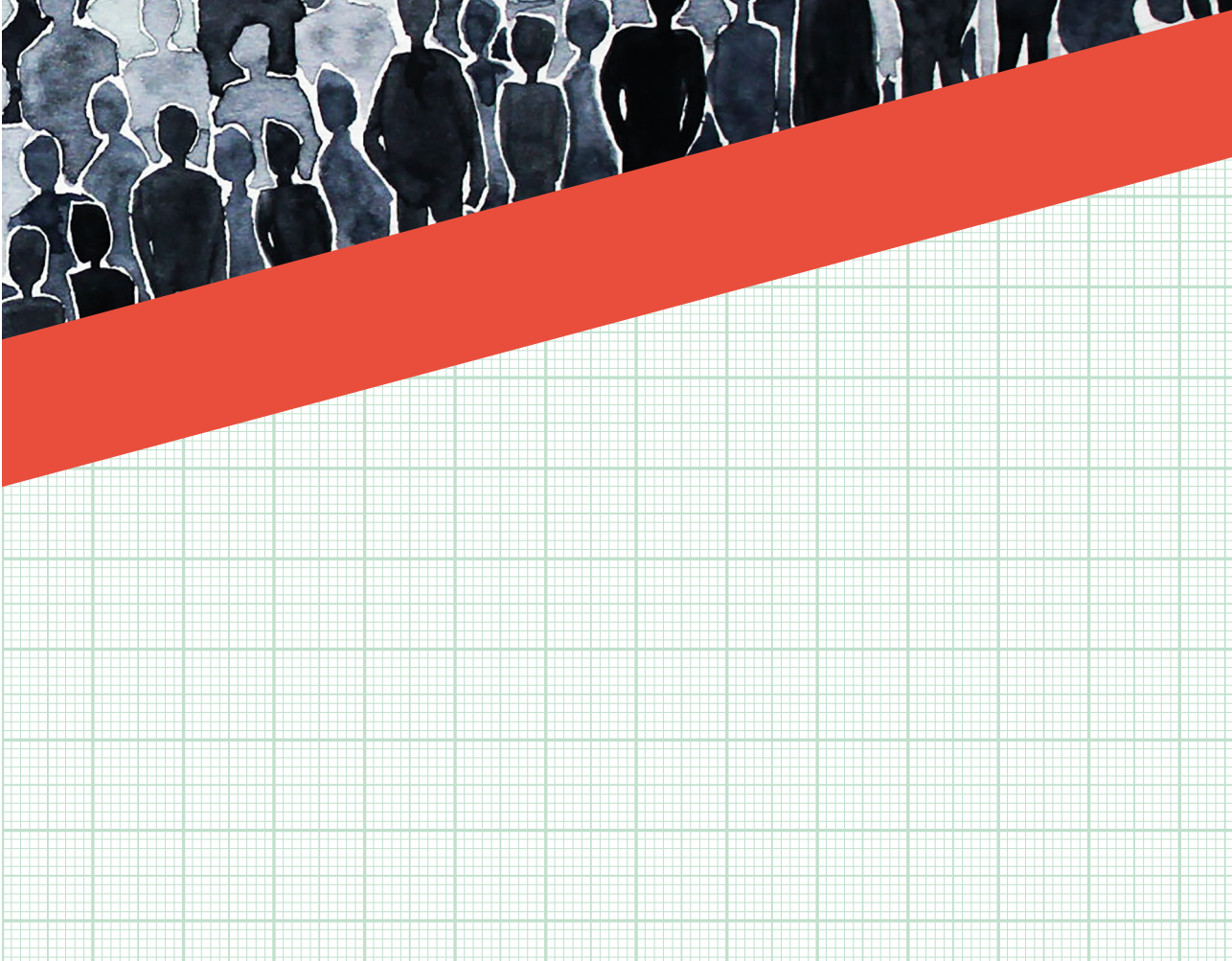
This dissertation also has several limitations. First, although it included longitudinal data in Chapters 4 and 6, most chapters were based on cross-sectional data only. Without being able to distinguish the temporal order of relations between variables, claims of causality can only be made very cautiously; longitudinal and experimental studies would help with making such claims in the future with more confidence. Nevertheless, cross-sectional findings, such as those included in Chapters 2, 3, and 5 of this dissertation, can still provide important insights, including into time trends. Second, the samples all have limitations and the findings in this dissertation may not generalise to all populations. In particular, though the samples were socioeconomically diverse, results may not be applicable to adolescents with very low levels of parental SES, who are most likely to have been under-sampled from the target population and to have dropped out of longitudinal datasets (Fakkkel et al., 2020). Even the data in the HBSC study (used in Chapters 2 and 5), which is as close to being nationally-representative as possible, is missing adolescents not attending school from its study population. Furthermore, the bulk of the findings apply to adolescents growing up in the Netherlands. Chapter 5 helps put these findings in the context of other European countries with high standards of living, but the conclusions drawn may not apply to adolescents in other continents, especially those in countries with much lower standards of living. Third, this dissertation has primarily focussed on the important role played by adolescents themselves in the social gradient, but this focus should not detract from the emphasis given in the ecological systems approach to how adolescent development takes place within a macro-level context. Attention solely on adolescents' psychology risks promoting an ideology of individual responsibility (McLeroy et al., 1988) and in turn minimising the role played by societal structures (such as capitalism and neoliberalism) that maintain SES inequality and contribute to health inequalities (Lamont, 2018; Marmot, 2020; Rapa & Geldhof, 2020). Further attention could be given to matters of power, politics and ideology (Beckfield & Krieger, 2009), including the exploration of how these matters interact with adolescent psychological processes in shaping the social gradient in adolescent mental health.

General conclusion

This dissertation set out to fill in a number of gaps regarding what is known about the social gradient in adolescent mental health. Several major findings stood out. First, subjective SES and adolescent educational level were more strongly associated with mental health than parental SES was, showing that how adolescents *perceive* their SES and their *own emerging* SES are both important SES indicators in adolescence. Second, adolescents' psychological processes mediated the social gradient in adolescent mental

health: adolescents with higher subjective SES had higher sense of control and more positive beliefs that the world was just, and these processes were associated with fewer emotional symptoms and peer problems. Thirdly, adolescents psychological processes can also moderate the social gradient; holding personal beliefs that the world is just may amplify the social gradient in peer problems. Above all, the results emphasise that better understanding of the what, why, and *for whom* of the social gradient in adolescent mental health requires deeper engagement with adolescents themselves and recognition that SES can ‘get into the head’ of adolescents.





Samenvatting (Summary in Dutch)

Inleiding

Het verbeteren van de mentale gezondheid van adolescenten kan op drie manieren nuttig zijn, namelijk om op korte termijn hulp te bieden aan adolescenten, om gezondheidsproblemen in de toekomst te voorkomen en om daarmee de vooruitzichten voor volgende generaties te verbeteren. Een beter begrip van hoe de mentale gezondheid van adolescenten gevormd wordt in interacties tussen hen en de context waarin zij leven, kan helpen de mentale gezondheid van adolescenten te verbeteren. Een belangrijke contextuele factor is sociaaleconomische status (SES). Er zijn sterke aanwijzingen dat SES gerelateerd is aan mentale gezondheid: hoe hoger de SES van een adolescent is, hoe beter zijn of haar mentale gezondheid is. Echter zijn drie belangrijke onbeantwoorde vragen met betrekking tot de relatie tussen SES en mentale gezondheid van adolescenten. *Hoe sterk* is de relatie tussen SES en de mentale gezondheid van adolescenten (hoe sterk zijn verschillende indicatoren van SES geassocieerd met de mentale gezondheid van adolescenten)? *Waarom* is SES van belang voor de mentale gezondheid van adolescenten (welke factoren verklaren het verband tussen SES en mentale gezondheid van adolescenten)? *Voor wie* is de relatie tussen SES en mentale gezondheid relatief sterk of zwak (welke factoren beïnvloeden de sociale gradiënt)? Het doel van dit proefschrift is antwoorden te geven op deze drie vragen, om zo beter te begrijpen waarom de relatie tussen SES en mentale gezondheid hardnekkig is, zelfs in landen waarin de welvaart hoog is en sociale voorzieningen uitgebreid zijn. In dit proefschrift is voornamelijk gekeken naar de relatie tussen SES en mentale gezondheid onder jongeren in Nederland. Daarnaast bevat dit proefschrift een hoofdstuk waarin internationale verschillen in deze relatie onderzocht worden, waardoor de bevindingen met betrekking tot Nederlandse jongeren in een internationale context kunnen worden geplaatst. Tenslotte heeft dit proefschrift ook een vierde doel, namelijk het onderzoeken van het verband tussen de SES van ouders en het onderwijsniveau van adolescenten.

Samenvatting van de resultaten

Aan de hand van vijf representatieve steekproeven onder adolescenten (11-16 jaar) in Nederland, verzameld in een periode van 16 jaar, werd in **hoofdstuk 2** het eerste doel (*wat* is de sociale gradiënt) behandeld. Drie SES-indicatoren (ouderlijke SES, subjectieve SES, en opleidingsniveau van de adolescent) waren positief geassocieerd met de mentale gezondheid van adolescenten. Adolescenten met hogere ouderlijke SES rapporteerden een hogere levenstevredenheid en minder emotionele problemen dan adolescenten met lagere ouderlijke SES. Adolescenten met hogere subjectieve SES rapporteerden een hogere levenstevredenheid, minder emotionele problemen, en minder problemen met leeftijdsgenoten dan adolescenten met lagere SES. Adolescenten in de hogere onderwijsniveaus rapporteerden minder gedragsproblemen, minder hyperactiviteit, en minder problemen met leeftijdsgenoten dan adolescenten in lagere onderwijsniveaus. De positieve associatie tussen ouderlijke SES en mentale gezondheid van adolescenten

varieerde met het niveau van subjectieve SES. Deze associatie tussen ouderlijke SES en mentale gezondheid van adolescenten was sterker voor adolescenten met een lagere subjectieve SES dan voor adolescenten met een hogere subjectieve SES. De relaties tussen SES en de mentale gezondheid van adolescenten waren vergelijkbaar tussen 2001 en 2017, wat erop wijst dat de relatie tussen SES en mentale gezondheid niet tot nauwelijks veranderd is in deze periode van 16 jaar.

In **hoofdstuk 3** is een steekproef gebruikt van adolescenten (16+) in het middelbaar beroepsonderwijs (MBO) in Utrecht. De resultaten wat betreft de relatie tussen SES en mentale gezondheid waren sterk vergelijkbaar met die van hoofdstuk 2. Dit hoofdstuk biedt ook inzicht in de tweede doelstelling van dit proefschrift (*waarom* bestaat er een relatie tussen SES en mentale gezondheid). Zowel persoonlijk geloof in een rechtvaardige wereld als een algemeen geloof in een rechtvaardige wereld zijn mechanismen die een rol spelen in het verband tussen subjectieve SES en de mentale gezondheid van adolescenten. Adolescenten met een lagere subjectieve SES hadden een lager persoonlijk geloof in een rechtvaardige wereld en algemeen geloof in een rechtvaardige wereld, hetgeen vervolgens geassocieerd was met meer emotionele problemen en problemen met leeftijdsgenoten. Dit hoofdstuk onderzocht ook de derde doelstelling van dit proefschrift (*voor wie* bestaat er een sociale gradiënt). Resultaten toonden aan dat bij hogere niveaus van persoonlijk geloof in een rechtvaardige wereld er een sterker negatief verband was tussen subjectieve SES en problemen met leeftijdsgenoten dan bij lagere niveaus van persoonlijk geloof in een rechtvaardige wereld.

In **hoofdstuk 4** zijn dezelfde data gebruikt als in hoofdstuk 3. De resultaten van dit hoofdstuk dragen in belangrijke mate bij aan de beantwoording van de tweede doelstelling van dit proefschrift doordat in dit hoofdstuk longitudinale associaties worden onderzocht tussen subjectieve SES, sociale cognities van adolescenten (zelfvertrouwen, gevoel van controle, en optimisme), en de mentale gezondheid van adolescenten. Adolescenten met een lagere subjectieve SES rapporteerden een afname in gevoel van controle zes maanden later. Een lager gevoel van controle voorspelde op zijn beurt een toename in emotionele problemen en hyperactiviteit zes maanden later.

Hoofdstuk 5 behandelde de eerste en derde doelstelling van dit proefschrift door de verschillen tussen landen in de relatie tussen SES en mentale gezondheid in 30 Europese landen te onderzoeken. Over het algemeen rapporteerden adolescenten met een lagere ouderlijke SES een lagere levenstevredenheid en meer psychosomatische klachten, hoewel dit niet in alle landen het geval was. Daarnaast rapporteerden adolescenten met een lagere subjectieve SES in *alle* landen een lagere levenstevredenheid en meer psychosomatische klachten. Ook kwam naar voren dat de mate waarin mensen in een land over het algemeen geloven dat mensen krijgen wat ze verdienen (hoe 'meritocratisch' het land is) de samenhang tussen beide SES-indicatoren en mentale gezondheid beïnvloedde, hoewel de manier waarop anders was voor ouderlijke SES dan voor subjectieve SES. In landen met een sterkere meritocratische overtuiging waren de verbanden tussen de ouderlijke SES en de mentale gezondheid van adolescenten sterker dan in landen met een zwakkere meritocratische overtuiging. Daarentegen waren

de verbanden tussen de subjectieve SES en de mentale gezondheid van adolescenten sterker in landen met een zwakkere meritocratische overtuiging dan in landen met een sterkere meritocratische overtuiging.

Hoofdstuk 6 maakte gebruik van een longitudinale dataset en vond dat zowel de opleiding van de moeder als die van de vader, maar niet de SES van de wijk, positief gerelateerd waren aan het onderwijsniveau van de adolescent. Drie factoren – de cognitieve vaardigheden van adolescenten (CITO-score), het advies van de basisschoolleerkracht en de onderwijsverwachtingen van adolescenten – dienden als verklaringen voor de samenhang tussen ouderlijke SES en het onderwijsniveau van adolescenten. Meer specifiek lieten de resultaten zien dat ouderlijke SES positief geassocieerd was met deze drie factoren en deze drie factoren vervolgens positief geassocieerd waren met het onderwijsniveau van adolescenten.

Belangrijkste resultaten en hun theoretische en praktische implicaties

De relatie tussen SES en mentale gezondheid van adolescenten bestaat, maar verschilt per SES-indicator en de analytische aanpak

Dit proefschrift bevestigt het idee dat hoe hoger de SES van een adolescent is, hoe beter zijn of haar mentale gezondheid is. De sterkte van deze samenhang hing af van de specifieke SES-indicator, waarbij de associatie tussen subjectieve SES en de mentale gezondheid van adolescenten sterker was dan de associatie tussen ouderlijke SES en de mentale gezondheid van adolescenten. Dit resultaat veronderstelt dat de *perceptie* van adolescenten over hun SES belangrijk is voor hun mentale gezondheid. Ook zijn er redenen om aan te nemen dat subjectieve SES een gedeeltelijke verklaring is voor de associatie tussen ouderlijke SES en mentale gezondheid van adolescenten. Verder onderzoek naar subjectieve SES is daarom nodig, met name naar welke individuele en contextuele factoren van invloed zijn op hoe adolescenten de SES van hun familie ervaren. Sociale vergelijkingentheorie suggereert dat subjectieve SES wordt gevormd door het maken van sociale vergelijkingen (bijvoorbeeld: “Ik ben rijker of armer dan mijn leeftijdgenoten”). Een ander, mogelijk complementair, theoretisch perspectief, namelijk het ‘Cognitive averaging’ principe, suggereert dat subjectieve SES gebaseerd is op het in acht nemen van verschillende indicatoren van SES (zoals de welvaart van het gezin, het opleidingsniveau van ouders of het beroep van ouders). Elk van deze indicatoren zouden op verschillende niveaus invloed kunnen hebben op het individu. Om meer inzicht te krijgen in de rol van sociale vergelijking en de verschillende indicatoren van SES op subjectieve SES is daarom van belang.

Het opleidingsniveau van adolescenten moet gezien worden als belangrijke indicator van SES

Dit proefschrift laat zien dat in Nederland, waar de meeste adolescenten voor hun 12-jarige leeftijd gefaciliteerd zijn voor een bepaald onderwijsniveau, het onderwijsniveau van adolescenten positief gerelateerd is aan hun mentale gezondheid (ook wanneer

gecontroleerd wordt voor de effecten van ouderlijke SES en subjectieve SES). Voor drie van de zes indicatoren van mentale gezondheid – gedragsproblemen, hyperactiviteit, en problemen met leeftijdsgenoten – rapporteerden adolescenten in lagere onderwijsniveaus een slechtere mentale gezondheid dan hun leeftijdsgenoten in hogere onderwijsniveaus. Het opleidingsniveau van adolescenten staat niet los van hun toekomstige SES, dus dit proefschrift suggereert dat de eigen positie van adolescenten in de maatschappelijke hiërarchie, en die van hun ouders, beiden van belang zijn voor de mentale gezondheid van adolescenten. Toekomstig onderzoek zou kunnen testen waarom adolescenten in hogere onderwijsniveaus een betere mentale gezondheid rapporteren. Een mogelijke verklaring zou gevonden kunnen worden in het meer ondersteunende leerklimaat in hoger onderwijstrajecten of in het contact met adolescenten die minder mentale problemen ervaren. Een andere mogelijke verklaring zou betrekking kunnen hebben op de kansen van adolescenten in hogere onderwijstrajecten om vaardigheden te ontwikkelen die helpen bij het omgaan met stress. Een alternatief perspectief, de theorie van gezondheidsgerelateerde sociale selectie, suggereert dat adolescenten met psychische problemen naar een lager opleidingsniveau zakken omdat ze worstelen met de vereisten of verwachtingen op academische instellingen.

Psychologische processen kunnen de samenhangen tussen SES en uitkomsten van adolescenten verklaren

Uit de resultaten blijkt dat adolescenten met een hogere subjectieve SES een betere mentale gezondheid hebben, omdat zij over positievere psychologische processen beschikken - met name een sterker gevoel van controle en overtuigingen dat de wereld rechtvaardig is. Verder laten adolescenten met een hogere ouderlijke SES betere onderwijsresultaten zien, gedeeltelijk omdat zij hogere onderwijsaspiraties hebben. Kortom, het hebben van een hogere SES kan adolescenten helpen positievere manieren te ontwikkelen om zichzelf en de wereld te zien, en dit kan vervolgens een betere mentale gezondheid stimuleren en onderwijsresultaten versterken. Toekomstig onderzoek zou kunnen proberen deze bevindingen te repliceren, bijvoorbeeld in een steekproef met studenten van meerdere onderwijsniveaus. Daarnaast is de adolescentie een periode waarin overtuigingen over zichzelf en de wereld in schril contrast kunnen staan met de objectieve realiteit. Om die reden zou er in toekomstig onderzoek ook gekeken kunnen worden of een sterkere discrepantie tussen de eigen overtuigingen van een adolescent en de objectieve realiteit bijdraagt aan mentale gezondheidsproblemen.

Overtuigingen (zowel van de adolescent als van de samenleving) kunnen de relatie tussen SES en mentale gezondheid van adolescenten veranderen

De positieve relatie tussen SES en de mentale gezondheid van adolescenten was sterker voor adolescenten met een sterker persoonlijk geloof in een rechtvaardige wereld (“de wereld is eerlijk, en ik krijg wat ik verdien”) dan voor adolescenten met een zwakker geloof hierin. Bovendien was de relatie tussen ouderlijke SES en de mentale gezondheid

van adolescenten sterker in landen met een sterkere meritocratische overtuiging (landen waar mensen over het algemeen geloven dat mensen krijgen wat ze verdienen), hoewel deze relatie in deze landen daarentegen relatief beperkt was voor een tweede indicator van SES, namelijk subjectieve SES. De combinatie van deze resultaten roept vragen op. Geloven adolescenten met een sterker persoonlijk geloof in een rechtvaardige wereld en wonend in landen met een sterkere meritocratische overtuiging dat SES hun eigen persoonlijke verantwoordelijkheid is (wat ertoe kan leiden dat adolescenten met een hogere SES zich relatief trots voelen en adolescenten met een lagere SES zich bijna schamen voor hun sociale positie)? Of hebben adolescenten met een sterkere persoonlijke geloof in een rechtvaardige wereld en wonend in landen met een sterkere meritocratische overtuiging het gevoel meer controle te hebben over hun eigen lot en in staat te zijn hun doelen te bereiken, wat kan helpen als buffer tegen stress voor adolescenten met een lagere SES? Voor toekomstig onderzoek is het dan ook interessant om te onderzoeken welk mechanisme hier van kracht is.

Beoordelingen van leerkrachten spelen een belangrijke rol in het verband tussen ouderlijke SES en het onderwijsniveau van adolescenten

Zelfs wanneer wordt gecontroleerd voor cognitieve capaciteiten, konden de adviezen van leerkrachten de positieve associatie tussen ouderlijke SES en het onderwijsniveau van adolescenten voor een aanzienlijk deel verklaren. Dit suggereert dat leerkrachten, bewust of onbewust, rekening houden met de ouderlijke SES van adolescenten en hiermee bijdragen aan verschillen in onderwijsresultaten tussen adolescenten met verschillende SES-achtergronden. Het kan zijn dat leerkrachten daadwerkelijk betere academische eigenschappen (zoals een hogere zelfbeheersing, academische motivatie en het vermogen om te plannen) en positieve psychologische processen (zoals een gevoel van controle) terugzien in adolescenten met een hogere ouderlijke SES. Dit proefschrift laat immers een positief verband zien tussen een hogere ouderlijke SES en verschillende positieve psychologische processen. Een andere mogelijkheid is dat leerkrachten veronderstellen dat adolescenten met een hogere ouderlijke SES over betere academische eigenschappen of positieve psychologische eigenschappen beschikken. Verder onderzoek naar waarom leerkrachten hogere onderwijsaanbevelingen geven aan adolescenten met een hogere ouderlijke SES is nodig.

References

- Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health. The challenge of the gradient. *The American Psychologist*, *49*(1), 15–24. doi.org/10.1037/0003-066X.49.1.15
- Adler, N. E., & Tan, J. J. (2017). Commentary: Tackling the health gap: the role of psychosocial processes. *International Journal of Epidemiology*, *46*(4), 1329–1331. doi.org/10.1093/ije/dyx167
- Aguinis, H., Gottfredson, R. K., & Culpepper, S. A. (2013). Best-practice recommendations for estimating cross-level interaction effects using multilevel modeling. *Journal of Management*, *39*(6), 1490–1528. doi.org/10.1177/0149206313478188
- Ahlborg, M., Svedberg, P., Nyholm, M., Morgan, A., & Nygren, J. M. (2017). Socioeconomic inequalities in health among Swedish adolescents—Adding the subjective perspective. *BMC Public Health*, *17*, 838. doi.org/10.1186/s12889-017-4863-x
- Ahlin, E. M., & Antunes, M. J. L. (2015). Locus of control orientation: Parents, peers, and place. *Journal of Youth and Adolescence*, *44*(9), 1803–1818. doi.org/10.1007/s10964-015-0253-9
- Ainsworth, J. W. (2002). Why does it take a village? The mediation of neighborhood effects on educational achievement. *Social Forces*, *81*(1), 117–152. doi.org/10.1353/sof.2002.0038
- Allen, J. P., Porter, M. R., McFarland, F. C., Marsh, P., & McElhaney, K. B. (2005). The two faces of adolescents' success with peers: Adolescent popularity, social adaptation, and deviant behavior. *Child Development*, *76*(3), 747–760. doi.org/10.1111/j.1467-8624.2005.00875.x
- Allison, S. T., Messick, D. M., & Goethals, G. R. (1989). On being better but not smarter than others: The Muhammad Ali effect. *Social Cognition*, *7*(3), 275–295. doi.org/10.1521/soco.1989.7.3.275
- Almås, I., Cappelen, A. W., Sørensen, E. Ø., & Tunngodden, B. (2010). Fairness and the development of inequality acceptance. *Science*, *328*(5982), 1176–1178. doi.org/10.1126/science.1187300
- American Psychological Association, Task Force on Socioeconomic Status. (2007). *Report of the APA Task Force on Socioeconomic Status*. American Psychological Association.
- Andersson, M. A. (2016). Health returns to education by family socioeconomic origins, 1980–2008: Testing the importance of gender, cohort, and age. *SSM - Population Health*, *2*, 549–560. doi.org/10.1016/j.ssmph.2016.08.006
- Antaramian, S. P., Huebner, E. S., Hills, K. J., & Valois, R. F. (2010). A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning. *American Journal of Orthopsychiatry*, *80*(4), 462–472. doi.org/10.1111/j.1939-0025.2010.01049.x
- Ashton, D. N. (2017). Globalization and its impact on the political, economic, and labor market aspects of the transition. In I. Schoon & J. Bynner (Eds.), *Young people's development and the Great Recession* (pp. 25–51). Cambridge University Press. doi.org/10.1017/9781316779507.003
- Atkinson, A. B. (2015). Can we reduce income inequality in OECD countries? *Empirica*, *42*(2), 211–223. doi.org/10.1007/s10663-015-9288-0
- Autor, D. H. (2014). Skills, education, and the rise of earnings inequality among the “other 99 percent.” *Science*, *344*(6186), 843–851. doi.org/10.1126/science.1251868

- Ayorech, Z., Krapohl, E., Plomin, R., & von Stumm, S. (2017). Genetic influence on intergenerational educational attainment. *Psychological Science, 28*(9), 1302–1310. doi.org/10.1177/0956797617707270
- Baars, S. W. (2014). *Place, space and imagined futures: How young people's occupational aspirations are shaped by the areas they live in* [Doctoral dissertation, The University of Manchester]. University of Manchester Library. www.escholar.manchester.ac.uk/uk-ac-man-scw:240917
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development, 72*(1), 187–206. doi.org/10.1111/1467-8624.00273
- Bandura, A., Pastorelli, C., Barbaranelli, C., & Caprara, G. V. (1999). Self-efficacy pathways to childhood depression. *Journal of Personality and Social Psychology, 76*(2), 258–269. doi.org/10.1037//0022-3514.76.2.258
- Barreiro, A., Arsenio, W. F., & Wainryb, C. (2019). Adolescents' conceptions of wealth and societal fairness amid extreme inequality: An Argentine sample. *Developmental Psychology, 55*(3), 498–508. doi.org/10.1037/dev0000560
- Bartels, M., Rietveld, M. J. H., Baal, G. C. M. V., & Boomsma, D. I. (2002). Heritability of educational achievement in 12-year-olds and the overlap with cognitive ability. *Twin Research and Human Genetics, 5*(6), 544–553. doi.org/10.1375/twin.5.6.544
- Beal, S. J., & Crockett, L. J. (2010). Adolescents' occupational and educational aspirations and expectations: Links to high school activities and adult educational attainment. *Developmental Psychology, 46*(1), 258–265. doi.org/10.1037/a0017416
- Beckfield, J., & Krieger, N. (2009). Epi + demos + cracy: Linking political systems and priorities to the magnitude of health inequities—evidence, gaps, and a research agenda. *Epidemiologic Reviews, 31*(1), 152–177. doi.org/10.1093/epirev/mxp002
- Belsky, D. W., Domingue, B. W., Wedow, R., Arseneault, L., Boardman, J. D., Caspi, A., Conley, D., Fletcher, J. M., Freese, J., Herd, P., Moffitt, T. E., Poulton, R., Sicinski, K., Wertz, J., & Harris, K. M. (2018). Genetic analysis of social-class mobility in five longitudinal studies. *Proceedings of the National Academy of Sciences, 201801238*. doi.org/10.1073/pnas.1801238115
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin, 135*(6), 885–908. doi.org/10.1037/a0017376
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society. Series B: Statistical Methodology, 57*(1), 289–300. doi.org/10.1111/j.2517-6161.1995.tb02031.x
- Ben-Zur, H. (2003). Happy adolescents: The link between subjective well-being, internal resources, and parental factors. *Journal of Youth and Adolescence, 32*(2), 67–79. doi.org/10.1023/A:1021864432505
- Bjarnason, T., Bendtsen, P., Arnarsson, A. M., Borup, I., Iannotti, R. J., Löfstedt, P., Haapasalo, I., & Niclasen, B. (2012). Life satisfaction among children in different family structures: A comparative study of 36 western societies. *Children & Society, 26*(1), 51–62. doi.org/10.1111/j.1099-0860.2010.00324.x
- Black, S. E., Devereux, P. J., & Salvanes, K. G. (2005). Why the apple doesn't fall far: Understanding intergenerational transmission of human capital. *The American Economic Review, 95*(1), 437–449.

- Blascovich, J., & Tomaka, J. (1991). Measures of self-esteem. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (Vol. 1, pp. 115–160). Academic Press.
- Blossfeld, P. N., Blossfeld, G. J., & Blossfeld, H.-P. (2015). Educational expansion and inequalities in educational opportunity: Long-term changes for East and West Germany. *European Sociological Review*, *31*(2), 144–160. doi.org/10.1093/esr/jcv017
- Boden, J. M., Sanders, J., Munford, R., Liebenberg, L., & McLeod, G. F. H. (2016). Paths to positive development: A model of outcomes in the New Zealand youth transitions study. *Child Indicators Research*, *9*(4), 889–911. doi.org/10.1007/s12187-015-9341-3
- Bøe, T., Petrie, K. J., Sivertsen, B., & Hysing, M. (2019). Interplay of subjective and objective economic well-being on the mental health of Norwegian adolescents. *SSM - Population Health*, *9*, 100471. doi.org/10.1016/j.ssmph.2019.100471
- Boehm, J. K., Chen, Y., Williams, D. R., Ryff, C., & Kubzansky, L. D. (2015). Unequally distributed psychological assets: Are there social disparities in optimism, life satisfaction, and positive affect? *PLOS ONE*, *10*(2), e0118066. doi.org/10.1371/journal.pone.0118066
- Bollen, K. A., Glanville, J. L., & Stecklov, G. (2001). Socioeconomic status and class in studies of fertility and health in developing countries. *Annual Review of Sociology*, *27*(1), 153–185. doi.org/10.1146/annurev.soc.27.1.153
- Boone, S., & Van Houtte, M. (2013). Why are teacher recommendations at the transition from primary to secondary education socially biased? A mixed-methods research. *British Journal of Sociology of Education*, *34*(1), 20–38. doi.org/10.1080/01425692.2012.704720
- Bosma, H., Brandts, L., Simons, A., Groffen, D., & van den Akker, M. (2015). Low socioeconomic status and perceptions of social inadequacy and shame: Findings from the Dutch SMILE study. *European Journal of Public Health*, *25*(2), 311–313. doi.org/10.1093/eurpub/cku212
- Bosma, H., Simons, A., Groffen, D. A. I., & Klabbers, G. (2012). Stigmatization and socio-economic differences in health in modern welfare states. *European Journal of Public Health*, *22*(5), 616–617. doi.org/10.1093/eurpub/cks072
- Bosma, H., Theunissen, M.-J., Verdonk, P., & Feron, F. (2014). Low control beliefs in relation to school dropout and poor health: Findings from the SIODO case-control study. *BMC Public Health*, *14*(1237). doi.org/10.1186/1471-2458-14-1237
- Boudon, R. (1974). *Education, opportunity, and social inequality: Changing prospects in western society*. Wiley.
- Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in education, society and culture*. SAGE Publications.
- Boyce, W., Torsheim, T., Currie, C., & Zambon, A. (2006). The Family Affluence Scale as a measure of national wealth: Validation of an adolescent self-report measure. *Social Indicators Research*, *78*(3), 473–487. doi.org/10.1007/s11205-005-1607-6
- Boylan, J. M., Cundiff, J. M., Jakubowski, K. P., Pardini, D. A., & Matthews, K. A. (2018). Pathways linking childhood SES and adult health behaviors and psychological resources in Black and White men. *Annals of Behavioral Medicine*, *52*(12), 1023–1035. doi.org/10.1093/abm/kay006
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*(1), 371–399. doi.org/10.1146/annurev.psych.53.100901.135233

- Brailovskaia, J., & Margraf, J. (2020). How to measure self-esteem with one item? Validation of the German single-item self-esteem scale (G-SISE). *Current Psychology*, 39(6), 2192–2202. doi.org/10.1007/s12144-018-9911-x
- Brann, P., Lethbridge, M. J., & Mildred, H. (2018). The young adult Strengths and Difficulties Questionnaire (SDQ) in routine clinical practice. *Psychiatry Research*, 264, 340–345. doi.org/10.1016/j.psychres.2018.03.001
- Breen, R., & Jonsson, J. O. (2005). Inequality of opportunity in comparative perspective: Recent research on educational attainment and social mobility. *Annual Review of Sociology*, 31(1), 223–243. doi.org/10.1146/annurev.soc.31.041304.122232
- Bronfenbrenner, U., & Evans, G. W. (2000). Developmental science in the 21st century: Emerging questions, theoretical models, research designs and empirical findings. *Social Development*, 9(1), 115–125. doi.org/10.1111/1467-9507.00114
- Bronfenbrenner, U., & Morris, P. A. (2007). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (6th ed.). John Wiley & Sons, Inc. doi.org/10.1002/9780470147658.chpsy0114
- Brown, B. B., & Larson, J. (2009). Peer relationships in adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (pp. 74–103). John Wiley & Sons, Inc. doi.org/10.1002/9780470479193.adlpsy002004
- Brumley, L. D., Jaffee, S. R., & Brumley, B. P. (2017). Pathways from childhood adversity to problem behaviors in young adulthood: The mediating role of adolescents' future expectations. *Journal of Youth and Adolescence*, 46(1), 1–14. doi.org/10.1007/s10964-016-0597-9
- Buchmann, C., & Park, H. (2009). Stratification and the formation of expectations in highly differentiated educational systems. *Research in Social Stratification and Mobility*, 27(4), 245–267. doi.org/10.1016/j.rjssm.2009.10.003
- Buijs, T., Maes, L., Salonna, F., Van Damme, J., Hublet, A., Kebza, V., Costongs, C., Currie, C., & De Clercq, B. (2016). The role of community social capital in the relationship between socioeconomic status and adolescent life satisfaction: Mediating or moderating? Evidence from Czech data. *International Journal for Equity in Health*, 15, 203. doi.org/10.1186/s12939-016-0490-x
- Buis, M. L. (2013). The composition of family background: The influence of the economic and cultural resources of both parents on the offspring's educational attainment in the Netherlands between 1939 and 1991. *European Sociological Review*, 29(3), 593–602. doi.org/10.1093/esr/jcs009
- Burger, K., Mortimer, J., & Johnson, M. K. (2020). Self-esteem and self-efficacy in the status attainment process and the multigenerational transmission of advantage. *Social Science Research*, 86, 102374. doi.org/10.1016/j.ssresearch.2019.102374
- Cantril, H. (1965). *Pattern of human concerns*. Rutgers University Press.
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30(7), 879–889. doi.org/10.1016/j.cpr.2010.01.006
- Centraal Bureau voor de Statistiek (CBS). (2018). *VO; leerlingen, onderwijssoort in detail, leerjaar [Secondary education; students, education type in detail, academic year]*. StatLine. <http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=80040ned&D1=0,6-8&D2=0&D3=3&D4=0&D5=0&D6=0&D7=7&HDR=G1,G3,G4,G5,G2,G6&STB=T&VW=T>

- Chen, B., Luo, L., Wu, X., Chen, Y., & Zhao, Y. (2021). Are the lower class really unhappy? Social class and subjective well-being in Chinese adolescents: Moderating role of sense of control and mediating role of self-esteem. *Journal of Happiness Studies*, 22(2), 825–843. doi.org/10.1007/s10902-020-00253-5
- Chen, E., Matthews, K. A., & Boyce, W. T. (2002). Socioeconomic differences in children's health: How and why do these relationships change with age? *Psychological Bulletin*, 128(2), 295–329. doi.org/10.1037//0033-2909.128.2.295
- Chetty, R., Hendren, N., & Katz, L. (2016). The effects of exposure to better neighborhoods on children: New evidence from the Moving to Opportunity project. *American Economic Review*, 106(4). doi.org/10.1257/aer.20150572
- Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin*, 124(1), 3–21. doi.org/10.1037/0033-2909.124.1.3
- Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology*, 29(6), 624–645. doi.org/10.1521/jscp.2010.29.6.624
- Ciarrochi, J., Heaven, P. C. L., & Davies, F. (2007). The impact of hope, self-esteem, and attributional style on adolescents' school grades and emotional well-being: A longitudinal study. *Journal of Research in Personality*, 41(6), 1161–1178. doi.org/10.1016/j.jrp.2007.02.001
- Cito. (2008). *Terugblik en resultaten Eindtoets Basisonderwijs 2008 [Review and results of the Final Test Primary Education]*. Cito B.V.
- Cito. (2014). *Interpretatie van het leerlingrapport 2014 [Interpretation of the student report 2014]*. Cito B.V.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. doi.org/10.1037//0033-2909.112.1.155
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310–357. doi.org/10.1037/0033-2909.98.2.310
- Colagrossi, M., Karagiannis, S., & Raab, R. (2019). *The median voter takes it all: Preferences for redistribution and income inequality in the EU-28* (No. 2019/6; JRC Working Papers in Economics and Finance). Joint Research Centre (JRC), European Commission. www.econstor.eu/handle/10419/202312
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558. doi.org/10.1037/0021-843X.112.4.558
- Conger, K. J., Williams, S. T., Little, W. M., Masyn, K. E., & Shebloski, B. (2009). Development of mastery during adolescence: The role of family problem-solving. *Journal of Health and Social Behavior*, 50(1), 99–114. doi.org/10.1177/002214650905000107
- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and the Family*, 72(3), 685–704. doi.org/10.1111/j.1741-3737.2010.00725.x
- Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, 58(1), 175–199. doi.org/10.1146/annurev.psych.58.110405.085551
- Conley, D., Domingue, B. W., Cesarini, D., Dawes, C., Rietveld, C. A., & Boardman, J. D. (2015). Is the effect of parental education on offspring biased or moderated by genotype? *Sociological Science*, 2(6), 82–105. doi.org/10.15195/v2.a6

- Conroy, K., Sandel, M., & Zuckerman, B. (2010). Poverty grown up: How childhood socioeconomic status impacts adult health. *Journal of Developmental & Behavioral Pediatrics, 31*(2), 154–160. doi.org/10.1097/DBP.0b013e3181c21a1b
- Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature Reviews Neuroscience, 13*(9), 636–650. doi.org/10.1038/nrn3313
- Crul, M. (2018). How key transitions influence school and labour market careers of descendants of Moroccan and Turkish migrants in the Netherlands. *European Journal of Education, 53*(4), 481–494. doi.org/10.1111/ejed.12310
- Culpin, I., Stapinski, L., Miles, Ö. B., Araya, R., & Joinson, C. (2015). Exposure to socioeconomic adversity in early life and risk of depression at 18 years: The mediating role of locus of control. *Journal of Affective Disorders, 183*, 269–278. doi.org/10.1016/j.jad.2015.05.030
- Currie, C., Inchley, J., Molcho, M., Lenzi, M., Veselska, Z., & Wild, F. (Eds.). (2014). *Health Behaviour in School-aged Children (HBSC) Study Protocol: Background, methodology and mandatory items for the 2013/14 survey*. CAHRU. <http://www.hbsc.org/methods/index.html>
- Currie, C., Molcho, M., Boyce, W., Holstein, B., Torshem, T., & Richter, M. (2008). Researching health inequalities in adolescents: The development of the Health Behaviour in School-Aged Children (HBSC) Family Affluence Scale. *Social Science & Medicine, 66*(6), 1429–1436. doi.org/10.1016/j.socscimed.2007.11.024
- Currie, C., & Morgan, A. (2020). A bio-ecological framing of evidence on the determinants of adolescent mental health—A scoping review of the international Health Behaviour in School-Aged Children (HBSC) study 1983–2020. *SSM - Population Health, 12*, 100697. doi.org/10.1016/j.ssmph.2020.100697
- Dalbert, C. (1999). The world is more just for me than generally: About the Personal Belief in a Just World Scale's validity. *Social Justice Research, 12*(2), 79–98. doi.org/10.1023/A:1022091609047
- Dalbert, C., & Sallay, H. (2004). *The justice motive in adolescence and young adulthood: Origins and consequences*. Routledge. doi.org/10.4324/9780203575802
- Dalbert, C., & Stoeber, J. (2005). The belief in a just world and distress at school. *Social Psychology of Education, 8*(2), 123–135. doi.org/10.1007/s11218-005-1835-2
- Darnon, C., Wiederkehr, V., Dompnier, B., & Martinot, D. (2018). 'Where there is a will, there is a way': Belief in school meritocracy and the social-class achievement gap. *British Journal of Social Psychology, 57*(1), 250–262. doi.org/10.1111/bjso.12214
- Davidovitch, M., Koren, G., Fund, N., Shrem, M., & Porath, A. (2017). Challenges in defining the rates of ADHD diagnosis and treatment: Trends over the last decade. *BMC Pediatrics, 17*(1), 218. doi.org/10.1186/s12887-017-0971-0
- Day, M. V., & Fiske, S. T. (2019). Understanding the nature and consequences of social mobility beliefs. In J. Jetten & K. Peters (Eds.), *The social psychology of inequality* (pp. 365–380). Springer International Publishing. doi.org/10.1007/978-3-030-28856-3_23
- de Boer, H., Bosker, R. J., & van der Werf, M. P. C. (2010). Sustainability of teacher expectation bias effects on long-term student performance. *Journal of Educational Psychology, 102*(1), 168–179. doi.org/10.1037/a0017289
- de Graaf, N. D., de Graaf, P. M., & Kraaykamp, G. (2000). Parental cultural capital and educational attainment in the Netherlands: A refinement of the cultural capital perspective. *Sociology of Education, 73*(2), 92–111. doi.org/10.2307/2673239

- de Looze, M., van Dorsselaer, S., de Roos, S., Verdurmen, J., Stevens, G., Gommans, R., van Bon-Martens, M., ter Bogt, T., & Vollebergh, W. (2014). *HBSC 2013: Gezondheid, welzijn en opvoeding van jongeren in Nederland [Health, well-being, and upbringing of adolescents in the Netherlands]*. Utrecht University.
- de Vuijst, E., van Ham, M., & Kleinhans, R. (2017). The moderating effect of higher education on the intergenerational transmission of residing in poverty neighbourhoods. *Environment and Planning A: Economy and Space*, 49(9), 2135–2154. doi.org/10.1177/0308518X17715638
- de Zeeuw, E. L., van Beijsterveldt, C. E. M., Ehli, E. A., de Geus, E. J. C., & Boomsma, D. I. (2017). Attention Deficit Hyperactivity Disorder symptoms and low educational achievement: Evidence supporting a causal hypothesis. *Behavior Genetics*, 47(3), 278–289. doi.org/10.1007/s10519-017-9836-4
- Deary, I. J. (2011). Intelligence. *Annual Review of Psychology*, 63(1), 453–482. doi.org/10.1146/annurev-psych-120710-100353
- Delaruelle, K., Van Houtte, M., & Bracke, P. (2019). Educational inequalities in general health: Does the curricular tracking system matter? *Acta Sociologica*, 0001699318817101. doi.org/10.1177/0001699318817101
- Destin, M. (2019). Socioeconomic mobility, identity, and health: Experiences that influence immunology and implications for intervention. *American Psychologist*, 74(2), 207–217. doi.org/10.1037/amp0000297
- Devenish, B., Hooley, M., & Mellor, D. (2017). The pathways between socioeconomic status and adolescent outcomes: A systematic review. *American Journal of Community Psychology*, 59(1–2), 219–238. doi.org/10.1002/ajcp.12115
- Diamantopoulos, A. (2006). The error term in formative measurement models: Interpretation and modeling implications. *Journal of Modelling in Management*, 1(1), 7–17. doi.org/10.1108/17465660610667775
- Diamantopoulos, A., Riefler, P., & Roth, K. P. (2008). Advancing formative measurement models. *Journal of Business Research*, 61(12), 1203–1218. doi.org/10.1016/j.jbusres.2008.01.009
- Diez-Roux, A. V. (1998). Bringing context back into epidemiology: Variables and fallacies in multilevel analysis. *American Journal of Public Health*, 88(2), 216–222. doi.org/10.2105/AJPH.88.2.216
- Dishion, T. J., & Tipsord, J. M. (2011). Peer contagion in child and adolescent social and emotional development. *Annual Review of Psychology*, 62, 189–214. doi.org/10.1146/annurev.psych.093008.100412
- Donnellan, M. B., Trzesniewski, K. H., & Robins, R. W. (2015). Measures of self-esteem. In G. J. Boyle, D. H. Saklofske, & G. Matthews (Eds.), *Measures of personality and social psychological constructs* (pp. 131–157). Academic Press. doi.org/10.1016/B978-0-12-386915-9.00006-1
- Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychological Science*, 16(4), 328–335. doi.org/10.1111/j.0956-7976.2005.01535.x
- Driessen, G., Slegers, P., & Smit, F. (2008). The transition from primary to secondary education: Meritocracy and ethnicity. *European Sociological Review*, 24(4), 527–542. doi.org/10.1093/esr/jcn018
- Dubow, E. F., Boxer, P., & Huesmann, L. R. (2009). Long-term effects of parents' education on children's educational and occupational success: Mediation by family interactions, child aggression, and teenage aspirations. *Merrill-Palmer Quarterly*, 55(3), 224–249. doi.org/10.1353/mpq.0.0030

- Duinhof, E. L., Lek, K. M., de Looze, M. E., Cosma, A., Mazur, J., Gobina, I., Wüstner, A., Vollebergh, W. A. M., & Stevens, G. W. J. M. (2019). Revising the self-report Strengths and Difficulties Questionnaire for cross-country comparisons of adolescent mental health problems: The SDQ-R. *Epidemiology and Psychiatric Sciences*, 29(e35), 1–10. doi.org/10.1017/S2045796019000246
- Duinhof, E. L., Smid, S. C., Vollebergh, W. A. M., & Stevens, G. W. J. M. (2020). Immigration background and adolescent mental health problems: The role of family affluence, adolescent educational level and gender. *Social Psychiatry and Psychiatric Epidemiology*, 55, 435–445. doi.org/10.1007/s00127-019-01821-8
- Duinhof, E. L., Stevens, G. W. J. M., Dorsseleer, S. van, Monshouwer, K., & Vollebergh, W. A. M. (2015). Ten-year trends in adolescents' self-reported emotional and behavioral problems in the Netherlands. *European Child & Adolescent Psychiatry*, 24(9), 1119–1128. doi.org/10.1007/s00787-014-0664-2
- Dupéré, V., Leventhal, T., Crosnoe, R., & Dion, É. (2010). Understanding the positive role of neighborhood socioeconomic advantage in achievement: The contribution of the home, child care and school environments. *Developmental Psychology*, 46(5), 1227–1244. doi.org/10.1037/a0020211
- Duru-Bellat, M., & Tenret, E. (2012). Who's for meritocracy? Individual and contextual variations in the faith. *Comparative Education Review*, 56(2), 223–247. doi.org/10.1086/661290
- Dzuka, J., & Dalbert, C. (2002). Mental health and personality of Slovak unemployed adolescents: The impact of belief in a just world. *Journal of Applied Social Psychology*, 32(4), 732–757. doi.org/10.1111/j.1559-1816.2002.tb00240.x
- Easterbrook, M. J., Kuppens, T., & Manstead, A. S. R. (2016). The education effect: Higher educational qualifications are robustly associated with beneficial personal and socio-political outcomes. *Social Indicators Research*, 126(3), 1261–1298. doi.org/10.1007/s11205-015-0946-1
- Elbers, E., & de Haan, M. (2014). Parent-teacher conferences in Dutch culturally diverse schools: Participation and conflict in institutional context. *Learning, Culture and Social Interaction*, 3(4), 252–262. doi.org/10.1016/j.lcsi.2014.01.004
- Elenbaas, L., Rizzo, M. T., & Killen, M. (2020). A developmental-science perspective on social inequality. *Current Directions in Psychological Science*, 29(6), 610–616. doi.org/10.1177/0963721420964147
- Elgar, F. J., Pfortner, T.-K., Moor, I., De Clercq, B., Stevens, G. W. J. M., & Currie, C. (2015). Socio-economic inequalities in adolescent health 2002–2010: A time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *The Lancet*, 385(9982), 2088–2095. doi.org/10.1016/S0140-6736(14)61460-4
- Elgar, F. J., Xie, A., Pfortner, T.-K., White, J., & Pickett, K. E. (2017). *Assessing the view from bottom: How to measure socioeconomic position and relative deprivation in adolescents*. SAGE Publications Ltd. doi.org/10.4135/9781526406347
- Elstad, J. I. (2010). Indirect health-related selection or social causation? Interpreting the educational differences in adolescent health behaviours. *Social Theory & Health*, 8(2), 134–150. doi.org/10.1057/sth.2009.26

- Essau, C. A., Olaya, B., Anastassiou-Hadjicharalambous, X., Pauli, G., Gilvarry, C., Bray, D., O'callaghan, J., & Ollendick, T. H. (2012). Psychometric properties of the Strength and Difficulties Questionnaire from five European countries. *International Journal of Methods in Psychiatric Research*, 21(3), 232–245. doi.org/10.1002/mpr.1364
- Esser, H., & Relikowski, I. (2015). *Is ability tracking (really) responsible for educational inequalities in achievement? A comparison between the country states Bavaria and Hesse in Germany* (No. 9082; IZA Discussion Paper). IZA. ssn.com/abstract=2612334
- European Commission. (2018). *Special Eurobarometer 471. Fairness, inequality and inter-generational mobility*. European Commission.
- European Commission, Brussels. (2019). *Eurobarometer 88.4 (2017). ZA6939 Data file Version 2.0.0*. [Data set]. TNS opinion, Brussels [producer]. GESIS Data Archive, Cologne. doi.org/10.4232/1.13288
- Eurostat. (2019a). *Expenditure on social protection (tps00098)*. <http://ec.europa.eu/eurostat/web/products-datasets/-/tps00098>
- Eurostat. (2019b). *GDP per capita in PPS (tec00114)*. <http://ec.europa.eu/eurostat/web/products-datasets/-/tec00114>
- Eurostat. (2019c). *Gini coefficient of equivalised disposable income—EU-SILC survey (ilc_di12)*. ec.europa.eu/eurostat/web/products-datasets/-/ilc_di12
- Eurydice. (2021, March 23). *Netherlands: Organisation of vocational upper secondary education (MBO)*. EACEA National Policies Platform. eacea.ec.europa.eu/national-policies/eurydice/content/organisation-vocational-secondary-education-mbo-0_en
- Fakkel, M., Peeters, M., Lugtig, P., Zondervan-Zwijnenburg, M. A. J., Blok, E., White, T., van der Meulen, M., Kevenaar, S. T., Willemsen, G., Bartels, M., Boomsma, D. I., Schmengler, H., Branje, S., & Vollebergh, W. A. M. (2020). Testing sampling bias in estimates of adolescent social competence and behavioral control. *Developmental Cognitive Neuroscience*, 46, 100872. doi.org/10.1016/j.dcn.2020.100872
- Falci, C. D. (2011). Self-esteem and mastery trajectories in high school by social class and gender. *Social Science Research*, 40(2), 586–601. doi.org/10.1016/j.ssresearch.2010.12.013
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. doi.org/10.3758/BF03193146
- Feinstein, L., Sabates, R., Anderson, T. M., Sorhaindo, A., & Hammond, C. (2006). What are the effects of education on health? In R. Desjarjans & T. Schuller (Eds.), *Measuring the effects of education on health and civic engagement: Proceedings of the Copenhagen symposium* (pp. 171–353). OECD.
- Fergusson, D. M., Horwood, L. J., & Boden, J. M. (2008). The transmission of social inequality: Examination of the linkages between family socioeconomic status in childhood and educational achievement in young adulthood. *Research in Social Stratification and Mobility*, 26(3), 277–295. doi.org/10.1016/j.rssm.2008.05.001
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7(2), 117–140.
- Fiske, S. T., & Taylor, S. E. (2013). *Social cognition: From brains to culture*. SAGE.

- Flanagan, C. A., Kim, T., Pykett, A., Finlay, A., Gally, E. E., & Pancer, M. (2014). Adolescents' theories about economic inequality: Why are some people poor while others are rich? *Developmental Psychology, 50*(11), 2512–2525. doi.org/10.1037/a0037934
- Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods, 9*(4), 466–491. doi.org/10.1037/1082-989X.9.4.466
- Frank, R. (2013). *Falling behind: How rising inequality harms the middle class*. University of California Press.
- Frankenhuis, W. E., & Nettle, D. (2020). The strengths of people in poverty. *Current Directions in Psychological Science, 29*(1), 16–21. doi.org/10.1177/0963721419881154
- Frasquilho, D., Matos, M. G., Salonna, F., Guerreiro, D., Storti, C. C., Gaspar, T., & Caldas-de-Almeida, J. M. (2016). Mental health outcomes in times of economic recession: A systematic literature review. *BMC Public Health, 16*(1), 115. doi.org/10.1186/s12889-016-2720-y
- Frome, P. M., & Eccles, J. S. (1998). Parents' influence on children's achievement-related perceptions. *Journal of Personality and Social Psychology, 74*(2), 435.
- Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research, and Evaluation, 17*(1), 1–13. doi.org/10.7275/n560-j767
- Gallo, L. C., & Matthews, K. A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin, 129*(1), 10–51. doi.org/10.1037/0033-2909.129.1.10
- Galster, G. C. (2012). The mechanism(s) of neighbourhood effects: Theory, evidence, and policy implications. In M. van Ham, D. Manley, N. Bailey, L. Simpson, & D. Maclennan (Eds.), *Neighbourhood effects research: New perspectives* (pp. 23–56). Springer Netherlands. doi.org/10.1007/978-94-007-2309-2_2
- Garbarski, D. (2010). Perceived social position and health: Is there a reciprocal relationship? *Social Science & Medicine, 70*(5), 692–699. doi.org/10.1016/j.socscimed.2009.11.007
- García-Sánchez, E., Toorn, J. V. der, Rodríguez-Bailón, R., & Willis, G. B. (2018). The vicious cycle of economic inequality: The role of ideology in shaping the relationship between “what is” and “what ought to be” in 41 countries. *Social Psychological and Personality Science*. doi.org/10.1177/1948550618811500
- Gariépy, G., & Elgar, F. J. (2016). Trends in psychological symptoms among Canadian adolescents from 2002 to 2014: Gender and socioeconomic differences. *The Canadian Journal of Psychiatry, 61*(12), 797–802. doi.org/10.1177/0706743716670130
- Gecas, V. (1982). The self-concept. *Annual Review of Sociology, 8*(1), 1–33. doi.org/10.1146/annurev.so.08.080182.000245
- Gilbert, P., & Irons, C. (2008). Shame, self-criticism, and self-compassion in adolescence. In N. B. Allen & L. B. Sheeber (Eds.), *Adolescent emotional development and the emergence of depressive disorders* (pp. 195–214). Cambridge University Press. doi.org/10.1017/CBO9780511551963.011
- Glick, W. H. (1985). Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *The Academy of Management Review, 10*(3), 601–616. JSTOR. doi.org/10.2307/258140

- Godfrey, E. B., Santos, C. E., & Burson, E. (2019). For better or worse? System-justifying beliefs in sixth-grade predict trajectories of self-esteem and behavior across early adolescence. *Child Development, 90*(1), 180–195. doi.org/10.1111/cdev.12854
- Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: Development and evaluation of a new indicator. *Pediatrics, 108*(2), e31–e31. doi.org/10.1542/peds.108.2.e31
- Goodman, E., Huang, B., Schafer-Kalkhoff, T., & Adler, N. E. (2007). Perceived socioeconomic status: A new type of identity that influences adolescents' self-rated health. *Journal of Adolescent Health, 41*(5), 479–487. doi.org/10.1016/j.jadohealth.2007.05.020
- Goodman, E., Maxwell, S., Malspeis, S., & Adler, N. (2015). Developmental trajectories of subjective social status. *Pediatrics, 136*(3), e633–e640. doi.org/10.1542/peds.2015-1300
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*(5), 581–586. doi.org/10.1111/j.1469-7610.1997.tb01545.x
- Goudeau, S., & Cimpian, A. (2021). How do young children explain differences in the classroom? Implications for achievement, motivation, and educational equity. *Perspectives on Psychological Science, 16*(3), 533–552.
- Goyer, J. P., Garcia, J., Purdie-Vaughns, V., Binning, K. R., Cook, J. E., Reeves, S. L., Apfel, N., Taborsky-Barba, S., Sherman, D. K., & Cohen, G. L. (2017). Self-affirmation facilitates minority middle schoolers' progress along college trajectories. *Proceedings of the National Academy of Sciences, 114*(29), 7594–7599. doi.org/10.1073/pnas.1617923114
- Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin, 129*(3), 447–466. doi.org/10.1037/0033-2909.129.3.447
- Greenaway, K. H., Frye, M., & Cruwys, T. (2015). When aspirations exceed expectations: Quixotic hope increases depression among students. *PLOS ONE, 10*(9), e0135477. doi.org/10.1371/journal.pone.0135477
- Greenwood, J., Guner, N., Kocharkov, G., & Santos, C. (2014). Marry your like: Assortative mating and income inequality. *American Economic Review, 104*(5), 348–353. doi.org/10.1257/aer.104.5.348
- Hafer, C. L., Busseri, M. A., Rubel, A. N., Drolet, C. E., & Cherrington, J. N. (2020). A latent factor approach to belief in a just world and its association with well-being. *Social Justice Research, 33*(1), 1–17. doi.org/10.1007/s11211-019-00342-8
- Hafer, C. L., & Sutton, R. (2016). Belief in a just world. In C. Sabbagh & M. Schmitt (Eds.), *Handbook of social justice theory and research* (pp. 145–160). Springer.
- Hagquist, C. (2007). Health inequalities among adolescents—The impact of academic orientation and parents' education. *European Journal of Public Health, 17*(1), 21–26. doi.org/10.1093/eurpub/ckl087
- Halpern-Manners, A., Schnabel, L., Hernandez, E. M., Silberg, J. L., & Eaves, L. J. (2016). The relationship between education and mental health: New evidence from a discordant twin study. *Social Forces, 95*(1), 107–131. doi.org/10.1093/sf/sow035
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*(1), 102–116. doi.org/10.1037/a0038889

- Harding, D. J. (2011). Rethinking the cultural context of schooling decisions in disadvantaged neighborhoods: From deviant subculture to cultural heterogeneity. *Sociology of Education, 84*(4), 322–339. doi.org/10.1177/0038040711417008
- Hartley, J. E. K., Levin, K. A., & Currie, C. (2016). A new version of the HBSC Family Affluence Scale - FAS III: Scottish qualitative findings from the International FAS Development Study. *Child Indicators Research, 9*, 233–245. doi.org/10.1007/s12187-015-9325-3
- Hatzenbuehler, M. L., Phelan, J. C., & Link, B. G. (2013). Stigma as a fundamental cause of population health inequalities. *American Journal of Public Health, 103*(5), 813–821. doi.org/10.2105/AJPH.2012.301069
- Havas, J., Bosma, H., Spreeuwenberg, C., & Feron, F. J. (2010). Mental health problems of Dutch adolescents: The association with adolescents' and their parents' educational level. *European Journal of Public Health, 20*(3), 258–264. doi.org/10.1093/eurpub/ckp172
- Heberle, A. E., & Carter, A. S. (2015). Cognitive aspects of young children's experience of economic disadvantage. *Psychological Bulletin, 141*(4), 723–746. doi.org/10.1037/bul0000010
- Hektner, J. M. (1995). When moving up implies moving out: Rural adolescent conflict in the transition to adulthood. *Journal of Research in Rural Education, 11*(1), 3–14.
- Hendriks, A. M., Bartels, M., Stevens, G. W. J. M., Walsh, S. D., Torsheim, T., Elgar, F. J., & Finkenauer, C. (2020). National child and adolescent health policies as indicators of adolescent mental health: A multilevel analysis of 30 European countries. *The Journal of Early Adolescence, 40*(4), 537–565. doi.org/10.1177/0272431619858413
- Hernán, M. A. (2018). The c-word: Scientific euphemisms do not improve causal inference from observational data. *American Journal of Public Health, 108*(5), 616–619. doi.org/10.2105/AJPH.2018.304337
- Hertogh, M. (2010). The curious case of Dutch legal culture: A reassessment of survey evidence. *Journal of Comparative Law, 5*(2), 146–168.
- Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., & Verashchagina, A. (2008). The inheritance of educational inequality: International comparisons and fifty-year trends. *The B.E. Journal of Economic Analysis & Policy, 7*(2). doi.org/10.2202/1935-1682.1775
- Hitlin, S., Erickson, L. D., & Brown, J. S. (2015). Agency and mental health: A transition to adulthood paradox. *Society and Mental Health, 5*(3), 163–181. doi.org/10.1177/2156869315573632
- Hitlin, S., & Johnson, M. K. (2015). Reconceptualizing agency within the life course: The power of looking ahead. *American Journal of Sociology, 120*(5), 1429–1472. doi.org/10.1086/681216
- Hoebel, J., & Lampert, T. (2018). Subjective social status and health: Multidisciplinary explanations and methodological challenges. *Journal of Health Psychology, 25*(2), 1–13. doi.org/10.1177/1359105318800804
- Holt-Lunstad, J. (2018). Why social relationships are important for physical health: A systems approach to understanding and modifying risk and protection. *Annual Review of Psychology, 69*(1), 437–458. doi.org/10.1146/annurev-psych-122216-011902
- Holtmann, A. C., Menze, L., & Solga, H. (2021). Intergenerational transmission of educational attainment: How important are children's personality characteristics? *American Behavioral Scientist, 0002764221996779*. doi.org/10.1177/0002764221996779

- Hout, M. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology*, 38(1), 379–400. doi.org/10.1146/annurev.soc.012809.102503
- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). Routledge, Taylor & Francis.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. doi.org/10.1080/10705519909540118
- Huppert, F. A., & Whittington, J. E. (2003). Evidence for the independence of positive and negative well-being: Implications for quality of life assessment. *British Journal of Health Psychology*, 8(1), 107–122. doi.org/10.1348/135910703762879246
- Inchley, J., Currie, D., Cosma, A., Piper, A., & Spanou, G. (Eds.). (2017). *Health Behaviour in School-aged Children (HBSC) Internal Protocol 2017/18*. CAHRU. <http://www.hbsc.org/methods/index.html>
- Inchley, J., Currie, D., Young, T., Samdal, O., Torsheim, T., Augustson, L., Mathison, F., Aleman-Diaz, A. Y., Molcho, M., Weber, M. W., Barnekow, V., World Health Organization, & Regional Office for Europe. (2016). *Growing up unequal: Gender and socioeconomic differences in young people's health and well-being: Health Behaviour in School-aged Children (HBSC) study: International report from the 2013/2014 survey*. WHO Regional Office for Europe. <http://www.euro.who.int/en/publications/abstracts/growing-up-unequal.-hbsc-2016-study-20132014-survey>
- Inspectorate of Education (The Netherlands). (2014). *De kwaliteit van het basisschooladvies [The quality of track recommendations]*. Dutch IoE.
- Inspectorate of Education (The Netherlands). (2018). *De staat van het onderwijs. Onderwijsverslag 2016/2017 [The State of Education. Education Report]*. Dutch IoE.
- Iversen, A. C., & Holsen, I. (2008). Inequality in health, psychosocial resources and health behavior in early adolescence: The influence of different indicators of socioeconomic position. *Child Indicators Research*, 1(3), 291–302. doi.org/10.1007/s12187-008-9015-5
- Jacobs, J. E., Bleeker, M. M., & Constantino, M. J. (2003). The self-system during childhood and adolescence: Development, influences, and implications. *Journal of Psychotherapy Integration*, 13(1), 33–65. doi.org/10.1037/1053-0479.13.1.33
- Jencks, C., & Mayer, S. E. (1990). The social consequences of growing up in a poor neighborhood. In L. E. Lynn & M. G. H. Mcgeary (Eds.), *Inner-city poverty in the United States*. National Academy Press.
- Johnson, S. E., Richeson, J. A., & Finkel, E. J. (2011). Middle class and marginal? Socioeconomic status, stigma, and self-regulation at an elite university. *Journal of Personality and Social Psychology*, 100(5), 838–852. doi.org/10.1037/a0021956
- Johnson, S. R. L., Blum, R. W., & Cheng, T. L. (2014). Future orientation: A construct with implications for adolescent health and wellbeing. *International Journal of Adolescent Medicine and Health*, 26(4), 459–468. doi.org/10.1515/ijamh-2013-0333
- Jost, J. T., & Banaji, M. R. (1994). The role of stereotyping in system-justification and the production of false consciousness. *British Journal of Social Psychology*, 33(1), 1–27. doi.org/10.1111/j.2044-8309.1994.tb01008.x
- Jost, J. T., & Hunyady, O. (2003). The psychology of system justification and the palliative function of ideology. *European Review of Social Psychology*, 13(1), 111–153. doi.org/10.1080/10463280240000046

- Jost, J. T., & Hunyady, O. (2005). Antecedents and consequences of system-justifying ideologies. *Current Directions in Psychological Science*, *14*(5), 260–265. doi.org/10.1111/j.0963-7214.2005.00377.x
- Jung, J., Krahé, B., & Busching, R. (2018). Beyond the positive reinforcement of aggression: Peers' acceptance of aggression promotes aggression via external control beliefs. *International Journal of Behavioral Development*, *42*(1), 73–82. doi.org/10.1177/0165025416671613
- Jussim, L., & Harber, K. D. (2005). Teacher expectations and self-fulfilling prophecies: Knowns and unknowns, resolved and unresolved controversies. *Personality and Social Psychology Review*, *9*(2), 131–155.
- Kalff, A., Kroes, M., Vles, J., Hendriksen, J., Feron, F., Steyaert, J., van Zeben, T. M. C. B., Jolles, J., & van Os, J. (2001). Neighbourhood level and individual level SES effects on child problem behaviour: A multilevel analysis. *Journal of Epidemiology and Community Health*, *55*(4), 246–250. doi.org/10.1136/jech.55.4.246
- Kalil, A. (2013). Effects of the Great Recession on child development. *The ANNALS of the American Academy of Political and Social Science*, *650*(1), 232–250. doi.org/10.1177/0002716213500453
- Kan, C., Kawakami, N., Karasawa, M., Love, G. D., Coe, C. L., Miyamoto, Y., Ryff, C. D., Kitayama, S., Curhan, K. B., & Markus, H. R. (2014). Psychological resources as mediators of the association between social class and health: Comparative findings from Japan and the USA. *International Journal of Behavioral Medicine*, *21*(1), 53–65. doi.org/10.1007/s12529-012-9249-y
- Karvonen, S., & Rahkonen, O. (2011). Subjective social status and health in young people. *Sociology of Health & Illness*, *33*(3), 372–383. doi.org/10.1111/j.1467-9566.2010.01285.x
- Kawachi, I., & Subramanian, S. V. (2018). Social epidemiology for the 21st century. *Social Science & Medicine*, *196*, 240–245. doi.org/10.1016/j.socscimed.2017.10.034
- Kay, A. C., & Jost, J. T. (2003). Complementary justice: Effects of “poor but happy” and “poor but honest” stereotype exemplars on system justification and implicit activation of the justice motive. *Journal of Personality and Social Psychology*, *85*(5), 823–837. doi.org/10.1037/0022-3514.85.5.823
- Kelemen, L., Szabó, Z. P., Mészáros, N. Z., László, J., & Forgas, J. P. (2014). Social cognition and democracy: The relationship between system justification, just world beliefs, authoritarianism, need for closure, and need for cognition in Hungary. *Journal of Social and Political Psychology*, *2*(1), 197–219. doi.org/10.5964/jsp.p.v2i1.208
- Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: A review of recent literature. *Current Opinion in Psychiatry*, *20*(4), 359.
- Kim, D. H., Bassett, S. M., So, S., & Voisin, D. R. (2019). Family stress and youth mental health problems: Self-efficacy and future orientation mediation. *American Journal of Orthopsychiatry*, *89*(2), 125–133. doi.org/10.1037/ort0000371
- Klanšček, H. J., Žiberna, J., Korošec, A., Zurc, J., & Albreht, T. (2014). Mental health inequalities in Slovenian 15-year-old adolescents explained by personal social position and family socioeconomic status. *International Journal for Equity in Health*, *13*(1), 26. doi.org/10.1186/1475-9276-13-26
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. The Guilford Press.

- Knol, F., Boelhouwer, J., & Veldheer, V. (2012). *Statusontwikkeling van wijken in Nederland 1998-2010 [Neighbourhood status development in the Netherlands 1998-2010]*. Sociaal en Cultureel Planbureau.
- Koivusilta, L., Rimpelä, A., & Kautiainen, S. (2006). Health inequality in adolescence. Does stratification occur by familial social background, family affluence, or personal social position? *BMC Public Health*, 6, 110. doi.org/10.1186/1471-2458-6-110
- Korupp, S. E., Ganzeboom, H. B. G., & van der Lippe, T. (2002). Do mothers matter? A comparison of models of the influence of mothers' and fathers' educational and occupational status on children's educational attainment. *Quality and Quantity*, 36(1), 17–42. doi.org/10.1023/A:1014393223522
- Krapohl, E., Rimfeld, K., Shakeshaft, N. G., Trzaskowski, M., McMillan, A., Pingault, J.-B., Asbury, K., Harlaar, N., Kovas, Y., Dale, P. S., & Plomin, R. (2014). The high heritability of educational achievement reflects many genetically influenced traits, not just intelligence. *Proceedings of the National Academy of Sciences*, 111(42), 15273–15278. doi.org/10.1073/pnas.1408777111
- Kraus, M. W., Adler, N., & Chen, T.-W. D. (2013). Is the association of subjective SES and self-rated health confounded by negative mood? An experimental approach. *Health Psychology*, 32(2), 138–145. doi.org/10.1037/a0027343
- Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review*, 119(3), 546–572. doi.org/10.1037/a0028756
- Krieger, N., Williams, D. R., & Moss, N. E. (1997). Measuring social class in US public health research: Concepts, methodologies, and guidelines. *Annual Review of Public Health*, 18(1), 341–378. doi.org/10.1146/annurev.publhealth.18.1.341
- Kristjánsson, K. (2004). Children and the belief in a just world. *Studies in Philosophy and Education*, 23(1), 41–60. doi.org/10.1023/b:sped.0000010695.02262.fb
- Lachman, M. E., & Agrigoroaei, S. (2010). Promoting functional health in midlife and old age: Long-term protective effects of control beliefs, social support, and physical exercise. *PLOS ONE*, 5(10), e13297. doi.org/10.1371/journal.pone.0013297
- Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, 74(3), 763–773. doi.org/10.1037//0022-3514.74.3.763
- Ladd, H. F., & Fiske, E. B. (2011). Weighted student funding in the Netherlands: A model for the U.S.? *Journal of Policy Analysis and Management*, 30(3), 470–498. doi.org/10.1002/pam.20589
- Lamont, M. (2018). Addressing Recognition Gaps: Destigmatization and the Reduction of Inequality. *American Sociological Review*, 83(3), 419–444. doi.org/10.1177/0003122418773775
- Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. University of California Press.
- Laurin, K., Fitzsimons, G. M., & Kay, A. C. (2011). Social disadvantage and the self-regulatory function of justice beliefs. *Journal of Personality and Social Psychology*, 100(1), 149–171. doi.org/10.1037/a0021343
- Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. Springer Science + Business Media.
- Letourneau, N. L., Duffett-Leger, L., Levac, L., Watson, B., & Young-Morris, C. (2013). Socio-economic status and child development: A meta-analysis. *Journal of Emotional and Behavioral Disorders*, 21(3), 211–224. doi.org/10.1177/1063426611421007

- Leventhal, T., Dupéré, V., & Brooks-Gunn, J. (2009). Neighborhood influences on adolescent development. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology, volume 2: Contextual influences on adolescent development*. John Wiley & Sons.
- Levin, K. A., & Currie, C. (2014). Reliability and validity of an adapted version of the Cantril Ladder for use with adolescent samples. *Social Indicators Research, 119*(2), 1047–1063. doi.org/10.1007/s11205-013-0507-4
- Liebenberg, L., Sanders, J., Munford, R., & Thimasarn-Anwar, T. (2015). Validation of the Hektner future emotions questions as a scale for use with youth in New Zealand. *Child Indicators Research, 8*(3), 641–655. doi.org/10.1007/s12187-014-9269-z
- Lipkus, I. M., Dalbert, C., & Siegler, I. C. (1996). The importance of distinguishing the belief in a just world for self versus for others: Implications for psychological well-being. *Personality and Social Psychology Bulletin, 22*(7), 666–677. doi.org/10.1177/0146167296227002
- Littler, J. (2017). *Against meritocracy: Culture, power and myths of mobility*. Routledge, Taylor & Francis. <http://www.oapen.org/search?identifier=1004179>
- Liu, B., & Platow, M. J. (2020). Chinese adolescents' belief in a just world and academic resilience: The mediating role of perceived academic competence. *School Psychology International, 41*(3), 239–256. doi.org/10.1177/0143034320908001
- Luthar, S. S., Kumar, N. L., & Zillmer, N. (2020). High-achieving schools connote risks for adolescents: Problems documented, processes implicated, and directions for interventions. *American Psychologist, 75*(7), 983–995. doi.org/10.1037/amp0000556
- Mackenbach, J. P. (2012). The persistence of health inequalities in modern welfare states: The explanation of a paradox. *Social Science & Medicine, 75*(4), 761–769. doi.org/10.1016/j.socscimed.2012.02.031
- Mackenbach, J. P., Meerding, W. J., & Kunst, A. E. (2011). Economic costs of health inequalities in the European Union. *Journal of Epidemiology and Community Health, 65*(5), 412–419. doi.org/10.1136/jech.2010.112680
- Mackenbach, J. P., Valverde, J. R., Artnik, B., Bopp, M., Brønnum-Hansen, H., Deboosere, P., Kaleidiene, R., Kovács, K., Leinsalu, M., Martikainen, P., Menvielle, G., Regidor, E., Rychtaříková, J., Rodríguez-Sanz, M., Vineis, P., White, C., Wojtyniak, B., Hu, Y., & Nusselder, W. J. (2018). Trends in health inequalities in 27 European countries. *Proceedings of the National Academy of Sciences, 115*(25), 6440–6445. doi.org/10.1073/pnas.1800028115
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*(1), 593–614. doi.org/10.1146/annurev.psych.58.110405.085542
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*(1), 83–104.
- Madeira, A. F., Costa-Lopes, R., Dovidio, J. F., Freitas, G., & Mascarenhas, M. F. (2019). Primes and consequences: A systematic review of meritocracy in intergroup relations. *Frontiers in Psychology, 10*, 1–21. doi.org/10.3389/fpsyg.2019.02007
- Mann, M., Hosman, C. M. H., Schaalma, H. P., & de Vries, N. K. (2004). Self-esteem in a broad-spectrum approach for mental health promotion. *Health Education Research, 19*(4), 357–372. doi.org/10.1093/her/cyg041

- Marks, G. N. (2008). Are father's or mother's socioeconomic characteristics more important influences on student performance? Recent international evidence. *Social Indicators Research, 85*(2), 293–309. doi.org/10.1007/s11205-007-9132-4
- Marmot, M. (2004). *Status syndrome: How your social standing directly affects your health*. Bloomsbury.
- Marmot, M. (2020). Despair, democracy, and the failures of American capitalism. *The Lancet, 395*(10229), 1027–1028. doi.org/10.1016/S0140-6736(20)30640-1
- Masselink, M., Van Roekel, E., & Oldehinkel, A. J. (2018). Self-esteem in early adolescence as predictor of depressive symptoms in late adolescence and early adulthood: The mediating role of motivational and social factors. *Journal of Youth and Adolescence, 47*(5), 932–946. doi.org/10.1007/s10964-017-0727-z
- Massey, E. K., Gebhardt, W. A., & Garnefski, N. (2008). Adolescent goal content and pursuit: A review of the literature from the past 16 years. *Developmental Review, 28*(4), 421–460.
- Matthews, K. A., & Gallo, L. C. (2011). Psychological perspectives on pathways linking socioeconomic status and physical health. *Annual Review of Psychology, 62*, 501–530. doi.org/10.1146/annurev.psych.031809.130711
- Matthews, K. A., Gallo, L. C., & Taylor, S. E. (2010). Are psychosocial factors mediators of socioeconomic status and health connections?: A progress report and blueprint for the future. *Annals of the New York Academy of Sciences, 1186*(1), 146–173. doi.org/10.1111/j.1749-6632.2009.05332.x
- McCoy, S. K., Wellman, J. D., Cosley, B., Saslow, L., & Epel, E. (2013). Is the belief in meritocracy palliative for members of low status groups? Evidence for a benefit for self-esteem and physical health via perceived control. *European Journal of Social Psychology, 43*(4), 307–318. doi.org/10.1002/ejsp.1959
- McDool, E. M. (2017). *Neighbourhood effects on educational attainment: Does family background influence the relationship?* (SERPS No. 2017002). The University of Sheffield Department of Economics.
- McLaughlin, K. A., Costello, E. J., Leblanc, W., Sampson, N. A., & Kessler, R. C. (2012). Socioeconomic status and adolescent mental disorders. *American Journal of Public Health, 102*(9), 1742–1750. doi.org/10.2105/AJPH.2011.300477
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly, 15*(4), 351–377. doi.org/10.1177/109019818801500401
- McLoyd, V. C., Kaplan, R., Purtell, K. M., Bagley, E., Hardaway, C. R., & Smalls, C. (2009). Poverty and socioeconomic disadvantage in adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of Adolescent Psychology* (pp. 444–491). John Wiley & Sons, Inc. doi.org/10.1002/9780470479193.adlpsy002014
- McWhirter, E. H., & McWhirter, B. T. (2008). Adolescent future expectations of work, education, family, and community: Development of a new measure. *Youth & Society, 40*(2), 182–202. doi.org/10.1177/0044118X08314257
- Melita, D., Willis, G. B., & Rodríguez-Bailón, R. (2021). Economic inequality increases status anxiety through perceived contextual competitiveness. *Frontiers in Psychology, 12*, 637365. doi.org/10.3389/fpsyg.2021.637365
- Menon, M., Tobin, D. D., Corby, B. C., Menon, M., Hodges, E. V. E., & Perry, D. G. (2007). The developmental costs of high self-esteem for antisocial children. *Child Development, 78*(6), 1627–1639. doi.org/10.1111/j.1467-8624.2007.01089.x
- Mijs, J. J. B. (2016). The unfulfillable promise of meritocracy: Three lessons and their implications for justice in education. *Social Justice Research, 29*(1), 14–34. doi.org/10.1007/s11211-014-0228-0

- Minh, A., Muhajarine, N., Janus, M., Brownell, M., & Guhn, M. (2017). A review of neighborhood effects and early child development: How, where, and for whom, do neighborhoods matter? *Health & Place*, *46*, 155–174. doi.org/10.1016/j.healthplace.2017.04.012
- Mirowsky, J., & Ross, C. E. (2003). *Education, social status, and health*. Aldine de Gruyter.
- Moor, I., Lampert, T., Rathmann, K., Kuntz, B., Kolip, P., Spallek, J., & Richter, M. (2014). Explaining educational inequalities in adolescent life satisfaction: Do health behaviour and gender matter? *International Journal of Public Health*, *59*(2), 309–317. doi.org/10.1007/s00038-013-0531-9
- Moor, I., Richter, M., Ravens-Sieberer, U., Otová-Jordan, V., Elgar, F. J., & Pförtner, T.-K. (2015). Trends in social inequalities in adolescent health complaints from 1994 to 2010 in Europe, North America and Israel: The HBSC study. *European Journal of Public Health*, *25*(Suppl. 2), 57–60. doi.org/10.1093/eurpub/ckv028
- Moreno-Maldonado, C., Ramos, P., Moreno, C., & Rivera, F. (2019). Direct and indirect influences of objective socioeconomic position on adolescent health: The mediating roles of subjective socioeconomic status and lifestyles. *International Journal of Environmental Research and Public Health*, *16*(9), 1637. doi.org/10.3390/ijerph16091637
- Moreno-Maldonado, C., Rivera, F., Ramos, P., & Moreno, C. (2018). Measuring the socioeconomic position of adolescents: A proposal for a composite index. *Social Indicators Research*, *136*(2), 517–538. doi.org/10.1007/s11205-017-1567-7
- Mulder, E. F. J. D., Pater, B. C. D., & Fortuijn, J. C. D. (2018). *The Netherlands and the Dutch: A physical and human geography*. Springer International Publishing AG. doi.org/10.1007/978-3-319-75073-6
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus user's guide* (Eighth). Muthén & Muthén. www.statmodel.com/download/usersguide/MplusUserGuideVer_8.pdf
- Nielsen, F., Roos, J. M., & Combs, R. M. (2015). Clues of subjective social status among young adults. *Social Science Research*, *52*, 370–388. doi.org/10.1016/j.ssresearch.2015.02.006
- Nielsen, M., Haun, D., Kärtner, J., & Legare, C. H. (2017). The persistent sampling bias in developmental psychology: A call to action. *Journal of Experimental Child Psychology*, *162*, 31–38. doi.org/10.1016/j.jecp.2017.04.017
- Nieuwelink, H., Dam, G. ten, & Dekker, P. (2018). Adolescent citizenship and educational track: A qualitative study on the development of views on the common good. *Research Papers in Education*, *34*(3), 373–388. doi.org/10.1080/02671522.2018.1452958
- Nieuwenhuis, J. (2016). Publication bias in the neighbourhood effects literature. *Geoforum*, *70*, 89–92. doi.org/10.1016/j.geoforum.2016.02.017
- Nieuwenhuis, J., & Hooimeijer, P. (2016). The association between neighbourhoods and educational achievement, a systematic review and meta-analysis. *Journal of Housing and the Built Environment*, *31*(2), 321–347. doi.org/10.1007/s10901-015-9460-7
- Nieuwenhuis, J., Hooimeijer, P., & Meeus, W. (2015). Neighbourhood effects on educational attainment of adolescents, buffered by personality and educational commitment. *Social Science Research*, *50*, 100–109. doi.org/10.1016/j.ssresearch.2014.11.011
- Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F., & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. *American Psychologist*, *67*(2), 130–159. doi.org/10.1037/a0026699

- Nobles, J., Ritterman Weintraub, M., & Adler, N. (2013). Subjective socioeconomic status and health: Relationships reconsidered. *Social Science & Medicine*, *82*, 58–66. doi.org/10.1016/j.socscimed.2013.01.021
- Nurmi, J.-E. (1991). How do adolescents see their future? A review of the development of future orientation and planning. *Developmental Review*, *11*(1), 1–59. doi.org/10.1016/0273-2297(91)90002-6
- Odgers, C. L. (2015). Income inequality and the developing child: Is it all relative? *The American Psychologist*, *70*(8), 722–731. doi.org/10.1037/a0039836
- Odgers, C. L. (2018). Smartphones are bad for some adolescents, not all. *Nature*, *554*(7693), 432–434. doi.org/10.1038/d41586-018-02109-8
- OECD. (2016). *Netherlands 2016*. OECD Publishing. doi.org/10.1787/9789264257658-en
- OECD. (2017). *OECD Employment Outlook 2017*. OECD Publishing, Paris. doi.org/10.1787/empl_outlook-2017-en
- Onderwijsraad [Education Council]. (2015). *Herkenbaar vmbo met sterk vakmanschap. [Discernable pre-vocational education with strong craftsmanship]*. Onderwijsraad. www.onderwijsraad.nl/publicaties/2015/herkenbaar-vmbo-met-sterk-vakmanschap/item7254
- Oppenheimer, L. (2006). The belief in a just world and subjective perceptions of society: A developmental perspective. *Journal of Adolescence*, *29*(4), 655–669. doi.org/10.1016/j.adolescence.2005.08.014
- Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*, *120*(4), 1013–1034. doi.org/10.1037/pspp0000358
- Orth, U., Robins, R. W., & Roberts, B. W. (2008). Low self-esteem prospectively predicts depression in adolescence and young adulthood. *Journal of Personality and Social Psychology*, *95*(3), 695–708. doi.org/10.1037/0022-3514.95.3.695
- Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, *102*(6), 1271–1288. doi.org/10.1037/a0025558
- Orton, L. C., Pennington, A., Nayak, S., Sowden, A., Petticrew, M., White, M., & Whitehead, M. (2019). What is the evidence that differences in ‘control over destiny’ lead to socioeconomic inequalities in health? A theory-led systematic review of high-quality longitudinal studies on pathways in the living environment. *Journal of Epidemiology and Community Health*, *73*(10), 929–934. doi.org/10.1136/jech-2019-212565
- Owens, A. (2010). Neighborhoods and schools as competing and reinforcing contexts for educational attainment. *Sociology of Education*, *83*(4), 287–311. doi.org/10.1177/0038040710383519
- Oyserman, D., Johnson, E., & James, L. (2011). Seeing the destination but not the path: Effects of socioeconomic disadvantage on school-focused possible self content and linked behavioral strategies. *Self and Identity*, *10*(4), 474–492. doi.org/10.1080/15298868.2010.487651
- Patacchini, E., & Zenou, Y. (2011). Neighborhood effects and parental involvement in the intergenerational transmission of education. *Journal of Regional Science*, *51*(5), 987–1013. doi.org/10.1111/j.1467-9787.2011.00722.x
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *The American Psychologist*, *44*(2), 329–335.

- Patton, G. C., Olsson, C. A., Skirbekk, V., Saffery, R., Wlodek, M. E., Azzopardi, P. S., Stonawski, M., Rasmussen, B., Spry, E., Francis, K., Bhutta, Z. A., Kassebaum, N. J., Mokdad, A. H., Murray, C. J. L., Prentice, A. M., Reavley, N., Sheehan, P., Sweeny, K., Viner, R. M., & Sawyer, S. M. (2018). Adolescence and the next generation. *Nature*, *554*(7693), 458–466. doi.org/10.1038/nature25759
- Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., Arora, M., Azzopardi, P., Baldwin, W., Bonell, C., Kakuma, R., Kennedy, E., Mahon, J., McGovern, T., Mokdad, A. H., Patel, V., Petroni, S., Reavley, N., Taiwo, K., ... Viner, R. M. (2016). Our future: A Lancet commission on adolescent health and well-being. *The Lancet*, *387*(10036), 2423–2478. doi.org/10.1016/S0140-6736(16)00579-1
- Patton, G. C., Tollit, M. M., Romaniuk, H., Spence, S. H., Sheffield, J., & Sawyer, M. G. (2011). A prospective study of the effects of optimism on adolescent health risks. *Pediatrics*, *127*(2), 308–316. doi.org/10.1542/peds.2010-0748
- Pearce, A., Dundas, R., Whitehead, M., & Taylor-Robinson, D. (2019). Pathways to inequalities in child health. *Archives of Disease in Childhood*, archdischild-2018-314808. doi.org/10.1136/archdischild-2018-314808
- Pepper, G. V., & Nettle, D. (2017). The behavioural constellation of deprivation: Causes and consequences. *Behavioral and Brain Sciences*, *40*(e314), 1–66. doi.org/10.1017/S0140525X1600234X
- Peter, J., & Valkenburg, P. M. (2006). Adolescents' internet use: Testing the "disappearing digital divide" versus the "emerging digital differentiation" approach. *Poetics*, *34*(4), 293–305. doi.org/10.1016/j.poetic.2006.05.005
- 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. doi.org/10.1016/j.cpr.2020.101933
- Pförtner, T.-K., Elgar, F. J., Rathmann, K., & Richter, M. (2017). The Great Recession, health, and health inequalities in adolescents in North America, Europe, and Israel. In I. Schoon & J. Bynner (Eds.), *Young people's development and the Great Recession* (pp. 401–424). Cambridge University Press. doi.org/10.1017/9781316779507.017
- Pförtner, T.-K., Günther, S., Levin, K. A., Torsheim, T., & Richter, M. (2015). The use of parental occupation in adolescent health surveys. An application of ISCO-based measures of occupational status. *Journal of Epidemiology and Community Health*, *69*(2), 177–184. doi.org/10.1136/jech-2014-204529
- Phillips, L. T., Martin, S. R., & Belmi, P. (2020). Social class transitions: Three guiding questions for moving the study of class to a dynamic perspective. *Social and Personality Psychology Compass*, *14*(9), e12560. doi.org/10.1111/spc3.12560
- Piff, P. K., Kraus, M. W., & Keltner, D. (2017). Unpacking the inequality paradox: The psychological roots of inequality and social class. In J. M. Olson (Ed.), *Advances in experimental social psychology* (Vol. 57, pp. 53–124). Academic Press. doi.org/10.1016/bs.aesp.2017.10.002
- Piko, B. F., Luszczynska, A., & Fitzpatrick, K. M. (2013). Social inequalities in adolescent depression: The role of parental social support and optimism. *International Journal of Social Psychiatry*, *59*(5), 474–481. doi.org/10.1177/0020764012440788

- Pratto, F., Sidanius, J., & Levin, S. (2006). Social dominance theory and the dynamics of intergroup relations: Taking stock and looking forward. *European Review of Social Psychology, 17*(1), 271–320. doi.org/10.1080/10463280601055772
- Prinstein, M. J. (2017). *Popular: The power of likability in a status-obsessed world*. Viking.
- Quon, E. C., & McGrath, J. J. (2014). Subjective socioeconomic status and adolescent health: A meta-analysis. *Health Psychology, 33*(5), 433–447. doi.org/10.1037/a0033716
- R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. www.R-project.org/
- Rahal, D., Huynh, V., Cole, S., Seeman, T., & Fuligni, A. (2020). Subjective social status and health during high school and young adulthood. *Developmental Psychology*. doi.org/10.1037/dev0000919
- Rapa, L. J., & Geldhof, G. J. (2020). Critical consciousness: New directions for understanding its development during adolescence. *Journal of Applied Developmental Psychology, 70*, 101187. doi.org/10.1016/j.appdev.2020.101187
- Rathmann, K., Ottova, V., Hurrelmann, K., de Looze, M., Levin, K. A., Molcho, M., Elgar, F., Gabhainn, S. N., van Dijk, J. P., & Richter, M. (2015). Macro-level determinants of young people's subjective health and health inequalities: A multilevel analysis in 27 welfare states. *Maturitas, 80*(4), 414–420. doi.org/10.1016/j.maturitas.2015.01.008
- Ravens-Sieberer, U., Erhart, M., Torsheim, T., Hetland, J., Freeman, J., Danielson, M., & Thomas, C. (2008). An international scoring system for self-reported health complaints in adolescents. *European Journal of Public Health, 18*(3), 294–299. doi.org/10.1093/eurpub/ckn001
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine, 90*, 24–31. doi.org/10.1016/j.socscimed.2013.04.026
- Reiss, F., Meyrose, A.-K., Otto, C., Lampert, T., Klasen, F., & Ravens-Sieberer, U. (2019). Socioeconomic status, stressful life situations and mental health problems in children and adolescents: Results of the German BELLA cohort-study. *PLOS ONE, 14*(3), e0213700. doi.org/10.1371/journal.pone.0213700
- Rivenbark, J., Arseneault, L., Caspi, A., Danese, A., Fisher, H. L., Moffitt, T. E., Rasmussen, L. J. H., Russell, M. A., & Odgers, C. L. (2020). Adolescents' perceptions of family social status correlate with health and life chances: A twin difference longitudinal cohort study. *Proceedings of the National Academy of Sciences*, 1–6. doi.org/10.1073/pnas.1820845116
- Rivenbark, J., Copeland, W. E., Davisson, E. K., Gassman-Pines, A., Hoyle, R. H., Piontak, J. R., Russell, M. A., Skinner, A. T., & Odgers, C. L. (2019). Perceived social status and mental health among young adolescents: Evidence from census data to cellphones. *Developmental Psychology, 55*(3), 574–585. doi.org/10.1037/dev0000551
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*(2), 151–161. doi.org/10.1177/0146167201272002
- Rosenberg, M., & Pearlin, L. I. (1978). Social class and self-esteem among children and adults. *American Journal of Sociology, 84*(1), 53–77. doi.org/10.1086/226740
- Ross, C. E., & Mirowsky, J. (2011). The interaction of personal and parental education on health. *Social Science & Medicine, 72*(4), 591–599. doi.org/10.1016/j.socscimed.2010.11.028

- Rossee, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of Statistical Software*, 48(2), 1–36. doi.org/10.18637/jss.v048.i02
- Ruijsbroek, A., Wijga, A. H., Gehring, U., Kerkhof, M., & Droomers, M. (2015). School performance: A matter of health or socio-economic background? Findings from the PIAMA birth cohort study. *PLOS ONE*, 10(8), e0134780. doi.org/10.1371/journal.pone.0134780
- Russell, A. E., Ford, T., Williams, R., & Russell, G. (2016). The association between socioeconomic disadvantage and Attention Deficit/Hyperactivity Disorder (ADHD): A systematic review. *Child Psychiatry and Human Development*, 47(3), 440–458. doi.org/10.1007/s10578-015-0578-3
- Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, 81(1), 6–22.
- Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S.-J., Dick, B., Eze, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet*, 379(9826), 1630–1640. doi.org/10.1016/S0140-6736(12)60072-5
- Schmitt, M. J. (1998). Methodological strategies in research to validate measures of belief in a just world. In L. Montada & M. J. Lerner (Eds.), *Responses to victimizations and belief in a just world* (pp. 187–215). Springer US. doi.org/10.1007/978-1-4757-6418-5_11
- Schnabel, K. U., Alfeld, C., Eccles, J. S., Köller, O., & Baumert, J. (2002). Parental influence on students' educational choices in the United States and Germany: Different ramifications - same effect? *Journal of Vocational Behavior*, 60(2), 178–198.
- Schnohr, C. W., Makransky, G., Kreiner, S., Torshøj, T., Hofmann, F., De Clercq, B., Elgar, F. J., & Currie, C. (2013). Item response drift in the Family Affluence Scale: A study on three consecutive surveys of the Health Behaviour in School-aged Children (HBSC) survey. *Measurement*, 46(9), 3119–3126. doi.org/10.1016/j.measurement.2013.06.016
- Schoon, I., & Bynner, J. (2017). *Young people's development and the great recession: Uncertain transitions and precarious futures*. Cambridge University Press.
- Schoon, I., & Lyons-Amos, M. (2017). A socio-ecological model of agency: The role of psycho-social and socioeconomic resources in shaping education and employment transitions in England. *Longitudinal and Life Course Studies*, 8(1), 35–56. doi.org/10.14301/llcs.v8i1.404
- Schoon, I., & Polek, E. (2011). Teenage career aspirations and adult career attainment: The role of gender, social background and general cognitive ability. *International Journal of Behavioral Development*, 35(3), 210–217. doi.org/10.1177/0165025411398183
- Schulz, W., Schunck, R., Diewald, M., & Johnson, W. (2017). Pathways of intergenerational transmission of advantages during adolescence: Social background, cognitive ability, and educational attainment. *Journal of Youth and Adolescence*, 46(10), 2194–2214. doi.org/10.1007/s10964-017-0718-0
- Schwartz, C. R., & Mare, R. D. (2005). Trends in educational assortative marriage from 1940 to 2003. *Demography*, 42(4), 621–646.
- Shane, J., & Heckhausen, J. (2013). University students' causal conceptions about social mobility: Diverging pathways for believers in personal merit and luck. *Journal of Vocational Behavior*, 82(1), 10–19. doi.org/10.1016/j.jvb.2012.08.003

- Shavit, Y., & Blossfeld, H.-P. (1993). *Persistent inequality: Changing educational attainment in thirteen countries. social inequality series*. Westview Press.
- Sheehy-Skeffington, J. (2020). The effects of low socioeconomic status on decision-making processes. *Current Opinion in Psychology*, 33, 183–188. doi.org/10.1016/j.copsyc.2019.07.043
- Shiffrer, D. (2019). The contributions of parental, academic, school, and peer factors to differences by socioeconomic status in adolescents' locus of control. *Society and Mental Health*, 9(1), 74–94. doi.org/10.1177/2156869318754321
- Silbereisen, R. K., & Tomasik, M. J. (2015). Social and economic change: Psychological challenges for individuals. In W. A. Darity Jr. (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed., Vol. 22, pp. 147–155). Elsevier. doi.org/10.1016/B978-0-08-097086-8.26070-4
- Simons, A. M. W., Houkes, I., Koster, A., Groffen, D. A. I., & Bosma, H. (2018). The silent burden of stigmatisation: A qualitative study among Dutch people with a low socioeconomic position. *BMC Public Health*, 18(1), 443. doi.org/10.1186/s12889-018-5210-6
- Singh-Manoux, A., Marmot, M. G., & Adler, N. E. (2005). Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine*, 67(6), 855–861. doi.org/10.1097/01.psy.0000188434.52941.a0
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417–453.
- Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology*, 57(1), 255–284. doi.org/10.1146/annurev.psych.57.102904.190124
- Smith, H. J., Pettigrew, T. F., Pippin, G. M., & Bialosiewicz, S. (2012). Relative deprivation: A theoretical and meta-analytic review. *Personality and Social Psychology Review*, 16(3), 203–232. doi.org/10.1177/1088868311430825
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, 13(1982), 290–312. doi.org/10.2307/270723
- Sorhagen, N. S. (2013). Early teacher expectations disproportionately affect poor children's high school performance. *Journal of Educational Psychology*, 105(2), 465–477. doi.org/10.1037/a0031754
- Statistics Netherlands, CBS. (2020). *Migration background*. CBS. www.cbs.nl/en-gb/about-us/innovation/project/cbs-experimenting-with-dot-maps/migration-background
- Stephens, N. M., Markus, H. R., & Phillips, L. T. (2014). Social class culture cycles: How three gateway contexts shape selves and fuel inequality. *Annual Review of Psychology*, 65(1), 611–634. doi.org/10.1146/annurev-psych-010213-115143
- Stevens, G. W. J. M., Buyukcan-Tetik, A., Maes, M., Weinberg, D., Vermeulen, S., Visser, K., & Finke-nauer, C. (2021). Socioeconomic disparities in changes in late adolescents' mental health before and during the COVID-19 pandemic. *Manuscript Submitted for Publication*. Preprint: <https://osf.io/czwea/>
- Stevens, G. W. J. M., van Dorsselaer, S., Boer, M., de Roos, S., Duinhof, E. L., ter Bogt, T., Van Den Eijnden, R. J. J. M., Kuyper, L., Visser, D., Vollebergh, W. A. M., & de Looze, M. E. (2018). *HBSC 2017: Gezondheid en welzijn van jongeren in nederland [Health and well-being of young people in the Netherlands]*. Utrecht University.

- Stevens, P. A. J., Clycq, N., Timmerman, C., & Van Houtte, M. (2011). Researching race/ethnicity and educational inequality in the Netherlands: A critical review of the research literature between 1980 and 2008. *British Educational Research Journal*, 37(1), 5–43. doi.org/10.1080/01411920903342053
- Stroebe, K., Postmes, T., Täuber, S., Stegeman, A., & John, M.-S. (2015). Belief in a just what? Demystifying just world beliefs by distinguishing sources of justice. *PLOS ONE*, 10(3), e0120145. doi.org/10.1371/journal.pone.0120145
- Sullivan, S. A., Thompson, A., Kounali, D., Lewis, G., & Zammit, S. (2017). The longitudinal association between external locus of control, social cognition and adolescent psychopathology. *Social Psychiatry and Psychiatric Epidemiology*, 52(6), 643–655. doi.org/10.1007/s00127-017-1359-z
- Svedberg, P., Nygren, J. M., Staland-Nyman, C., & Nyholm, M. (2016). The validity of socioeconomic status measures among adolescents based on self-reported information about parents occupations, FAS and perceived SES; implication for health related quality of life studies. *BMC Medical Research Methodology*, 16(1), 48. doi.org/10.1186/s12874-016-0148-9
- Sweeting, H., Green, M., Benzeval, M., & West, P. (2016). The emergence of health inequalities in early adulthood: Evidence on timing and mechanisms from a West of Scotland cohort. *BMC Public Health*, 16(1), 41. doi.org/10.1186/s12889-015-2674-5
- Sweeting, H., West, P., Young, R., & Der, G. (2010). Can we explain increases in young people's psychological distress over time? *Social Science & Medicine*, 71(10), 1819–1830. doi.org/10.1016/j.socscimed.2010.08.012
- Sykes, B., & Kuyper, H. (2009). Neighbourhood effects on youth educational achievement in the Netherlands: Can effects be identified and do they vary by student background characteristics? *Environment and Planning A*, 41(10), 2417–2436. doi.org/10.1068/a41255
- Sykes, B., & Musterd, S. (2011). Examining neighbourhood and school effects simultaneously: What does the Dutch evidence show? *Urban Studies*, 48(7), 1307–1331. doi.org/10.1177/0042098010371393
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103(2), 193–210. doi.org/10.1037/0033-2909.103.2.193
- Taylor, S. E., & Seeman, T. E. (1999). Psychosocial resources and the SES-health relationship. *Annals of the New York Academy of Sciences*, 896(1), 210–225. doi.org/10.1111/j.1749-6632.1999.tb08117.x
- ter Bogt, T., van Dorsselaer, S., & Vollebergh, W. (2003). *HBSC 2002: Psychische gezondheid, risicogedrag en welbevinden van Nederlandse scholieren [Mental health, risk behaviour and well-being of Dutch students]*. Trimboos-instituut.
- Thomas, K. J., & Mucherah, W. M. (2016). How fair is my world? Development of just world beliefs among Kenyan students. *Journal of Adolescence*, 49, 244–253. doi.org/10.1016/j.adolescence.2016.03.011
- Thomas, K. J., & Rodrigues, H. (2019). The just world gap, privilege, and legal socialization: A study among Brazilian preadolescents. *Social Justice Research*. doi.org/10.1007/s11211-019-00344-6

- Tieben, N., de Graaf, P. M., & de Graaf, N. D. (2010). Changing effects of family background on transitions to secondary education in the Netherlands: Consequences of educational expansion and reform. *Research in Social Stratification and Mobility*, 28(1), 77–90. doi.org/10.1016/j.rssm.2009.12.004
- Tieben, N., & Wolbers, M. H. J. (2010). Transitions to post-secondary and tertiary education in the Netherlands: A trend analysis of unconditional and conditional socio-economic background effects. *Higher Education*, 60(1), 85–100. doi.org/10.1007/s10734-009-9289-7
- Timmermans, A. C., Boer, H. de, Amsing, H. T. A., & Werf, M. P. C. van der. (2018). Track recommendation bias: Gender, migration background and SES bias over a 20-year period in the Dutch context. *British Educational Research Journal*, 44(5), 847–874. doi.org/10.1002/berj.3470
- Timmermans, A. C., Kuyper, H., & van der Werf, G. (2015). Accurate, inaccurate, or biased teacher expectations: Do Dutch teachers differ in their expectations at the end of primary education? *British Journal of Educational Psychology*, 85(4), 459–478. doi.org/10.1111/bjep.12087
- Torsheim, T., Cavallo, F., Levin, K. A., Schnohr, C., Mazur, J., Niclasen, B., Currie, C., & the FAS Development Study Group. (2016). Psychometric validation of the revised Family Affluence Scale: A latent variable approach. *Child Indicators Research*, 9(3), 771–784. doi.org/10.1007/s12187-015-9339-x
- Trejo, S., Belsky, D. W., Boardman, J. D., Freese, J., Harris, K. M., Herd, P., Sicinski, K., & Domingue, B. W. (2018). Schools as moderators of genetic associations with life course attainments: Evidence from the WLS and Add Health. *Sociological Science*, 5, 513–540.
- Twenge, J. M., & Campbell, W. K. (2002). Self-esteem and socioeconomic status: A meta-analytic review. *Personality and Social Psychology Review*, 6(1), 59–71. doi.org/10.1207/S15327957PSPR0601_3
- Van de Werfhorst, H. G., & Mijs, J. J. B. (2010). Achievement inequality and the institutional structure of educational systems: A comparative perspective. *Annual Review of Sociology*, 36(1), 407–428. doi.org/10.1146/annurev.soc.012809.102538
- van der Heide, I., Gehring, U., Koppelman, G. H., & Wijga, A. H. (2016). Health-related factors associated with discrepancies between children's potential and attained secondary school level: A longitudinal study. *PloS One*, 11(12), e0168110. doi.org/10.1371/journal.pone.0168110
- van Deursen, A. J. A. M., & Helsper, E. J. (2015). The third-level digital divide: Who benefits most from being online? In L. Robinson, S. R. Cotten, J. Schulz, T. M. Hale, & A. Williams (Eds.), *Studies in media and communications* (Vol. 10, pp. 29–52). Emerald Group Publishing Limited. doi.org/10.1108/S2050-206020150000010002
- van Dorsselaer, S., de Looze, M. E., Vermeulen-Smit, E., de Roos, S., Verdurmen, J., ter Bogt, T. F. M., & Vollebergh, W. A. M. (2010). *HBSC 2009: Gezondheid, welzijn en opvoeding van jongeren in Nederland [Health, well-being, and upbringing of adolescents in the Netherlands]*. Trimbos-instituut.
- van Dorsselaer, S., van Zeijl, S., van den Eeckhout, S., ter Bogt, T. F. M., & Vollebergh, W. A. M. (2007). *HBSC 2005: Gezondheid en welzijn van jongeren in Nederland [Health and wellbeing of adolescents in the Netherlands]*. Trimbos-instituut.
- van Ham, M., & Clark, W. A. V. (2009). Neighbourhood mobility in context: Household moves and changing neighbourhoods in the Netherlands. *Environment and Planning A*, 41(6), 1442–1459. doi.org/10.1068/a4182

- van Vuuren, C. L., Uitenbroek, D. G., van der Wal, M. F., & Chinapaw, M. J. M. (2018). Sociodemographic differences in 10-year time trends of emotional and behavioural problems among adolescents attending secondary schools in Amsterdam, The Netherlands. *European Child & Adolescent Psychiatry*, 27(12), 1621–1631. doi.org/10.1007/s00787-018-1157-5
- Veed, G. J., McGinley, M., & Crockett, L. J. (2019). Friendship network influence on the development of internalizing symptoms during adolescence. *Journal of Applied Developmental Psychology*, 60, 157–165. doi.org/10.1016/j.appdev.2018.09.002
- Vigo, D., Thornicroft, G., & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet Psychiatry*, 3(2), 171–178. doi.org/10.1016/S2215-0366(15)00505-2
- Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *The Lancet*, 379(9826), 1641–1652. doi.org/10.1016/S0140-6736(12)60149-4
- Visser, K., Bolt, G., Finkenauer, C., Jonker, M., Weinberg, D., & Stevens, G. W. J. M. (2020). Neighbourhood deprivation effects on young people's mental health and well-being: A systematic review of the literature. *Social Science & Medicine*, 113542. doi.org/10.1016/j.socscimed.2020.113542
- Visser, K., Bolt, G., & Kempen, R. van. (2015). 'Come and live here and you'll experience it': Youths talk about their deprived neighbourhood. *Journal of Youth Studies*, 18(1), 36–52. doi.org/10.1080/13676261.2014.933196
- Wheaton, B. (1980). The sociogenesis of psychological disorder: An attributional theory. *Journal of Health and Social Behavior*, 21(2), 100–124. JSTOR. doi.org/10.2307/2136730
- Whitehead, M., Pennington, A., Orton, L., Nayak, S., Petticrew, M., Sowden, A., & White, M. (2016). How could differences in 'control over destiny' lead to socio-economic inequalities in health? A synthesis of theories and pathways in the living environment. *Health & Place*, 39, 51–61. doi.org/10.1016/j.healthplace.2016.02.002
- Wijga, A. H., Kerkhof, M., Gehring, U., Jongste, D., C. J., Postma, D. S., Aalberse, R. C., Wolse, A. P., Koppelman, G. H., van Rossem, L., Oldenwening, M., Brunekreef, B., & Smit, H. A. (2014). Cohort profile: The Prevention and Incidence of Asthma and Mite Allergy (PIAMA) birth cohort. *International Journal of Epidemiology*, 43(2), 527–535. doi.org/10.1093/ije/dys231
- Wilkinson, R. G. (1999). Health, hierarchy, and social anxiety. *Annals of the New York Academy of Sciences*, 896(1), 48–63. doi.org/10.1111/j.1749-6632.1999.tb08104.x
- Willcutt, E. G. (2012). The prevalence of DSM-IV Attention-Deficit/Hyperactivity Disorder: A meta-analytic review. *Neurotherapeutics*, 9(3), 490–499. doi.org/10.1007/s13311-012-0135-8
- Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. University of Chicago Press.
- Wood, D., Kaplan, R., & McLoyd, V. C. (2007). Gender differences in the educational expectations of urban, low-income African American youth: The role of parents and the school. *Journal of Youth and Adolescence*, 36(4), 417–427. doi.org/10.1007/s10964-007-9186-2
- World Economic Forum. (2020). *The global social mobility report 2020: Equality, opportunity and a new economic imperative*. World Economic Forum. http://www3.weforum.org/docs/Global_Social_Mobility_Report.pdf

- WRR, Netherlands Scientific Council for Government Policy. (2014). *Economic inequality in the Netherlands in 8 figures*. english.wrr.nl/binaries/wrr-eng/documents/press-releases/2014/09/03/factsheet-economic-inequality-in-the-netherlands-in-8-figures/factsheet-economic-inequality.pdf
- Wu, M. S., Yan, X., Zhou, C., Chen, Y., Li, J., Zhu, Z., Shen, X., & Han, B. (2011). General belief in a just world and resilience: Evidence from a collectivistic culture. *European Journal of Personality, 25*(6), 431–442. doi.org/10.1002/per.807
- Yan, W., Yang, K., Wang, Q., You, X., & Kong, F. (2020). Subjective family socioeconomic status and life satisfaction in Chinese adolescents: The mediating role of self-esteem and social support. *Youth & Society, 1*–19. doi.org/10.1177/0044118X20941344
- Yeager, D. S., Dahl, R. E., & Dweck, C. S. (2018). Why interventions to influence adolescent behavior often fail but could succeed. *Perspectives on Psychological Science, 13*(1), 101–122. doi.org/10.1177/1745691617722620
- Young, M. D. (2017). *The rise of the meritocracy*. Routledge.
- Youthinmind. (2015). *Downloadable SDQs and related items*. <http://www.sdqinfo.org/py/sdqinfo/b0.py>
- Yu, G., Zhao, F., Wang, H., & Li, S. (2018). Subjective social class and distrust among Chinese college students: The mediating roles of relative deprivation and belief in a just world. *Current Psychology*. doi.org/10.1007/s12144-018-9908-5
- Zaborskis, A., Grincaite, M., Lenzi, M., Tesler, R., Moreno-Maldonado, C., & Mazur, J. (2018). Social inequality in adolescent life satisfaction: Comparison of measure approaches and correlation with macro-level indices in 41 countries. *Social Indicators Research, 141*, 1055–1079. doi.org/10.1007/s11205-018-1860-0
- Zajacova, A., & Lawrence, E. M. (2018). The relationship between education and health: Reducing disparities through a contextual approach. *Annual Review of Public Health, 39*(1), 273–289. doi.org/10.1146/annurev-publhealth-031816-044628
- Zambon, A., Boyce, W., Cois, E., Currie, C., Lemma, P., Dalmasso, P., Borraccino, A., & Cavallo, F. (2006). Do welfare regimes mediate the effect of socioeconomic position on health in adolescence? A Cross-national comparison in Europe, North America, and Israel. *International Journal of Health Services, 36*(2), 309–329.
- Zarrett, N., & Eccles, J. (2006). The passage to adulthood: Challenges of late adolescence. *New Directions for Youth Development, 2006*(111), 13–28. doi.org/10.1002/yd.179
- Zilanawala, A., Sacker, A., & Kelly, Y. (2019). Internalising and externalising behaviour profiles across childhood: The consequences of changes in the family environment. *Social Science & Medicine, 226*, 207–216. doi.org/10.1016/j.socscimed.2019.02.048
- Zou, R., Xu, X., Hong, X., & Yuan, J. (2020). Higher socioeconomic status predicts less risk of depression in adolescence: Serial mediating roles of social support and optimism. *Frontiers in Psychology, 11*(1955). doi.org/10.3389/fpsyg.2020.01955

Acknowledgements

Rather than claim to be standing on the shoulders of a few *giants*, researchers could instead consider ourselves indebted to a vast colony of fellow *ants*. During these past four years I have leant on many shoulders, and only hope that my own will buttress others in the future. It is humbling to recognise the breadth of the community that contributed, in so many different ways, to this thesis (and then further, to recognise that every author of every paper cited within has similarly benefited from the support of innumerable others).

And so, to my ants (☺).

First, my supervisors, **Catrin** and **Gonneke**. Your dedication to this project and this PhD has been phenomenal. You provided extremely thorough, critical, yet constructive suggestions on tens (if not hundreds) of drafts. You made yourself available week after week after week, always pushing me to further sharpen my ideas and my writing. Your relentless drive to do science in a principled way, your curiosity, and your optimism that (despite the inevitable barriers) this work would lead to valuable knowledge, are inspiring. We didn't always see eye to eye, but the fact there is a now a more than satisfactory PhD to show for our collaboration is testimony to your patience and judgement. **Catrin**, you are an unstoppable force of enthusiasm, ideas, and commitment – in short, an appropriate dynamism for Dynamics of Youth! **Gonneke**, I'm so glad the successful collaboration on my Master's thesis continued and that this final year has contained several high notes (including our lovely lunch in Amelisweerd). Hope to attend an inaugural lecture one day soon! Thank you both for taking a chance on me four years ago: I have learned an enormous amount, about science, academia, teamwork, and perhaps, most of all, about myself.

Next, to the Fabulinus members (Youth Studies PhD and researchers). **Peggy**, thank you for welcoming me at the start. **Lydia**, we are due a catch up! I have so missed regularly seeing you and our office repartee, though it is some comfort when we're both online for team meetings (and secretly messaging in the background). **Elisa**, your pragmatic advice (such as reminding me how to get the best out of our shared supervisors!) has been invaluable, and our trip to Ghent was a lovely memory of when conferences were spent making friends in charming cities rather than sitting behind a screen. Can't wait to meet your twins! **Maartje**, I'm sure you've accomplished about twice as much as I have despite starting at the same time, and yet you've always been so generous in sharing your vast expertise. It's so exciting that we are finishing our PhDs and beginning a different kind of extraordinary adventure at much the same time. Our little ones will have to meet soon, good luck in these first months! **Ties**, thanks for encouraging me to download the mess in my brain in my rambling Teams messages (if you didn't intend this, well, perhaps you didn't discourage me enough!), for your all your great questions in LSG, and for being one of my main Twitter foils, long may it continue. **Heiko**, your tremendous dedication to unpacking socioeconomic inequalities in adolescent health has provided me with so much to think about, I can't wait to see what you uncover next. **Suzanne**, thanks for being another true interdisciplinarian in the group, for your kindness (that Dutch summary palaver...), and for joining me in the Krommerijn that time. **Ying**,

I miss organising presents with you, though at least I'm still working with you on the risk project, and thank you again for organising that unforgettable online game night... **Ricarda**, lovely to have you in the group for a while and begin (our ongoing) discussions of what good science should look like. **Hilde**, great you are working on such a similar topic (so I can send you all the papers I don't have time to read...) and good luck with this next round of HBSC! **Yanyu**, hope to meet you in person soon, but glad we've at least started getting to know you online. **Laurien**, funny to think that 4.5 years ago we were organising a ReMa quiz... I'm still astounded by you researchers who combine PhD with practice. **Luzia**, lovely to have you join the group and hear about Groningen PhD life, looking forward to a dinner someday soon.

To the rest of the **Youth Studies** group, past and present, I have learned so much from LSG meetings, corridor conversations, and email chains. I'm particularly lucky to count the wonderfully talented and supportive **Margot, Margreet, and Zeena** as co-authors (even if that latter paper isn't quite finished, I can still call you a co-author, right?!) And **Regina**, thanks for being an excellent course coordinator and making my first teaching experience such a positive one.

I've also appreciated the support of other researchers in the Youth Got Talent project. **Jet, Kirsten, and Merel**, thanks for making several of my chapters interdisciplinary collaborations, I still have so much to learn from you and your fields. **Willem**, thank you for your mentorship, for listening when I really needed it, for your collaboration and passion for opening up science, and for the insight into combining academia and fatherhood. And **Jenna**, so glad you chose to stay here in Utrecht, looking forward to more hanging out and chatting about academic and immigrant life in the coming years. An enormous thank you to all the other members of the team over the years – **Rianne, Lisa, Weske, Belle, Steffie, Sander** – without whom I wouldn't have had any data to analyse. So great to hear from most of you again in recent weeks and to hear how your lives are going. Finally, to the students who I supervised for their theses – **Charita, Inger, Maartje, Melissa, Melissa, Rianne, Rolf, Shanna, Tamara** – your ideas, questions, and enthusiasm for understanding adolescent health inequalities was crucial for developing my own thinking and remains much appreciated. And without such positive teaching experience, I would never have chosen to become a lecturer.

Fellow **ISS colleagues**, it's been a pleasure to share the corridors of SGG with you. A special mention to my starting day buddies – **Evi, Nora, Tom, and Wybren** – who've always made me feel like an honorary ERCOMER-member, and to my one-time roommate **Zhipeng**, we had such fascinating chats back in the day, please come back to Utrecht again! To the many other ISS PhDs, looking forward to your own defences and parties. Thanks also to the teaching community, particularly **Ester**, can't believe it's now 5 years ago since I felt welcomed into that teachers room in Langeveld – it's about time to restart those long lunches! And **Tracy**, great to work together with our bachelor's students, it's a shame you've left, but thank you for your job 😊. I'm delighted to be staying within ISS, yet also starting afresh in the **SPPH group**, and I'm excited to keep building new links and cementing existing ones.

Speaking of the Langeveld building, I am also indebted to many people in **CAS** and throughout the **faculty**. (I feel rather guilty about the unfortunate clash between my defence and the annual CAS Research Days, which I have always thoroughly enjoyed.) Thank you to the **teachers** across the faculty who provided some excellent theory, methods and pedagogy courses. And to all the **CAS PhDs** who contributed to making meetings and socials enjoyable, being a CAS PhD representative and part of the community was one thing that kept me going during the early years of my PhD. A special shout out to my international PhD companions, **Susanne** (more Yuna pics please!) and **Stefanos** (just thinking about all the Dutch classes we've survived...), and my former-DaSCA classmate **Natasha** (who always seemed to know when I wanted to practise my Dutch and when I was far too exhausted for it). I should also mention the fantastic experience I had during **DaSCA**, in large part due to many great teachers and a lovely cohort of classmates, without which I would never have stayed in Utrecht beyond two years.

I have also been extremely fortunate to work with the extraordinary international HBSC team. **Alina** – the beating heart of the Early Careers Group – we don't know how lucky we were to have you in Utrecht for a while; thank you for being here and reassuring me that it was worth the struggle, that I was capable, and that I would eventually find my place. **Candace, Gill, Maxim, Katrijn, Michela**, thanks for your support and guidance as co-authors, hope to see you (again) at a conference soon. Michela, you were also responsible for undoubtedly the best week of my PhD, the Winter School in Pàdova. Sadly the pandemic (among other things), meant far too little of my PhD was spent outside Utrecht, but perhaps nothing could have topped that experience anyway. **Anabel**, thank you for keeping those memories alive for several years, you are an inspiration and I hope we'll get back in touch properly again soon.

Another highlight of my PhD was being part of the **Breaking Science** communication training (and competition), thank you to the organisers and fellow participants. I also greatly enjoyed working with members of the **Graduate Student Think Tank**, and coordinating the **International FSBS PhD** group. It feels like a long time ago now, but at the start of my PhD I was also warmly welcomed by the **PIAMA PhDs**, and **Alet**, and **Jet** were also wonderfully kind and supportive, and expert collaborators. Thank you also to **Miriam, Koos**, and **Inge**, for your advice, support, and kindness at moments when I was struggling (and perhaps, most of all, for validating my feelings). **Anne** and **Yayouk**, thank you for welcoming me to your group at the VU: Yayouk, crazy to realise how long ago it was that we walked through Utrecht just as this PhD started, discussing how to make the most of this time; Anne, thank you for listening, I'm not sure I would have made it without your wise counsel, and I really hope to meet Tobias soon. I am also grateful to my assessment committee – professors **Kleinjan, Kunst, Lubbers, Maas**, and **Vollebergh** – for giving their time and expertise; I'm looking forward to discussing the social gradient in adolescent mental health with you.

Also worthy of thanks are a whole host of people that I've mostly never met. All the **young people** who kindly contributed to data collection as participants in HBSC, Youth

Got Talent, or the PIAMA study. The **often unheralded staff** working at the university, whether cleaning, providing welcome and security, or in the background organising the systems that enable researchers and teachers to get on with what we do (the quality of this thesis has far more to do with the resource-rich environment that I've been privileged enough to work within than any personal intellect.) And thank you to **everyone out there prying open science and academia** (despite the best efforts of those who profit and benefit from the closed way): those who develop essential resources and make them free (Zotero, R, SciHub, RationalWiki spring to mind, there are no doubt many more); those who commit to sharing code and advice in public online forums (despite this receiving far too little recognition or reward); those who fight to dismantle academic hierarchies and power structures, systems resistant to reform, rife with injustice, and often hostile to difference. I'm also enormously grateful to all the researchers who share my view that trawling **Twitter** is a legitimate way of spending research time – not only has this led to my finding many invaluable resources, but it has also shown me that out there is a community who share my views on the role of social justice in research, and research in social justice.

My paranymphs, I have not forgotten you! **Shanshan** and **Sandra**, you both joined the department in the middle of my PhD. More than anything, you came with big open hearts, which is why I'm so proud to have you beside me on 19 November. On top of your many kindnesses, and all your practical support as I've been finishing up my PhD, you have both made these last couple of years so much fun. Sandra, all the long lunches, and walks, and brownies, and conversations about anything and everything made for a wonderfully social period in the office (bah that the pandemic ended this prematurely). And Shanshan, thank you for making me smile whenever I think of all the silliness of our Teams (and real) chats, and for being one of Wilf's most adoring fans.

As well as all these thanks, I cannot resist the temptation to also *acknowledge* a couple of things. First, to do something that a braver scientist would have insisted should appear in every paper, which is to acknowledge my own positionality. Most pertinently to this thesis, I wish to acknowledge my privileged status as someone with high SES (let's just say that I'm not the first in my family to get a PhD). I have no doubt that this facet of my identity (and no doubt other facets too) biases the way I think about knowledge, the approach I take when developing research questions, and the assumptions I make when interpreting data. Acknowledging that I have these biases, even if I'm not completely sure of their implications, seems like the least I (and other researchers) should do.

Second, I wish to acknowledge (as I insisted to myself that I must in those darkest moments) that I came extremely close to quitting this PhD. Looking back, I can only wonder that I did in fact make it to the end during this extraordinary time, when the backdrop (Brexit, a global pandemic, democracy under threat across the world) made being stuck in an ivory tower sometimes feel even more futile than it usually would. With travel curtailed for most of the last 18 months, family has been mostly impossible to reach in person, and the one part of academia that I genuinely relished (meeting a diverse range of passionate people from around the world) has been put on hold (or, also

unsatisfactorily, online). Of course, I was also fortunate not to be among those who have suffered far more, but nonetheless these circumstances only added to the considerable challenge of doing a PhD. Too many people suffer mental health challenges during their PhD that I can't help but feel it would be insincere not to acknowledge my own struggles. It took a long time for me to feel confident that there were spaces in academia where I could be myself, but I think, with the help of many people mentioned here, I may have got there in the end.

But back to my thanks, and my ants. Of course, family and friends have also been critical in reminding me that life goes on outside academia. First, the people who've brought joy to life in Utrecht. **Nelly** and **Whitney**, who've been there from the start of my Utrecht adventure (though I wish Whitney and **Alex** were still here!) **Madhuri** and **Jane**, who helped me survive our digs in Zeist and who, amazingly, are still here and have been joined by the lovely **Martin** and **Lifei** respectively. **Elmar** and **Martina**, the best neighbours we could have wished for. **Maja** and **Toni**, who among other things, have led the way in being expat parents. **Jo** and **Gareth**, although you left (sob), at least you moved somewhere we also call home! And finally, the new parent friends, in solidarity with our latest adventure. Ook, enorm bedankt aan mijn Nederlandse docenten – vooral **Jan** en **Anneke** – wie begrijpen hoe belangrijk het is om buitenlanders te verwelkomen en te integreren. Of course, friends in the UK have also been invaluable during this period too. You are too many to name, so I hope it is enough to just mention the **Balliol**, **Bucks**, **NCVYS** and **Cantelope** families (especially those who paved the way with their own PhDs).

Finally, I finish with my ever-growing family, who have all endured the lows of this PhD process and celebrated the highs. My fantastic in-laws: **Sandra**, **Jim**, **Pam**, **Simon**, **Jo**, **Ethan**, **Mila**. My siblings and their families: **Josh**, **Nyasha**, **Lou**, **Cat**, **Robin**, **James**, **Sienna**, **Edith**, **bump**. My step parents, **Esther** and **Simon**, and **Granny Beth** and **Grandma**, the two family matriarchs celebrating 90th birthdays this year (even if one of them was supposed to be last year). Each of you has contributed so much to my development and I am so lucky to have you in my life. **Mum** and **Dad**, whose love, wisdom, and guidance (and perhaps SES and genes) obviously set me (and kept me) on this path. (Now I've acknowledged this, can I go back to taking these for granted?!) And **Wilf**, you may be but 5 months old, yet I have no trouble believing you (will) have many talents and I'm so excited to discover them with you.

Finally, **Sarah**, thank you for your unwavering belief, even when it felt that no one else thought I could do this. Thank you for your stunning cover design, extraordinarily wise instincts, your humility in asking questions, your probing away and revealing where I still needed to do more work (you make me think more than anyone else), your pragmatism, and your dedication in dealing with all the things (all of which would make you a much better scientist than me if were so inclined, though I feel it's rather for the best that you're not...) If only science was set up to acknowledge how emotional and practical input are utterly crucial to the work, then you would be co-author on all of these papers. I haven't even begun to touch on all the things beyond the PhD that you bring to our family, but perhaps, for now, this will be enough. I love you.

Curriculum Vitae

Biography

Dom Weinberg (1985, London) obtained a Bachelor's degree in Philosophy, Politics and Economics (PPE) from Balliol College Oxford (2009, 2:1). He next worked for the National Council for Voluntary Youth Services (NCVYS), a London-based charitable organisation, for nearly 6 years (2010-2015), first as Policy Officer, and later as Partnerships and Policy Manager. He returned to academia in 2015, joining Utrecht University and obtaining an MSc, following a two-year research master's in Development and Socialisation in Childhood and Adolescence (2017, *cum laude*). He began his PhD, on the Youth Got Talent project, in the Interdisciplinary Social Science (ISS) department shortly afterwards, supervised by Prof. dr. Catrin Finkenauer and dr. Gonneke Stevens. The project, supported by Utrecht University's Dynamics of Youth strategic theme, aims to lead to better understanding of the relationship between socioeconomic status and adolescent health.

During his PhD project, Dom presented his work at several international conferences: the Association for Psychological Science (APS, online, 2021); the European Association for Research on Adolescence (EARA, online, 2020); the International Convention of Psychological Science (ICPS, Paris, 2019); and EARA (Ghent, 2018), where he was awarded the SECNET Best Poster Award. Dom supervised nine bachelor students' theses and taught on the Risk Behaviour and Addiction bachelor's course. He was also tutor for a group of first-year ISS bachelor students. He gave guest lectures to Utrecht University bachelor's students (twice on 'Youth policy' and once on 'Social inequalities'), and to the University College Dublin Sociology research group (on 'The social gradient in adolescent mental health').

Dom also engaged in several science communication initiatives, winning his heat in the Breaking Science competition and participating in *Weekend van de Wetenschap* and *Expeditie Next*, events to promote science to young children. He was a regular blog contributor to DUB, the independent news site of UU, and published an updated version of one blog in the Association for Psychological Science (APS) Observer magazine, titled "How can we all contribute to a more diverse psychological science?" He was also engaged in several representation initiatives as: a member of Graduate Student Think Tank; a regular speaker on the experience of being an international PhD candidate; a convenor of the faculty's International PhD Group; a PhD representative on the UU Graduate Committee Feeling at Home working group; and a CAS (Child and Adolescent Studies) Educational Committee member. Dom now works as a lecturer in the Social Policy and Public Health research group in the ISS department at Utrecht University.

Scientific publications

- Weinberg, D.**, Stevens, G. W. J. M., Bucksch, J., Inchley, J., & de Looze, M. (2019). Do country-level environmental factors explain cross-national variation in adolescent physical activity? A multilevel study in 29 European countries. *BMC Public Health*, *19*(1), 680. <https://doi.org/10.1186/s12889-019-6908-9>
- Weinberg, D.**, Stevens, G. W. J. M., Finkenauer, C., Brunekreef, B., Smit, H. A., & Wijga, A. H. (2019). The pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment: An examination of the role of cognitive ability, teacher assessment, and educational expectations. *PLOS ONE*, *14*(5), e0216803. <https://doi.org/10.1371/journal.pone.0216803>
- Weinberg, D.**, Stevens, G. W. J. M., Duinhof, E. L., & Finkenauer, C. (2019). Adolescent socioeconomic status and mental health inequalities in the Netherlands, 2001–2017. *International Journal of Environmental Research and Public Health*, *16*(19), 3605. <https://doi.org/10.3390/ijerph16193605>
- Dierckens, M., **Weinberg, D.**, Huang, Y., Elgar, F., Moor, I., Augustine, L., Lyyra, N., Deforche, B., De Clercq, B., Stevens, G. W. J. M., & Currie, C. (2020). National-level wealth inequality and socioeconomic inequality in adolescent mental well-being: A time series analysis of 17 countries. *Journal of Adolescent Health*, *66*(6), S21–S28. <https://doi.org/10.1016/j.jadohealth.2020.03.009>
- Visser, K., Bolt, G., Finkenauer, C., Jonker, M., **Weinberg, D.**, & Stevens, G. W. J. M. (2020). Neighbourhood deprivation effects on young people's mental health and well-being: A systematic review of the literature. *Social Science & Medicine*, 113542. <https://doi.org/10.1016/j.socscimed.2020.113542>
- Weinberg, D.**, Stevens, G. W. J. M., Currie, C., Delaruelle, K., Dierckens, M., Lenzi, M., Main, G., & Finkenauer, C. (2020). Country-level meritocratic beliefs moderate the social gradient in adolescent mental health: A multilevel study in 30 European countries. *Journal of Adolescent Health*, *68*(3), 548–557. <https://doi.org/10.1016/j.jadohealth.2020.06.031>
- Weinberg, D.**, Stevens, G. W. J. M., Peeters, M., Visser, K., Frankenhuis, W. E., & Finkenauer, C. (submitted). The role of social cognitions in the social gradient in adolescent mental health: A longitudinal mediation model.
- Weinberg, D.**, Stevens, G. W. J. M., Peeters, M., Visser, K., Tigchelaar, J., & Finkenauer, C. (revise and resubmit). The social gradient in adolescent mental health: Mediated or moderated by belief in a just world? *European Child & Adolescent Psychiatry*. Preprint: <https://osf.io/nkw4v/>.
- Stevens, G. W. J. M., Buyukcan-Tetik, A., Maes, M., **Weinberg, D.**, Vermeulen, S., Visser, K., & Finkenauer, C. (submitted). Socioeconomic disparities in changes in late adolescents' mental health before and during the COVID-19 pandemic. Preprint: <https://osf.io/czwea/>
- Stevens, G. W. J. M., **Weinberg, D.**, Visser, K., Jonker, M., Tigchelaar, J., Finkenauer, C., (In preparation). Socioeconomic status and child and adolescent mental health problems: An umbrella review.

- Dierckens, M., Deforche, B., De Clercq, B., Clays, E., Stevens, G. W. J. M., **Weinberg, D.**, Rouche, M., Chatelane, A., & Delaruelle, K. (*In preparation*). Countries' macro-cultural and -economic context in relation to (evolutions in) material and occupational social class-based inequalities in adolescent dietary behaviours: A multilevel analysis in 21 countries.
- Harakeh, Z., **Weinberg, D.**, Koning, I., Peeters, M., Stevens, G. W. J. M., & Boele, S. (*In preparation*) Peer processes and individual's risk-taking: A systematic review of experimental studies.

