



**SOCIAL INEQUALITIES
IN ADOLESCENT
MENTAL HEALTH
IN THE NETHERLANDS**

Elisa Duinhof

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Printed by: GVO drukkers B.V., Ede

ISBN: 978-90-393-7307-1

DOI: <https://doi.org/10.33540/25>

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Social inequalities in adolescent mental health in the Netherlands

Sociale ongelijkheid in de mentale gezondheid van adolescenten in Nederland

(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 18 september 2020 des middags te 2.30 uur

door

Edith Lisa Duinhof

Geboren op 8 augustus 1991
te Almelo

Promotor: Prof.dr. W.A.M. Vollebergh

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Voor mijn ouders

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Introduction

“There is no health without mental health” (World Health Organization, 2001, p. 1). Mental health problems are the leading source of health-related burden among young people (Gore et al., 2011). Being mentally healthy is more than the absence of mental health problems: “It is a state of well-being, in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (World Health Organization, 2001, p. 1). In this thesis I focus on both aspects of mental health: *subjective well-being* (life satisfaction; **Chapter 6**) and *mental health problems* (conduct problems, emotional problems, peer relationship problems, hyperactivity-inattention problems, psychosomatic complaints; **Chapter 2 – Chapter 6**).

With many mental health problems having their first onset in childhood or adolescence (Kessler et al., 2007), worldwide, a significant number of adolescents experience mental health problems (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). Looking at adolescent mental health from an international perspective, there is reason to believe that adolescents in the Netherlands do very well. Dutch adolescents are known as “the happiest kids in the world” (De Looze, Huijts, Stevens, Torsheim, & Vollebergh, 2018). In international comparisons, Dutch adolescents consistently report among the highest levels of subjective well-being (Bradshaw & Richardson, 2009; Inchley et al., 2016; Klocke, Clair, & Bradshaw, 2014).

This does not mean that *all* adolescents in the Netherlands have such good mental health. Social inequalities in adolescent mental health (i.e., differences in mental health status between social groups of adolescents) are a world-wide phenomenon (Inchley et al., 2016). In general, adolescents who grow up in families with a low socioeconomic status (SES) and/or families with an immigration background, and adolescents who attend lower educational levels report, on average, lower levels of subjective well-being and higher levels of mental health problems (Elgar et al., 2015; Havas, Bosma, Spreeuwenberg, & Feron, 2009; Klanšček, Zibera, Korošec, Zurc, & Albrecht, 2014; McMahon et al., 2017; Reiss, 2013; Stevens et al., 2015). Clear gender differences in mental health exist as well: worldwide, boys report higher levels of externalizing problems (directed at others, such as fighting), whereas girls report higher levels of internalizing problems (directed at the self, such as depression) (De Looze, Elgar, Currie, Kolip, & Stevens, 2019; Thapar, Collishaw, Pine, & Thapar, 2012; Torsheim et al., 2006). In line with these international findings, comparable social inequalities in the mental health of Dutch adolescents have been found (Stevens et al., 2018). In this thesis, I focus on social inequalities in adolescent mental health related to: (a) family affluence (a measure of family SES), (b) immigration background, (c) adolescent educational level, and/or (d) gender. In the remainder of the introduction I refer to these as *social inequality indicators*.

To facilitate efforts to reduce these social inequalities in adolescent mental health (e.g., Kouider, Koglin, & Petermann, 2014; Ravens-Sieberer et al., 2007; Reiss, 2013), more scientific knowledge is needed. Among others, researchers need to map the interplay of social inequality indicators in shaping adolescent mental health, across different social contexts, and examine the mechanisms underlying social inequalities in adolescent mental health (e.g., Inchley et al., 2016; Kapilashrami, 2018). The first aim of this thesis is to increase our scientific knowledge on social inequalities in adolescent mental health in the Netherlands. To do this, we examine if (social inequalities in) adolescent mental health problems have changed during the last decades (**Chapter 2**), the interplay between social inequality indicators in shaping adolescent mental health problems (**Chapter 3**), and we explore possible explanations for social inequalities in adolescent mental health problems (**Chapter 3, Chapter 4**). The second aim of this thesis is to put social inequalities in adolescent mental health in their national context. We evaluate if the self-report SDQ, a commonly used questionnaire to assess adolescent mental health problems, allows for valid cross-country comparisons of adolescent mental health problems (**Chapter 5**), and we examine to what extent the interplay between social inequality indicators depends upon characteristics of the national context (**Chapter 6**).

Social inequalities in adolescent mental health in the Netherlands

Time-trend analyses are relevant as they inform both researchers, policymakers, and practitioners whether there is cause for growing concern about adolescent mental health, and whether this is particularly true for certain groups of adolescents. Although many Western countries have reported declines in adolescent mental health during the last decades, especially among girls (Bor, Dean, Najman, & Hayatbakhsh, 2014; Collishaw, 2015), there is a lack of recent research on (social inequalities in) trends in adolescent mental health in the Netherlands. This thesis addresses this gap in the literature, by examining time-trends in Dutch adolescents mental health problems and by testing if these trends differed with social inequality indicators (immigration background, educational level, gender) (**Chapter 2**).

Studies examining the interplay of social inequality indicators are also important to get a more complete picture of social inequalities in adolescent mental health in the Netherlands. Previous studies were limited as most of these have mainly examined the impact of single social inequality indicators on adolescent mental health (e.g., family SES or immigration background or gender). It is, however, increasingly argued that social inequality indicators should not be examined in isolation. According to *intersectionality theory* (Crenshaw, 1989), adolescents belong to *multiple* social groups

based on, among others, their family SES, immigration background, and gender. These social group memberships are experienced *simultaneously* (e.g., immigrant girl; native boy) and *jointly* shape adolescents' social experiences of privilege and disadvantage and, subsequently, their developmental outcomes (Cole, 2009; Else-Quest & Hyde, 2016; Ghavami, Katsiaficas, & Rogers, 2016). Thus, social inequality indicators may interact with each other and as such exacerbate or mitigate each other's impact on adolescent mental health. To illustrate, according to the *double/multiple jeopardy hypothesis* (Dowd & Bengtson, 1978; King, 1988), having an immigration background and belonging to a low SES family may have an *aggravated* (i.e., $1 + 1 = 3$) rather than simply *cumulative* (i.e., $1 + 1 = 2$) effect on adolescent mental health. To date, little is known about the interplay between social inequality indicators in shaping adolescent mental health. In the present thesis, we aim to fill this gap of knowledge by examining the interplay between immigration background and, respectively, family affluence, adolescent educational level, and/or gender on adolescent mental health problems in the Netherlands (**Chapter 3**).

Attempts to reduce social inequalities in adolescent mental health also benefit from an understanding of the mechanisms that may underlie these social inequalities. In this thesis we examine the explanatory role of family affluence and adolescent educational level in differences in the mental health problems reported by non-western immigrant and native Dutch adolescents. As many immigrant adolescents have a lower family affluence and educational level than native adolescents (Alba, Sloan, & Sperling, 2011; Molcho et al., 2010), and because a low family affluence and low educational level are risk factors for adolescent mental health problems (Klanšček et al., 2014; Reiss, 2013), family affluence and educational differences may explain the generally found higher risk of immigrant adolescents for mental health problems. Unfortunately, previous studies (including Dutch one's) mainly controlled for family SES and have hardly examined the explanatory role of family SES and adolescent educational level. This thesis aims to fill this gap in **Chapter 3**.

In this thesis we also examine the explanatory role of perceived discrimination – adolescents' subjective perceptions of personally experiencing unfair and negative treatments based on their social group memberships (e.g., Schmitt, Postmes, Branscombe, & Garcia, 2014) – in family affluence, immigration background, and gender differences in adolescent mental health problems in the Netherlands. Adolescents who belong to stigmatized social groups – devalued social groups of low social, economic, and/or political power (i.e., low family SES, immigration background, girls) – are found to perceive more discrimination (Bucchianeri, Eisenberg, & Neumark-Sztainer, 2013; Bucchianeri, Gower, McMorris, & Eisenberg, 2016; Grollman, 2012) and there is a well-

established link between adolescents' personal perceptions of discrimination and poor mental health (Benner et al., 2018; Schmitt et al., 2014). Previous studies have mainly focused on (understanding) the associations between perceived discrimination and adolescent mental health (Benner et al., 2018; Marks, Ejesi, Mccullough, & García Coll, 2015; Priest et al., 2013), and very little research tested the explanatory role of perceived discrimination in social inequalities in adolescent mental health (Priest et al., 2013; Williams & Mohammed, 2009). We therefore examine the explanatory role of perceived discrimination in social inequalities in adolescent mental health problems in the Netherlands in **Chapter 4**.

The role of the national context

Bronfenbrenner's *bioecological theory* (Bronfenbrenner & Morris, 2007) emphasizes the importance of the social context for adolescent development. Bronfenbrenner draws attention to the fact that researchers overwhelmingly focus on the, important, role of immediate social contexts (e.g., family, school, peers) in adolescent development. However, according to Bronfenbrenner, the broader social contexts (macro-context) involved in adolescent development (e.g., societal beliefs and values, national-level policies, economical and governmental systems) are also important and should not be neglected (Bronfenbrenner & Morris, 2007; Miller, 2011). Thus, according to the bioecological theory, the national context in which adolescents grow up may shape their mental health.

International comparisons of adolescent mental health tell us how adolescents in the Netherlands are doing compared to their agemates in other countries and, as such, provide valuable information about the broader national context in which social inequalities in Dutch adolescent mental health should be understood. International comparative studies on adolescent subjective well-being are widespread and have indicated that adolescents in the Netherlands, on average, report high levels of subjective well-being (Bradshaw & Richardson, 2009; Inchley et al., 2016; Klocke et al., 2014). There are also some indications that adolescents in the Netherlands report relatively low levels of mental health problems (Ravens-Sieberer, Erhart, Gosh, & Wille, 2008; Verhulst et al., 2003), but compared to subjective well-being, cross-country data on adolescent mental health problems are relatively scarce (Erskine et al., 2017).

This may stem from the many methodological challenges that researchers face when conducting cross-country comparisons of adolescent mental health. Among others, researchers need to make sure that questionnaire items tap into the same underlying constructs and that adolescents attach the same meaning to these constructs in each country. In this thesis, adolescent mental health problems are examined using the

self-report Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). The self-report SDQ is a brief behavioral screening questionnaire and commonly used as a research tool. Many (general population) studies have included the self-report SDQ because it is short (25 items), freely available, and it captures a broad spectrum of adolescent mental health problems (i.e., conduct problems, emotional problems, peer relationship problems, hyperactivity-inattention problems). These assets also make the self-report SDQ a highly relevant instrument for cross-country comparisons of adolescent mental health problems. However, recent studies have argued that the self-report SDQ is not suitable for cross-country comparisons of adolescent mental health problems in its current form (Stevanovic et al., 2017). In this thesis we aim to fill these gaps of knowledge by evaluating and establishing a version of the self-report SDQ that allows for valid comparisons of adolescent mental health problems before examining cross-country variation in adolescent mental health problems (**Chapter 5**).

In the last chapter of this thesis, the role of the national context in social inequalities in adolescent mental health is examined. Previous studies examining the impact of *single* social inequality indicators found that higher levels of national income inequality, more restrictive national-level immigration and integration policies, and higher levels of national gender inequality widened, respectively, family affluence differences (Elgar et al., 2015), immigration background differences (Malmusi, Palència, Ikram, Kunst, & Carme Borrell, 2017), and gender differences (Torsheim et al., 2006) in adolescent mental health. This suggests that in more equal and inclusive countries, social inequalities in adolescent mental health may be smaller than in less equal and inclusive countries. To date, it is not known how these national-level characteristics impact the mental health of adolescents belonging to particular *combinations* of social groups. To further increase our understanding of the role of the national context in social inequalities in adolescent mental health, in **Chapter 6** we examine the interplay between adolescents' family affluence, immigration background, and gender and how this interplay varies with characteristics of the national context (national-level income equality, national-level immigration and integration policies, and national-level gender equality).

The Health Behaviour in School-aged Children study

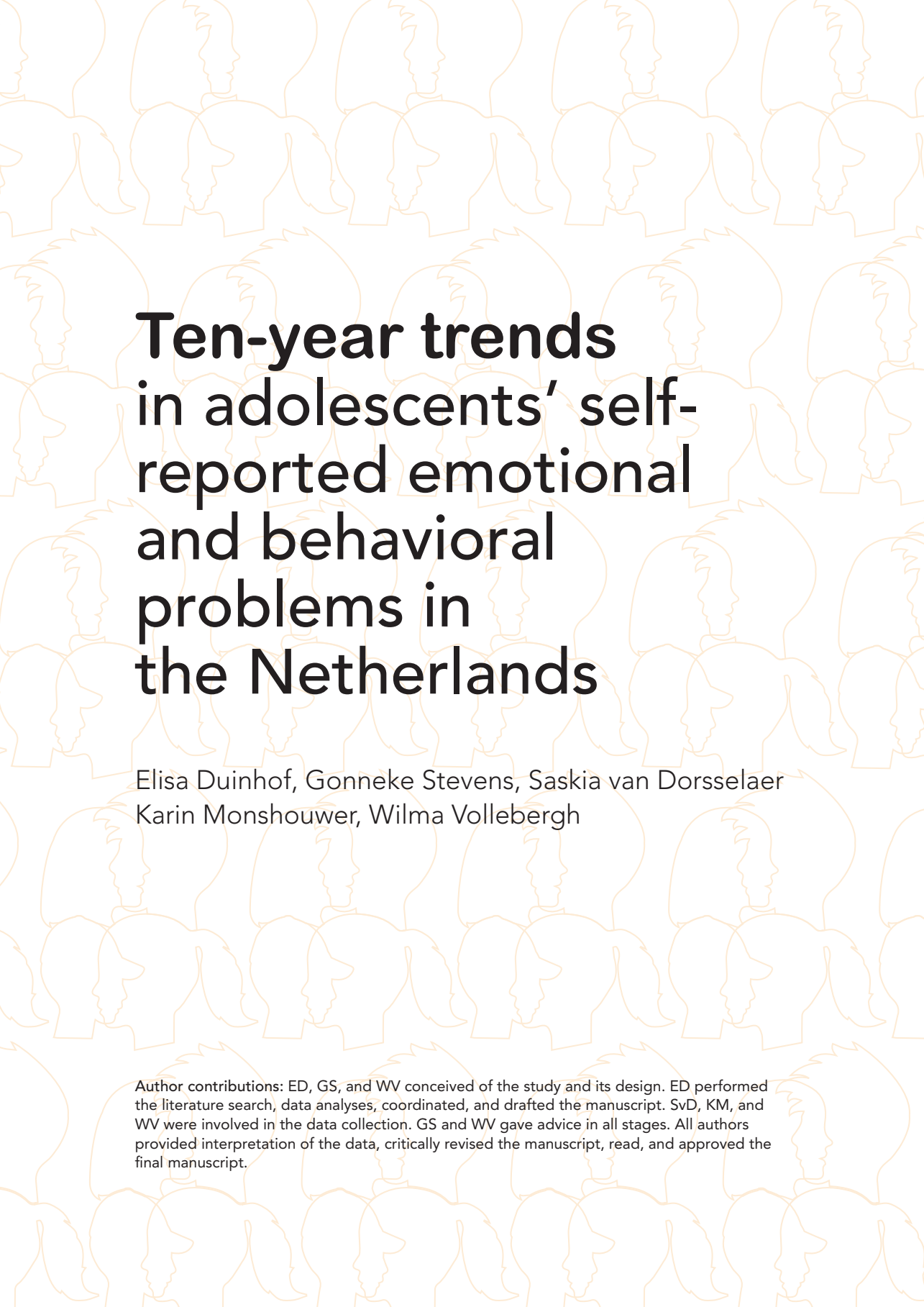
All chapters in this thesis are based on the Health Behaviour in School-aged Children (HBSC) study. HBSC is an internationally comparative, cross-sectional study on the health and well-being of adolescents that is conducted every four years. The Netherlands joined in 2001 and to date over 40 countries in Europe, North America, and the Middle East participate in the study. To assure the comparability of findings

across countries, the HBSC study uses a standardized research protocol for the sample design and survey administration.

The HBSC study is school-based and samples whole school classes using cluster sampling. In the Netherlands, a two-stage cluster sampling approach is employed. First, after stratification according to the level of urbanization, schools are randomly selected from a list of all secondary schools in the Netherlands that is provided by the government. Special education schools are not included in the study and samples are drawn separately for primary education and secondary education, respectively. Within primary education, adolescents in the highest grade (groep 8) are asked to participate in the study. In case of multiple school classes, one of these classes is randomly selected. For secondary education the procedure is slightly different. Depending upon the number of students in the school, two to five school classes are randomly selected using a list of school classes provided by the school. Within the selected school classes, anonymous, self-report questionnaires are administered with the help of trained research assistants.

The HBSC study aims to include large, national representative samples of 11-, 13-, and 15-year-old adolescents attending school. However, since whole school classes are sampled, the age of the adolescents included in the study typically ranges between 10 and 16 years. Countries can choose to apply weights to assure nationally representativeness. In the Netherlands, data is weighted for degree of urbanization, gender, school grade, and educational level (the latter two only apply to secondary education). More information can be found elsewhere (Inchley et al., 2016; Roberts et al., 2009; Stevens et al., 2018). The first three chapters (**Chapter 2 – Chapter 4**) of this thesis are based on the Dutch HBSC study and the last two chapters (**Chapter 5, Chapter 6**) are based on the international HBSC data.





Ten-year trends in adolescents' self- reported emotional and behavioral problems in the Netherlands

Elisa Duinhof, Gonneke Stevens, Saskia van Dorsselaer
Karin Monshouwer, Wilma Vollebergh

Author contributions: ED, GS, and WV conceived of the study and its design. ED performed the literature search, data analyses, coordinated, and drafted the manuscript. SvD, KM, and WV were involved in the data collection. GS and WV gave advice in all stages. All authors provided interpretation of the data, critically revised the manuscript, read, and approved the final manuscript.

Abstract

Changes in social, cultural, economic, and governmental systems over time may affect adolescents' development. The present study examined 10-year trends in self-reported emotional and behavioral problems among 11- to 16-year-old adolescents in the Netherlands. In addition, gender (girls versus boys), immigration background (native Dutch versus non-western immigrant) and educational (vocational versus academic) differences in these trends were examined. By means of the Strengths and Difficulties Questionnaire, trends in emotional and behavioral problems were studied in adolescents belonging to one of five independent population representative samples (2003: $n = 6,904$; 2005: $n = 5,183$; 2007: $n = 6,228$; 2009: $n = 5,559$; 2013: $n = 5,478$). Structural equation models indicated rather stable levels of emotional and behavioral problems over time. Whereas some small changes were found between different time points, these changes did not represent consistent changes in problem levels. Similarly, gender, immigration background, and educational differences in self-reported problems on each time point were highly comparable, indicating stable mental health inequalities between groups of adolescents over time. Future internationally comparative studies using multiple measurement moments are needed to monitor whether these persistent mental health inequalities hold over extended periods of time and in different countries.

Introduction

Recent decades have shown ample societal changes in Western countries with a potential positive or negative impact on the lives of adolescents (e.g., Collishaw et al., 2012; Collishaw, Goodman, Pickles, & Maughan, 2007; Maughan, Iervolino, & Collishaw, 2005; Rutter & Smith, 1995). By means of time-trend studies on adolescent emotional and behavioral problems, possible effects of changing societies on the lives of adolescents can be detected. To examine trends in adolescents' emotional and behavioral problems in a reliable manner, repeated assessments with comparable measures in population representative samples are needed (Maughan et al., 2005). Studies meeting these criteria are relatively rare and show mixed findings. In both Europe and the USA, most studies reported increased population levels of adolescents' emotional problems over time (e.g., Achenbach, Dumenci, & Rescorla, 2003; Collishaw, Maughan, Goodman, & Pickles, 2004; Collishaw, Maughan, Natarajan, & Pickles, 2010; Fichter, Xepapdakos, Quadflieg, Georgopoulou, & Fthenakis, 2004; Sweeting, Young, & West, 2009; Tick, Van der Ende, & Verhulst, 2007; Twenge et al., 2010; West & Sweeting, 2003). In addition, some studies found increased population levels of behavioral problems (Achenbach et al., 2003; Collishaw et al., 2004). In contrast, other studies reported slightly decreased population levels of behavioral problems (Tick, Van der Ende, & Verhulst, 2008) or both (slightly) decreased emotional and behavioral population levels over time (Achenbach, Dumenci, & Rescorla, 2002; Maughan, Collishaw, Meltzer, & Goodman, 2008). Furthermore, some time-trend studies found stable population levels of emotional and behavioral problems (Sourander et al., 2012; Verhulst, Van der Ende, & Rietbergen, 1997; Wångby, Magnusson, & Stattin, 2005). Although the former might roughly suggest that levels of emotional problems have increased during the last decades whereas this may not be the case for behavioral problems the findings of previous research are somewhat inconsistent. As such, it is difficult to draw firm conclusions about trends in adolescents' emotional and behavioral problems in Western countries.

In addition, previous studies on time trends in emotional and behavioral problems were limited because they only used two or three measurement moments with approximately 10-year time intervals. Therefore, the results of these studies might not reflect consistent trends in emotional and behavioral problems over time, but more or less random problem levels at different points of time. Finally, societal changes may have a differential impact on emotional and behavioral problems of different social groups. The impact of societal changes on the daily lives of adolescents may not only vary with the social group, but these daily life changes may also have differential effects on emotional and behavioral problems for different social groups (Rutter & Smith,

1995). This suggests that different time-trends in emotional and behavioral problems may be found for different social groups. In this study, it is tested whether time-trends in emotional and behavioral problems vary with the gender of the adolescent as well as with their immigration background and educational background. Some studies were indicative of gender-specific trends in emotional and behavioral problems, with girls showing increasing population levels of emotional problems and boys showing stable or decreasing population levels of emotional problems over time (Tick et al., 2008; West & Sweeting, 2003). However, although previous studies on time trends stratified by or controlled for social group differences (i.e., gender, immigration background), these did not empirically test whether these trends vary with the gender, immigration background, or educational level of the adolescent.

To find out if adolescents' mean levels of emotional and behavioral problems have been subjected to change during the last decade, the present study aimed to investigate trends in Dutch adolescents' self-reported emotional and behavioral problems between 2003 and 2013 as well as gender, immigration background, and educational differences in these trends. To do so, five nationally representative samples were used measuring emotional and behavioral problems on consecutive time points.

Materials and methods

Samples

Five independent population representative samples of the Dutch Health Behavior in School-aged Children (HBSC; 2005, 2009, 2013) (De Looze et al., 2014; Van Dorsselaer et al., 2010; Van Dorsselaar, Zeijl, Van den Eeckhout, Ter Bogt, & Vollebergh, 2007) and the Dutch National School Survey on Substance Use (DNSSSU; 2003, 2007) (Monshouwer, Van Dorsselaer, Gorter, Verdurmen, & Vollebergh, 2004; Monshouwer, Verdurmen, Van Dorsselaar, Gorter, & Vollebergh, 2008) studies were used. The total sample consisted of 29,352 11- to 16-year-old boys and girls attending secondary education. Consent procedures required by ethical and legal authorities for this type of survey were followed; only those adolescents who volunteered to participate and whose parents did not object to their participation were included in the current study.

The HBSC and the DNSSSU studies made use of a highly comparable data collection and sampling methods and were conducted by the same national research team. In both studies, field work took place in October and November and samples were drawn using cluster sampling, with schools as the primary sampling units. All samples were stratified by degree of urbanization. In addition, data were weighted

for school grade, educational level, degree of urbanization, and gender to assure that all samples were nationally representative. All data were collected by means of questionnaires, which were distributed in school classes and administered by research assistants during a lesson (usually 50 min). When introducing the questionnaire, the anonymity of the answers of the participants was emphasized by the research assistant. Collecting all questionnaires in one envelope and sealing the envelope in the presence of the participants further ensured anonymity. Also, during administration of the questionnaires, research assistants ensured that participants were not able to read each other's answers. More information about the data collection procedure can be found elsewhere (e.g., De Looze et al., 2014; Monshouwer et al., 2004).

The average school response rate was 52.8%, ranging from 40% (2013) to 72% (2003). Main reasons for schools not to participate in the study were participation in, or frequent research participation requests by other surveys. Within randomly selected school classes, in all samples, response rates were above 91%. Main reasons for non-response of students were illness or truancy. Of the total sample, for 900 adolescents (2003: $n = 162$, 2.3%; 2005: $n = 238$, 4.4%; 2007: $n = 328$, 5.0%; 2009: $n = 81$, 1.4%; 2013: $n = 91$, 1.6%) all items assessing emotional and behavioral problems were missing and the adolescents were excluded from the analyses. Comparing these adolescents with the remaining samples, some significant ($p < 0.05$) but negligible ($\phi < 0.10$) gender, immigration background, and educational differences were found. For the remaining samples, missing item responses varied between 0.1% and 2.3%. Although for some items missing responses were significantly ($p < 0.05$) related to participants' characteristics (i.e., gender, immigration background, and educational level), these relationships were all negligible ($\phi < 0.10$) in size.

Instruments

Emotional and behavioral problems. All participants filled in the Dutch translation of the self-report version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). The self-report SDQ is a 25-item behavioral screening questionnaire, for adolescents from 11- to 16-years that has been used throughout the Western world (Achenbach et al., 2008; Goodman, 1997). The SDQ consists of five subscales, each including five items, measuring difficulties (i.e., conduct problems, emotional symptoms, peer relationship problems, hyperactivity-inattention problems) and strengths (i.e., prosocial behavior). Items are scored on a three-point ordinal Likert scale ("Not true" = 0; "Somewhat true" = 1; "Certainly true" = 2), with higher scores indicating more problems. Examples of items are: "I worry a lot" and "I am easily distracted, I find it difficult to concentrate". The items that assessed difficulties were

included in this study. For descriptive purposes subscale mean scores were computed. Mean scores were only computed for participants who completed at least three of the five subscale items.

In the present study, Cronbach's alphas were acceptable for emotional symptoms ($\alpha_{\text{range}} = 0.67\text{--}0.71$) and hyperactivity-inattention problems ($\alpha_{\text{range}} = 0.68\text{--}0.73$). However, in line with former studies (e.g., Van Widenfelt, Goedhart, Treffers, & Goodman, 2003), unacceptably low values were found for conduct problems ($\alpha_{\text{range}} = 0.48\text{--}0.54$) and peer relationship problems ($\alpha_{\text{range}} = 0.42\text{--}0.49$). Moreover, the construct validity of the SDQ has been debated upon (e.g., Goodman, Lamping, & Ploubidis, 2010). Therefore, the construct validity of the SDQ was examined in the current sample before proceeding with subsequent analyses (see Results).

Demographic variables. Age, gender, immigration background (i.e., native Dutch vs. non-western immigrant) and educational level (i.e., vocational vs. academic) were all measured by means of self-report. The academic educational level consisted of adolescents following pre-university education, higher secondary education, and intermediate secondary education. These educational levels were compared with the vocational track. Adolescents were considered as having a non-western immigration background if at least one of the parents of the adolescent was born in a non-western country.

Analytic strategy

Structural equation modeling analyses were performed in Mplus 7.11, using the weighted least squares mean and variance adjusted estimator. Analyses were corrected for cluster effects of adolescents sharing the same school. First, using multigroup confirmatory factor analysis, the factor structure of the SDQ with four latent factors representing emotional and behavioral problems was examined. Second, it was tested whether the SDQ measured identical underlying constructs in each sample (i.e., time point), and subgroup (i.e., gender, immigration background, and educational level). To do so, analyses of invariance were performed by testing three consecutive models: a model without equality constraints (i.e., configural invariance), a model with equally constrained factor loadings (i.e., metric invariance), and a model with equally constrained factor loadings and item thresholds (i.e., scalar invariance). Measurement invariance was established if models showed acceptable fits to the data, no significant increases in Chi square ($\Delta\chi^2$) and negligible differences in model fit (ΔCFI and ΔRMSEA) compared to the configural model. CFI values above 0.900 and RMSEA values below 0.080 suggested acceptable model fits (for details and references see Byrne, 2012). Values not exceeding 0.010 for ΔCFI and 0.015 for ΔRMSEA were considered negligible (Chen, 2007).

Second, latent mean differences in problems between time points were examined using a multigroup model. The Wald test was used to examine whether latent means were comparable across all five time points. In case the Wald test reached significance, indicating that values were not comparable across all five time points, latent mean differences between successive time points were examined. This was investigated by successively fixing latent means at zero for each time point because multigroup models require latent means to be fixed at zero for one group. To examine the size of latent mean differences between time points the latent standardized effect size for independent samples (D) (Choi, Fan, & Hancock, 2009) was used.

Third, gender, immigration background, and educational differences in trends were examined. To test this, multigroup Multiple Indicators Multiple Causes (MIMIC) models were constructed by regressing the dichotomized variables gender, immigration background, and educational level on the latent factors. The Wald test was used to examine whether subgroup mean differences changed significantly across all five time points. To examine the size of group mean differences on each time point, standardized regression coefficients were interpreted using Cohen's d [negligible ($d < 0.20$), small ($d < 0.50$), medium ($d < 0.80$), large ($d > 0.80$)] (Cohen, 1992).

Results

Descriptives

The key demographic statistics of the five samples are presented in Table 2.1. Little age, gender, immigration background, and educational differences were found between the samples. Although samples differed significantly in their age, immigration background, and educational level composition, these differences were all negligible in size. In addition, Table 2.1 shows that, with subscale scores ranging from 0 to 10, mean levels of conduct problems, emotional symptoms, and peer relationship problems were rather low on all time points. For hyperactivity-inattention problems, moderate mean levels were found on all time points.

Tests of measurement invariance

Results of the multigroup confirmatory factor analysis indicated that the four factor multigroup model showed an acceptable fit to the data (see Table 2.2, model 3): CFI values were just below 0.900 and RMSEA values were far below 0.080. Hence, these statistics indicated that the model could be used to examine self-reported problems on all time points. Standardized factor loadings of the SDQ items and correlations

Table 2.1 Demographic and descriptive statistics of the samples (weighted %)

Survey year ^a	DNSSU 2003	HBSC 2005	DNSSU 2007	HBSC 2009	HBSC 2013
Total, n	6,904	5,183	6,228	5,559	5,478
Age, M (SD)	13.84 (1.27)	13.86 (1.27)	13.89 (1.25)	13.85 (1.27)	13.83 (1.28)
Gender, n (%)					
Girls	3,376 (48.9)	2,550 (49.2)	3,054 (49.0)	2,733 (49.2)	2,694 (49.2)
Boys	3,528 (51.1)	2,633 (50.8)	3,174 (51.0)	2,826 (50.8)	2,784 (50.8)
Immigration background, n (%)					
Native Dutch	5,443 (84.1)	3,902 (80.3)	5,059 (86.9)	4,442 (83.8)	4,359 (84.5)
Non-western immigrant	1,025 (15.9)	956 (19.7)	765 (13.1)	859 (16.2)	799 (15.5)
Educational level, n (%)					
Vocational	1,829 (26.9)	1,481 (28.7)	1,407 (22.6)	1,124 (20.2)	1,335 (24.4)
Academic	4,958 (73.1)	3,680 (71.3)	4,821 (77.4)	4,435 (79.8)	4,143 (75.6)
Self-reported problems, M (SD)					
Conduct problems	2.24 (1.63)	2.01 (1.55)	1.95 (1.59)	1.83 (1.50)	1.83 (1.51)
Emotional symptoms	2.55 (2.14)	2.17 (2.07)	2.46 (2.09)	2.16 (2.00)	2.53 (2.20)
Peer relationship problems	1.80 (1.67)	1.71 (1.62)	1.71 (1.62)	1.47 (1.53)	1.57 (1.58)
Hyperactivity-inattention problems	4.15 (2.22)	3.57 (2.19)	3.78 (2.28)	3.77 (2.24)	3.93 (2.31)

Note. ^aNo differences in gender composition ($\chi^2(4) = 0.16, p = 0.997, \phi = 0.002$), and significant but negligible differences in immigration background ($\chi^2(4) = 85.92, p < 0.001, \phi = 0.056$), educational level ($\chi^2(4) = 138.19, p < 0.001, \phi = 0.069$), and age ($F(4) = 11.48, p < 0.001, \eta^2 = 0.002$) were found between samples.

between latent factors are presented in the Appendix, Tables A2.4 and A2.5. All latent factors correlated significantly and positively with each other. Correlations between the peer relationship problems and hyperactivity-inattention problems factors were small on all time points, whereas other latent factors showed medium to large correlations on all time points.

Next, Table 2.2 shows the fit indices of the models that tested measurement invariance across times and subgroups. The first model that examined configural invariance over time showed an acceptable fit, with a CFI value just below 0.900 and an RMSEA value far below 0.080. The second and third model that tested for metric and scalar invariance also yielded acceptable fits: the Chi square decreased significantly, and Δ CFI and Δ RMSEA indicated negligible changes compared to the configural model. Interestingly, the Δ CFI value slightly exceeding the 0.010 criteria was positive, indicating that the constrained model showed a better fit to the data than the model without equality constraints. Together, these findings indicate metric and scalar invariance across time. Comparable results were found for models testing measurement invariance in gender, immigration background, and educational groups. Thus, these findings showed the SDQ to be measurement invariant over time and between boys and girls, native Dutch and non-western immigrant adolescents, and vocational and academic educated adolescents allowing mean levels to be compared.

Trends in adolescents' self-reported problems

Results indicated that the latent means of conduct problems [Wald $\chi^2(4) = 99.69$, $p < 0.001$], emotional symptoms [Wald $\chi^2(4) = 89.22$, $p < 0.001$], peer relationship problems [Wald $\chi^2(4) = 10.99$, $p = 0.027$], and hyperactivity-inattention problems [Wald $\chi^2(4) = 72.47$, $p < 0.001$] were not equal across all time points. More specifically, as can be seen in Figure 2.1, conduct problems decreased between 2003 and 2007, and slightly increased between 2007 and 2013. For emotional symptoms, similar levels of problems were found in 2003, 2007 and 2013, while slightly lower mean levels were revealed in 2005 and 2009. Hyperactivity-inattention problem levels also declined between 2003 and 2005, and increased again between 2005 and 2013. The most stable pattern was found for peer relationship problems, only in 2009 problem levels were lower than most of the other years. Although these significant mean differences indicate some changes in problem levels over time, it is important to note that mean differences were only negligible ($D < 0.20$) to small ($D < 0.50$) in size.

Table 2.2 Fit indices of the models testing measurement invariance and multigroup MIMIC models

Models ^a	$\chi^2/\Delta\chi^2$	df/ Δ df	CFI/ Δ CFI	RMSEA/ Δ RMSEA	90% CI of RMSEA
Measurement invariance over time					
1. Configural invariance	9,136.22*	815	0.890	0.042	0.041-0.042
2. Metric invariance	7,939.06*	879	0.907	0.037	0.036-0.038
3. Scalar invariance	8,855.31*	943	0.896	0.038	0.037-0.039
Difference model 1 and 2	237.76*	64	0.017	0.005	
Difference model 1 and 3	726.61*	128	0.006	0.004	
Measurement invariance gender					
4. Configural invariance	10,301.38*	326	0.893	0.046	0.045-0.046
5. Metric invariance	9,298.74*	342	0.904	0.042	0.042-0.043
6. Scalar invariance	10,285.07*	358	0.894	0.043	0.043-0.044
Difference model 4 and 5	207.14*	16	0.011	0.004	
Difference model 4 and 6	737.68*	32	0.001	0.003	
Measurement invariance immigration background					
7. Configural invariance	8,678.93*	326	0.895	0.043	0.042-0.044
8. Metric invariance	7,537.48*	342	0.909	0.039	0.038-0.040
9. Scalar invariance	7,936.06*	358	0.905	0.039	0.038-0.040
Difference model 7 and 8	97.07*	16	0.014	0.004	
Difference model 7 and 9	200.79*	32	0.010	0.004	
Measurement invariance educational level					
10. Configural invariance	9,439.62*	326	0.893	0.044	0.043-0.045
11. Metric invariance	8,405.75*	342	0.905	0.040	0.039-0.041
12. Scalar invariance	8,866.98*	358	0.900	0.040	0.040-0.041
Difference model 10 and 11	188.12*	16	0.012	0.004	
Difference model 10 and 12	271.29*	32	0.007	0.004	
Multigroup MIMIC models					
13. Gender	9,163.72*	1,023	0.895	0.037	0.036-0.038
14. Immigration background and educational level	8,512.64*	1,103	0.891	0.035	0.034-0.036

Note. ^aTo increase global model-fit, the first and second item measuring hyperactivity-inattention problems were allowed to correlate based on similar meaning.

* $p < 0.001$.

Trends in subgroup differences

To explore whether it was necessary to control for any possibly confounding relationships between the subgroup variables, correlations between the subgroup variables were examined for each time point. No significant ($p > 0.05$) and negligible correlations between gender and immigration background ($r_{\text{range}} = < -0.01$ to -0.05) and gender and educational level ($r_{\text{range}} = < -0.01$ to 0.08) were found. However, significant ($p < 0.05$) and small to medium correlations were found between immigration background and educational level ($r_{\text{range}} = -0.20$ to -0.38). On each time point, non-western immigrant adolescents were less likely to attend academic educational tracks. To control for this interrelatedness, immigration background and educational level were analyzed together in one multigroup MIMIC model. Both multigroup MIMIC models showed an acceptable model fit (see Table 2.2, model 13 and model 14).

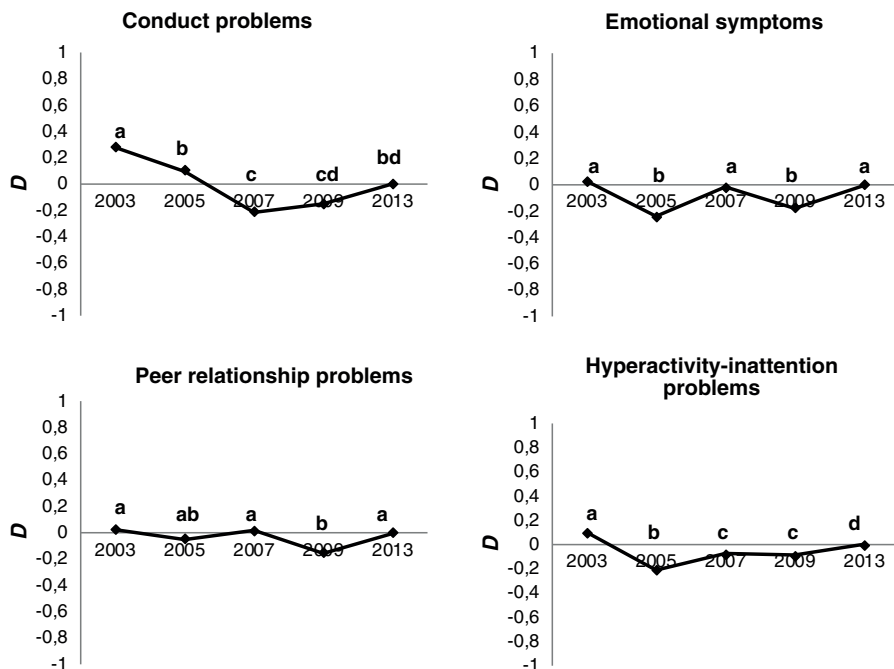


Figure 2.1 Standardized latent mean differences between time points, corrected for measurement error, with 2013 as the reference category. Latent means with different subscripts are significantly different at $p < 0.05$. Using other time points as the reference category similar results were found.

Gender differences in self-reported problems over time

For all problems, results indicated that mean differences between boys and girls changed across all five time points [conduct problems: Wald $\chi^2(4) = 31.71, p < 0.001$; emotional symptoms: Wald $\chi^2(4) = 47.32, p < 0.001$; peer relationship problems: Wald $\chi^2(4) = 18.46, p = 0.001$; hyperactivity-inattention problems: Wald $\chi^2(4) = 25.55, p < 0.001$]. As can be seen in Table 2.3, for conduct problems gender differences were relatively strong in 2007 and 2009, whereas gender differences in emotional symptoms were most pronounced in 2005 and 2013. For hyperactivity-inattention problems, gender differences were most evident in 2003. Gender differences in peer relationship problems disappeared in 2013. Although these findings indicated some changing gender differences in problems, in general, the significance and substantiality of these gender differences were highly comparable between time points (see Table 2.3). On all time points, boys reported more conduct problems and less emotional symptoms than girls. In addition, on all time points except for 2013 boys reported more peer relationship problems. Moreover, the size of gender differences in hyperactivity-inattention problems was not substantial on all time points.

Immigration background differences in self-reported problems over time

Comparable immigration background differences were found on all time points for conduct problems [Wald $\chi^2(4) = 8.95, p = 0.062$], emotional symptoms [Wald $\chi^2(4) = 4.02, p = 0.404$] and hyperactivity-inattention problems [Wald $\chi^2(4) = 2.87, p = 0.581$], indicating stable differences between native Dutch and non-western immigrant adolescents in these problems between 2003 and 2013. Indeed, Table 2.3 shows that non-western immigrant adolescents were found to report more conduct problems and lower levels of hyperactivity-inattention problems compared to native Dutch adolescents on all time points. In addition, on all time points, differences in emotional symptoms were negligible or just small in size. In contrast, immigration background differences in peer relationship problems changed to some extent over time [Wald $\chi^2(4) = 16.20, p = 0.003$]. As can be seen in Table 2.3, immigration background differences were small in 2003 and 2005 with non-western immigrant adolescents reporting more peer relationship problems whereas no immigration background differences existed in 2007 and onwards.

Table 2.3 Standardized and unstandardized gender, immigration background, and educational differences in problem mean levels for each time point

Subgroup variables	2003		2005		2007		2009		2013	
	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β	B(SE)	β
Gender^a										
COND	0.39** (0.04)	0.39	0.34** (0.05)	0.34	0.55** (0.05)	0.44	0.59** (0.05)	0.54	0.27** (0.05)	0.27
EMO	-0.68** (0.04)	-0.68	-0.85** (0.05)	-0.75	-0.66** (0.03)	-0.66	-0.72** (0.04)	-0.69	-0.90** (0.03)	-0.82
PEER	0.27** (0.04)	0.28	0.16** (0.04)	0.17	0.19** (0.04)	0.19	0.23** (0.04)	0.23	0.06 (0.04)	0.06
HYP	-0.13** (0.03)	-0.15	-0.08* (0.03)	-0.09	-0.02 (0.03)	-0.02	0.08* (0.03)	0.08	-0.01 (0.04)	-0.01
Immigration background^b										
COND	0.39** (0.06)	0.35	0.23** (0.05)	0.22	0.44** (0.08)	0.31	0.33** (0.10)	0.28	0.23** (0.05)	0.22
EMO	-0.09 (0.05)	-0.09	-0.15* (0.06)	-0.14	-0.10* (0.05)	-0.10	-0.21** (0.05)	-0.21	-0.11 (0.06)	-0.11
PEER	0.20** (0.06)	0.21	0.35** (0.06)	0.36	0.09 (0.06)	0.09	0.05 (0.08)	0.05	0.11 (0.06)	0.10
HYP	-0.34** (0.05)	-0.36	-0.40** (0.07)	-0.42	-0.34** (0.06)	-0.33	-0.35** (0.06)	-0.36	-0.26** (0.05)	-0.26
Educational level^c										
COND	-0.42** (0.06)	-0.37	-0.52** (0.08)	-0.49	-0.52** (0.08)	-0.37	-0.63** (0.09)	-0.52	-0.46** (0.06)	-0.45
EMO	-0.08 (0.05)	-0.09	-0.17* (0.07)	-0.16	-0.15** (0.04)	-0.16	-0.08 (0.06)	-0.08	-0.14* (0.07)	-0.14
PEER	-0.49** (0.06)	-0.50	-0.44** (0.07)	-0.45	-0.39** (0.06)	-0.39	-0.44** (0.07)	-0.43	-0.44** (0.05)	-0.43
HYP	-0.11* (0.04)	-0.11	-0.33** (0.06)	-0.34	-0.21** (0.04)	-0.20	-0.21** (0.04)	-0.21	-0.27** (0.06)	-0.27

Note. COND = Conduct problems; EMO = Emotional symptoms; PEER = Peer relationship problems; HYP = Hyperactivity-inattention problems.

^aGender (0 = girls; 1 = boys); ^bImmigration background (0 = native Dutch; 1 = non-western immigrant); ^cEducational level (0 = vocational; 1 = academic).

* $p < 0.05$. ** $p < 0.001$.

Educational differences in self-reported problems over time

Educational differences in conduct problems [Wald $\chi^2(4) = 5.15, p = 0.273$], emotional symptoms [Wald $\chi^2(4) = 2.27, p = 0.687$], and peer relationship problems [Wald $\chi^2(4) = 1.33, p = 0.856$] were found to be equal across all time points, indicating that differences between vocational and academic educated adolescents in these problems were stable between 2003 and 2013. Academically educated adolescents reported less conduct problems and less peer relationship problems compared to vocationally educated adolescents on each time point. For emotional symptoms, differences reached no substantial size on all time points. In contrast, educational differences in hyperactivity-inattention problems [Wald $\chi^2(4) = 11.38, p = 0.023$] changed somewhat over time. Differences between adolescents following vocational and academic educational levels were negligible in 2003, most pronounced in 2005 and small in 2007 and 2013 (see Table 2.3).

Discussion

It has been widely acknowledged that social, cultural, economic and governmental changes may affect adolescents' development (Bronfenbrenner & Morris, 2007). However, whilst not ignoring the negligible to small variations in problem mean levels over time in this study, no consistent increases or decreases in emotional and behavioral problems were found for Dutch adolescents during the last decade. Only for conduct problems, variations over time were somewhat more substantial, with the decline in conduct problems being just short of medium between 2003 and 2007. Hence, the results of the present study indicate that emotional and behavioral problem levels of Dutch adolescents were rather stable during the last decade. In line with this notion of stability; gender, immigration background, and educational differences in self-reported problems on each time point were relatively stable as well, indicative of persistent mental health inequalities.

The findings suggest that variations in emotional and behavioral problems between 2003 and 2013 should not be considered as consistent changes but rather as temporary changes within this period of time. The most notable result in this respect was the small decline in conduct problems between 2003 and 2007 and the subsequent small rise in conduct problem levels afterwards. These temporary changes in self-reported problems might be important for the interpretation of the inconsistent findings in previous research on time trends. More specifically, the inconsistent findings might be the result of the fact that former studies predominantly used two measurement moments, and these two moments may not represent a consistent time trend in

certain problems. To exemplify, if the present study would have examined emotional symptoms between 2003 and 2009 by means of two time points, results would have indicated a decrease in these problems, whereas a comparison of 2003 and 2013 would have indicated stable levels of emotional symptoms. Obviously, other reasons may be formulated to explain the differential results between studies as well. For instance, although it has been argued that societal changes of recent decades have taken place throughout many Western countries (Rutter & Smith, 1995), many societal changes might have been culture- and country-specific and may as such be partly responsible for differences in time trends between studies conducted in different countries. In addition, different studies have covered different time spans, which may also explain the variation in results between studies.

The rather stable levels of emotional and behavioral problems of Dutch adolescents throughout the last decade may be explained by considering the impact of societal changes on adolescents' proximal environments. Whereas there is evidence for the occurrence of numerous societal changes during the last decade (Collishaw et al., 2012, 2007; Maughan et al., 2005; Rutter & Smith, 1995), it can be questioned whether these changes were large enough to affect the proximal environment of adolescents known to more directly affect adolescents' emotional and behavioral problems (e.g., Hill, 2002). Gender differences in emotional and behavioral problems were also found to be relatively stable over time. Roughly speaking, differences in emotional and behavioral problems between boys and girls can be explained by genetic differences (e.g., Silberg et al., 1999) and by differences in gender role socialization processes (Bem, 1981; Bussey & Bandura, 1992). Drawing on the genetic explanation, stable gender differences were to be expected, since it is highly unlikely that considerable changes in the population gene pool occurred during the last decade. In addition, although gender role socialization processes have been found to be relevant for understanding gender differences in emotional and behavioral problems (Torsheim et al., 2006), gender roles may not have changed much during the last decade. More specifically, although societies seem to have become more gender egalitarian during the last decades (England, 2010), it might take more time for gender roles to change which may in turn postpone the impact of societal changes on boys' and girls' behaviors. Finally, immigration background and educational differences in emotional and behavioral problems were also rather stable over time. Especially, the first might be considered surprising, given evidence of an increasing intolerant political and public climate toward immigrants in the Netherlands during the last decade (Shadid, 2006; Van der Veer, 2006; Vasta, 2007). Although not ignoring the potential impact of these societal changes, possibly these changes hardly influence the day-to-day lives of immigrant adolescents.

By using five nationally representative samples separated by 2- to 4-year time intervals, this study provided a detailed description of trends in adolescents' self-reported problems. Still, several limitations of the current study should be considered. One limitation is that we were not able to test whether societal phenomena such as discrimination are able to explain the trends found in this study. Although this might be considered less relevant since the present study found rather stable problem levels over time, it is still important that future studies on time trends investigate possible underlying factors of trends in self-reported problems. A second limitation is that results were solely based on self-reports. Although self-reports are an important source of information, especially with regard to emotional problems that are less apparent to teachers and parents (Rescorla et al., 2013), a more comprehensive view on problem behaviors would have been obtained if parent and teacher reports were included. Third, we cannot rule out entirely that differences in sample compositions between our five samples may have affected the results. However, considering the negligibly small differences in sample compositions between the samples, it is highly unlikely that this impact is sizable. Fourth, adolescents' willingness to report problems may have changed over time. However, in such instance, a systematic change in all self-reported problem levels would be expected. Since trends were specific for each problem behavior, it is unlikely that results were due to changes in reporting thresholds. Last, the data allowed no comparison of problem differences between specific groups of immigrants. This is unfortunate, since self-reported problem levels are found to differ with the specific immigration background of adolescents (Stevens et al., 2003). Future research analyzing trends for specific groups of immigrants is needed to prevent a misguided generalization of findings to all immigrant groups in the Netherlands.

Conclusion

The present study revealed rather stable trends in emotional and behavioral problems as well as rather stable gender, immigration background, and educational differences in these trends. Hence, the most important lesson to be learnt from these findings is the stability of mental health on a population level as well as the persistency of inequalities in mental health. Among others, vocationally educated adolescents reported higher levels of conduct problems and more peer relationship problems and hyperactivity-inattention problems compared to their academically educated peers, non-western immigrant adolescents reported more conduct problems and native Dutch adolescents reported higher levels of hyperactivity-inattention problems on all time points. To change these persistent mental health inequalities, intervention and

prevention efforts should be tailored to the specific needs of these more vulnerable groups of adolescents. Moreover, internationally comparative research using multiple measurement moments is needed to examine whether these stable differences in emotional and behavioral problems hold over extended periods of time in different countries.

Appendix

Table A2.4 Standardized factor loadings of the SDQ items in the multigroup four factor model

Latent factors	β 2003	β 2005	β 2007	β 2009	β 2013	Range R^2
Conduct problems						
Tempers	0.707	0.706	0.728	0.730	0.728	0.498-0.533
Obedient ^a	-0.195	-0.190	-0.287	-0.229	-0.204	0.036-0.082
Fights	0.538	0.531	0.588	0.586	0.510	0.260-0.346
Lies	0.696	0.694	0.686	0.689	0.675	0.457-0.482
Steals	0.502	0.468	0.486	0.500	0.510	0.219-0.260
Emotional symptoms						
Somatic symptoms	0.530	0.575	0.508	0.543	0.567	0.258-0.330
Worries	0.618	0.668	0.633	0.661	0.647	0.382-0.446
Unhappy	0.844	0.808	0.832	0.834	0.880	0.653-0.775
Clingy	0.604	0.640	0.596	0.634	0.644	0.355-0.415
Fears	0.663	0.673	0.648	0.688	0.676	0.420-0.473
Peer relationship problems						
Solitary	0.463	0.460	0.461	0.505	0.471	0.211-0.255
Has good friend ^a	-0.207	-0.192	-0.235	-0.262	-0.262	0.037-0.069
Generally liked ^a	-0.454	-0.413	-0.506	-0.519	-0.498	0.170-0.270
Bullied	0.774	0.828	0.771	0.810	0.832	0.594-0.692
Prefers adults	0.471	0.493	0.459	0.488	0.514	0.211-0.269
Hyperactivity-inattention problems						
Restless	0.535	0.645	0.632	0.604	0.655	0.286-0.429
Fidgety	0.574	0.624	0.611	0.598	0.613	0.329-0.389
Distractible	0.791	0.759	0.836	0.825	0.832	0.576-0.700
Thinks before acting ^a	-0.479	-0.459	-0.505	-0.480	-0.498	0.210-0.255
Good attention ^a	-0.577	-0.560	-0.659	-0.634	-0.632	0.314-0.434

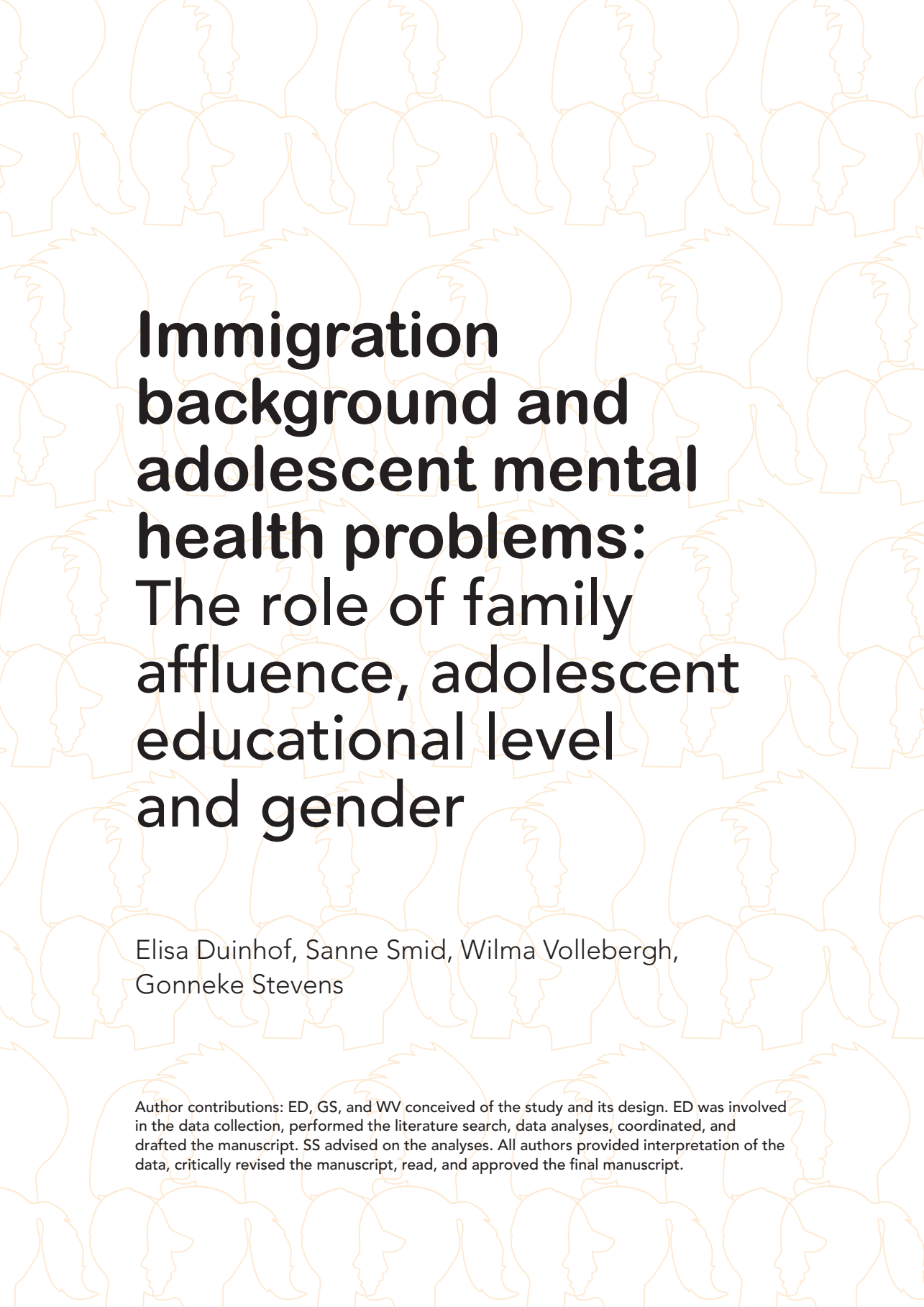
Note. All loadings were significant at $p < 0.001$. ^aPositively phrased items with higher scores indicating less problems.

Table A2.5 Correlations between the latent factors on each time point

Latent factors	2003	2005	2007	2009	2013
EMO with COND	0.423	0.468	0.454	0.390	0.507
HYP with COND	0.569	0.635	0.650	0.588	0.669
HYP with EMO	0.418	0.465	0.412	0.368	0.405
PEER with COND	0.523	0.569	0.528	0.505	0.635
PEER with EMO	0.569	0.589	0.646	0.562	0.602
PEER with HYP	0.138	0.194	0.203	0.163	0.225

Note. All correlations were significant at $p < 0.001$. EMO = emotional symptoms; COND = conduct problems; PEER = peer relationship problems; HYP = hyperactivity-inattention problems.





Immigration background and adolescent mental health problems: The role of family affluence, adolescent educational level and gender

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Author contributions: ED, GS, and WV conceived of the study and its design. ED was involved in the data collection, performed the literature search, data analyses, coordinated, and drafted the manuscript. SS advised on the analyses. All authors provided interpretation of the data, critically revised the manuscript, read, and approved the final manuscript.

Abstract

Purpose. European studies demonstrated that immigrant adolescents are at a higher risk for mental health problems than native adolescents, but little is known about the role of socioeconomic status (SES) and gender in this association. This study examined to what extent differences in the mental health problems of non-western immigrant and native Dutch adolescents were explained by the adolescents' family affluence and educational level and differed with the adolescents' family affluence, educational level, and gender.

Methods. Adolescents in a Dutch nationally representative sample of 11- to 16-year-old native Dutch ($n = 5,283$) and non-western immigrants ($n = 1,054$) reported on their family affluence, own educational level, conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems.

Results. Non-western immigrant adolescents were at a higher risk for conduct problems and peer relationship problems than native Dutch adolescents, but family affluence and educational level explained only a very small proportion of these differences. With two exceptions, differences in the mental health problems of non-western immigrants and natives were highly comparable for different family affluence levels, educational levels, and for boys and girls. Only for natives, a higher family SES was related to less conduct problems. Furthermore, only for non-western immigrants a high family SES related to more hyperactivity-inattention problems.

Conclusions. Our findings illustrate that the association between immigration background and adolescent mental health problems is largely independent of SES and gender. Future studies should include other factors to facilitate our understanding of the association between immigration background and adolescent mental health problems.

Introduction

In Europe, research addressing the association between immigration background and adolescent mental health problems generally supports a risk perspective, with immigrant adolescents being at a higher risk of mental health problems than their native peers (Dimitrova, Chasiotis, & Van de Vijver, 2016; McMahon et al., 2017; Mock-Muñoz de Luna, Vitus, Torslev, Krasnik, & Jervelund, 2019; Stevens et al., 2015). Several studies highlight that socioeconomic status (SES) is important to consider in such research because immigrant adolescents relatively often grow up in low SES families (e.g., Dogra, Singh, Svirydzenka, & Vostanis, 2012). *Intersectionality theory* (Crenshaw, 1989) also highlights that the association between immigration background and adolescent mental health problems cannot be fully understood without acknowledging that adolescents belong to multiple, interconnected social groups (e.g., immigration background, SES, gender) and that these social group memberships jointly shape (mental) health outcomes (Cole, 2009; Else-Quest & Hyde, 2016). However, studies explicitly testing the role of SES and gender in the association between immigration background and adolescent mental health problems are scarce. This is unfortunate, as an examination of the role of SES and gender may foster our understanding of the explanatory role of SES and help us identify those immigrant adolescents who are most at risk for mental health problems. This may inform intervention and prevention efforts aimed at reducing mental health disparities between immigrant and native adolescents. Therefore, this study investigated to what extent the association between immigration background and adolescent self-reported mental health problems (a) can be *explained* by the adolescents' family affluence and educational level and (b) *differs* with the adolescents' family affluence, educational level, or gender.

The explanatory role of family SES and adolescent educational level

Family SES and educational level may explain the association between immigration background and adolescent mental health problems. Research indicates that immigrant adolescents are less likely to grow up in affluent families (Molcho et al., 2010; Stevens et al., 2015), less likely to attend higher educational tracks compared to natives (Alba et al., 2011), and both family SES and adolescent educational level are inversely related to adolescent mental health problems (Havas et al., 2009; Klanšček et al., 2014; Reiss, 2013).

In Europe, studies mainly controlled for SES or examined the explanatory role of SES simultaneously with other family background variables. Studies testing the unique mediational pathways of family SES and educational level are thus rare. Moreover, those studies that focused on the explanatory role of family SES reported inconsistent

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results for different types of adolescent self-reported mental health problems. Overall, in Europe, family SES was found to (fully or partially) explain the association between immigration background and internalizing problems and social problems, but for externalizing problems results were inconsistent (Darwish Murad, Joung, Van Lenthe, Bengi-Arslan, & Crijnen, 2003; Stevens et al., 2015). For educational level even less empirical evidence is available. To our knowledge, only one study conducted in the Netherlands examined the explanatory role of adolescent educational level and found that educational level could not explain differences in mental health problems between immigrants and natives (Darwish Murad et al., 2003). Hence, the explanatory role of family SES and educational level in the association between immigration background and different types of adolescent mental health problems remains poorly understood.

The differential impact of family SES and adolescent educational level

Family SES and educational level may also have a differential impact on the mental health problems of native and immigrant adolescents. According to the *double jeopardy hypothesis* (Dowd & Bengtson, 1978), the effects of having an immigration background and a low SES will strengthen each other's impact. Immigrants encounter relatively many stressors (e.g., discrimination), which may deplete their coping resources and make them more vulnerable to additional stressors that are prevalent in low SES environments than natives (Adkins, Wang, Dupre, Van Den Oord, & Elder, 2009; McLeod & Owens, 2004). Additionally, the combination of an immigration background and low SES might also result in a particularly unfavorable perceived social status (McLeod & Owens, 2004). If such perceptions of relative deprivation are seen as being unfair, they may lead to mental health problems (Smith, Pettigrew, Pippin, & Bialosiewicz, 2012). Thus, due to the expected combined disadvantage of having an immigration background and a low SES, mental health gaps between native and immigrant adolescents may be greater for adolescents with a low than with a high SES.

In contrast, according to the *diminishing returns hypothesis* (Farmer & Ferraro, 2005), attaining a higher SES may confer less mental health benefits to immigrant than native adolescents. Immigrant adolescents with a higher SES may perceive more discrimination than immigrant adolescents with a lower SES (Cheng, Cohen, & Goodman, 2015; Turcatti, 2018) and, at the same time, they may receive less social support from other ethnic group members who may not perceive them as "prototypical" ethnic group members anymore (Cole & Omari, 2003; J. D. Johnson & Kaiser, 2012). Both processes might diminish the protective effect of a high SES for immigrant adolescents. From this perspective it may be inferred that mental health

gaps between native and immigrant adolescents may be greater for adolescents with a high than with a low SES.

Studies examining the intersection of immigration background and SES are extremely scarce. Previous studies are almost exclusively conducted in the United States on adult samples and focused on family SES. The scarcely available literature revealed inconsistent findings for different types of adolescent self-reported mental health problems. For internalizing problems (e.g., depression), some studies found support for the double jeopardy hypothesis (Adkins et al., 2009; Vollebergh et al., 2005), while others found some support for the diminishing returns hypothesis (Cheng et al., 2015; Jackson & Goodman, 2011), or did not find a differential impact of SES for native and immigrant adolescents (Evans & Erickson, 2019). The latter was also found for adolescent hyperactivity-inattention problems, externalizing problems, and social problems (Vollebergh et al., 2005). Consequently, little (family SES) to nothing (adolescent educational level) is known about whether the association between immigration background and mental health problems depends upon the adolescents' SES.

The differential impact of gender

The association between immigration background and mental health problems may also differ for boys and girls. The *intersectional invisibility hypothesis* (Purdie-Vaughns & Eibach, 2008) argues that adolescents with multiple disadvantaged social group memberships do not fit the prototypes of the social group they belong to. To illustrate, the prototype of an immigrant is an immigrant boy and the prototype of a girl is a native girl. This may render adolescents with multiple disadvantaged social group memberships (i.e., immigrant girls), "invisible" compared to their single disadvantaged peers (i.e., immigrant boys, native girls). Due to this "intersectional invisibility" immigrant girls may experience distinct advantages (e.g., avoid more active forms of discrimination) and distinct disadvantages (e.g., experience invisibility discrimination) compared to their single disadvantaged peers.

In Europe, studies testing the intersection of immigration background and gender are relatively scarce and revealed inconsistent findings across different types of adolescent self-reported mental health problems. Some studies found that especially immigrant boys reported higher levels of internalizing problems (Fandrem, Sam, & Roland, 2009; Oppedal & Røysamb, 2004), and that immigrant girls—but not immigrant boys—reported higher levels of peer problems but lower levels of conduct problems than their native peers (Alonso-Fernández, Jiménez-García, Alonso-Fernández, Hernández-Barrera, & Palacios-Ceña, 2017). In contrast, other studies did not find gender differences in the

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association between immigration background and different types of adolescent self-reported mental health problems (e.g., internalizing problems, externalizing problems, peer relationship problems, hyperactivity-inattention problems) (Steinhausen, Bearth-Carrari, & Metzke, 2009; Stevens et al., 2003; Vollebergh et al., 2005). Hence, it remains unclear whether immigrant boys or girls are more vulnerable for, different types of, mental health problems than native adolescents.

This study

Given the increasingly negative socio-political climate towards immigrants in the Netherlands (Geddes & Scholten, 2016; Thijs, Grotenhuis, & Scheepers, 2018), it is highly relevant to examine the association between immigration background and adolescent mental health problems in the Dutch context. Using a nationally representative sample of 11- to 16-year-old, native Dutch and non-western immigrant adolescents, the present study examined to what extent differences in a broad spectrum of self-reported mental health problems between immigrants and natives (a) can be *explained* by the adolescents' family affluence and educational level and (b) *varied* with the adolescents' family affluence, educational level, and gender. Since previous studies show that immigrant adolescents relatively often grow up in less affluent families and are overrepresented in lower educational tracks, family affluence and adolescent educational level were expected to – at least partly – explain the higher risk for mental health problems in immigrant adolescents. Although the literature is inconclusive about the direction, intersectionality theory (Cole, 2009; Crenshaw, 1989) assumes that the association between immigration background and adolescent mental health problems differs with the adolescents' family affluence, educational level, and gender.

Methods

Participants

Data from the 2017 Dutch Health Behavior in School-aged Children (HBSC) study were used. HBSC is a cross-sectional, school-based survey that is conducted every four years in over 40 countries. Using a standardized research protocol, web-based, self-report questionnaires were administered to a nationally representative sample of adolescents in the classroom. Samples were drawn using cluster sampling, with schools being the primary sampling units. In the present study, adolescents attending primary education and special education were excluded.

The response rate on the school level was 37%. Main reasons for non-response were participation in other surveys (38%) or too frequent research participation requests (19%). Additional analyses indicated no selection bias concerning immigration background or the number of students in the school. Only schools in urban areas were somewhat less likely to participate than schools in rural areas, which most likely stems from them getting more frequent research participation requests. Within randomly selected classes in these schools, the average response rate was 92% on the student level. Non-response was mostly due to absence because of illness or truancy. More information about the data collection can be found elsewhere (Inchley et al., 2016; Stevens et al., 2018). Adolescents who did not fill in any of the items on mental health problems ($n = 32$) or immigration background ($n = 1$) were excluded from the sample.

In line with previous Dutch research (Vollebergh et al., 2005), we focused on immigrant adolescents with a non-western immigration background. Since mass immigration to the Netherlands started from the 1960s in the last century predominantly from so-called non-western countries (Geddes & Scholten, 2016), non-western immigrants constitute by far the largest group of immigrant adolescents (> 70%). Studies show that non-western immigrant adolescents are especially likely to have a low SES (Netherlands Inspectorate of Education, 2018; Hoff, Van Hulst, Wildeboer Schut, & Goderis, 2019), and that the socio-cultural distance between the origin and receiving country is usually larger for immigrants originating from non-western than from western countries (Kalmijn, 2015). Therefore, we did not combine data from adolescents with a western and non-western immigration background.

The resulting final sample consisted of 6,337 11- to 16-year-old native Dutch and non-western immigrant adolescents. In our sample, adolescents with a non-western immigration background ($n = 1,054$) were mainly born in Morocco ($n = 294$, 28%), Turkey ($n = 173$, 16%), Suriname ($n = 131$, 12%) and the Antilles ($n = 60$, 6%) and belonged to the second generation (85.5%) (i.e., they were born in the Netherlands, but at least one of their parents was born abroad).

Measures

Mental health problems. Adolescents filled in the Dutch translation of the problem scales of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), consisting of four subscales measuring mental health problems (conduct problems, emotional symptoms, peer relationship problems, hyperactivity-inattention problems). Each subscale includes five ordinal items with answer categories: "Not true" = 0; "Somewhat true" = 1; "Certainly true" = 2. The present study used a revised version of the problem scales: the SDQ-R (Duinhof et al., 2020). Confirmatory factor analyses showed that the

SDQ-R, that excluded the five reverse worded items of the original self-report SDQ, showed a better fit to the data than the original SDQ. The SDQ-R showed a good model fit ($\chi^2(84) = 1168.67, p < 0.001, CFI = 0.939, TLI = 0.923, RMSEA = 0.045$), while the original SDQ did not demonstrate an acceptable model fit ($\chi^2(164) = 2775.37, p < 0.001, CFI = 0.861, TLI = 0.839, RMSEA = 0.050$).

Acceptable internal consistencies (ordinal α above 0.70) (Gadernann, Guhn, & Zumbo, 2012) were found for the conduct problems ($\alpha = 0.74$), emotional symptoms ($\alpha = 0.81$), and hyperactivity-inattention problems ($\alpha = 0.79$) subscales of the SDQ-R. A somewhat lower internal consistency was found for the peer relationship problems subscale ($\alpha = 0.63$). Measurement invariance tests indicated that the SDQ-R allowed for valid comparisons of mental health problems between natives and non-western immigrants, the three family affluence levels, the four educational levels, and boys and girls (see Appendix 3.1). The Mplus syntax of all models testing the SDQ-R can be found on <https://osf.io/cmga8/>. In the final sample, the occurrence of missing values on the individual SDQ-R items ranged between 1 (0.02%) and 21 (0.3%).

Demographic variables. In line with previous international studies (e.g., Stevens et al., 2015), to measure immigration background, adolescents were asked to indicate the country of birth of both their parents. Following previous Dutch studies (Vollebergh et al., 2005) and the definition of Statistics Netherlands, adolescents were considered having a non-western immigration background if at least one of their parents was born in a non-western country [Africa, Latin America, Asia (excluding Indonesia or Japan) and Turkey]. Adolescents of whom both parents were born in the Netherlands were considered having a native Dutch background. Age was assessed based upon the adolescents' month and year of birth and the date of the survey administration. Adolescents indicated their gender by responding to the question: "Are you a boy or a girl?" with answer categories "boy" and "girl". Adolescents also reported their educational level. In the Netherlands, secondary education consists of four different levels: low prevocational education, medium prevocational education, high prevocational education, and pre-university education.

The Revised Family Affluence Scale (FAS) was used as a proxy for family SES. FAS is a valid indicator of family wealth and comprises six items on material assets in the family (Torsheim et al., 2016). Examples of items are: "Does your family own a car, van, or truck?" and "Do you have your own bedroom for yourself?". Responses were summed into a total FAS score. In line with previous studies (Inchley et al., 2016), adolescent were identified as having a low (lowest 20%), middle (middle 60%), or high (highest 20%) family affluence based upon the FAS distribution in the total sample. In the final sample, data on the FAS were missing for 106 (2%) of the native Dutch and for 21 (2%) of the non-western immigrant adolescents.

Analytic strategy

We conducted structural equation modelling analyses in Mplus version 8.2 (Muthén & Muthén, 2017) using the weighted least squares mean and variance adjusted (WLSMV) estimator. Following recent recommendations on the SDQ (Smid et al., 2018), latent variable modeling was used to measure adolescent mental health problems. Analyses were corrected for cluster effects of adolescents in the same school (the primary sampling unit) and controlled for gender and age. To assure national representativeness, data were weighted for educational level, school grade, gender, and urbanicity. Given the large sample size, a stringent significance level was applied ($p < 0.01$). To examine the size of the associations between immigration background and adolescent mental health problems, standardized regression coefficients were interpreted using Cohen's d [negligible ($d < 0.20$), small ($d = 0.20$ to 0.50), medium ($d = 0.50$ to 0.80), large ($d > 0.80$)] (Cohen, 1992).

Based on the literature, five different models were specified to test our hypotheses. First, the direct associations between immigration background and the four latent factors representing mental health problems were examined in the total sample (a graphical representation of Model 1 is displayed in Appendix 3.2). Second, a mediation model was ran to examine if family affluence and adolescent educational level can explain differences in the mental health problems of native Dutch and non-western immigrant adolescents (Model 2). Since children growing up in higher SES families tend to have higher educational attainments (Conger, Conger, & Martin, 2010; Melby, Conger, Fang, Wickrama, & Conger, 2008), a sequential two-mediator model with family affluence and adolescent educational level as ordinal mediators was examined (Figure 3.1). With the WLSMV estimator a probit link function¹ was used to model the coefficients for the regression paths with the ordinal mediators as outcome variables. To facilitate interpretation, probit regression probabilities were calculated (see Appendix 3.3). All other regression paths can be interpreted as linear regression coefficients (Muthén & Muthén, 2017). To compute the indirect effect of immigration background on adolescent mental health problems via family SES and/or educational level, percentile bootstrapped confidence intervals (using 5000 replications) were obtained. Partially standardized effects were used to interpret the size of indirect effects (Miočević, O'Rourke, MacKinnon, & Brown, 2018).

Finally, three multigroup models (see Appendix 3.2 for a graphical representation of the model tested in each subgroup) were tested to examine family affluence (Model 3), educational level (Model 4), and gender (Model 5) differences in the association between immigration background and adolescent mental health problems. The Wald

¹ Probit links are used to model categorical outcome variables, and transform the probabilities related to the outcome variables to standard normal z-scores (Agresti, 2018).

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test was used to test whether the associations between immigration background and adolescent mental health problems differed significantly between the three family affluence levels, four educational levels, and boys and girls. The Mplus syntax of all the five models can be found on <https://osf.io/cmga8/>.

Results

Differences between the native Dutch and non-western immigrant adolescents

Table 3.1 shows the family affluence, educational level, and gender distributions for the native Dutch and non-western immigrant adolescents. There were no significant differences in the age ($F(3.61, 303.15) = 0.45, p = 0.75$), gender ($F(1,84) = 5.97, p = 0.02$), and educational level ($F(2.05, 171.75) = 1.48, p = 0.23$) of both groups. Significant family affluence differences were found ($F(1.62, 135.93) = 48.87, p < 0.001$), with non-western immigrant adolescents reporting a lower family affluence than native Dutch adolescents.

Since measurement invariance was established (see Appendix 3.1), latent means could be validly compared between the native Dutch and non-western immigrant adolescents. Table 3.2 shows that non-western immigrant adolescents reported more conduct problems and peer relationship problems, less hyperactivity-inattention problems, and equal levels of emotional symptoms compared to native Dutch adolescents.

The explanatory role of family affluence and adolescent educational level

The sequential two-mediator model (Figure 3.1) showed an acceptable fit to the data ($\chi^2(143) = 1,391.61, p < 0.001, CFI = 0.929, TLI = 0.907, RMSEA = 0.037$) and explained a significant percentage of the variance in conduct problems ($R^2 = 0.12, p < 0.001$), emotional symptoms ($R^2 = 0.17, p < 0.001$), peer relationship problems ($R^2 = 0.11, p < 0.001$), and hyperactivity-inattention problems ($R^2 = 0.05, p < 0.001$).

Significant indirect effects were found for immigration background on emotional symptoms ($B = 0.04, \beta = 0.06, 99\% \text{ CI } [0.02, 0.07]$), peer relationship problems ($B = 0.05, \beta = 0.08, 99\% \text{ CI } [0.02, 0.08]$), and hyperactivity-inattention problems ($B = -0.05, \beta = -0.04, 99\% \text{ CI } [-0.09, -0.01]$) through family affluence. No indirect effect was found for immigration background on conduct problems ($B = -0.00, \beta = -0.00, 99\% \text{ CI } [-0.04, 0.03]$) via family affluence. Being a non-western immigrant (compared to native

Table 3.1 Demographic statistics of the native Dutch and non-western immigrant adolescents

	Native Dutch (n = 5,283)	Non-western immigrant (n = 1,054)
Age, M (SD)	13.92 (1.40)	14.00 (1.37)
Gender, n (weighted %)		
Boys	2,594 (52.0)	473 (47.1)
Girls	2,689 (48.0)	581 (52.9)
Educational level, n (weighted %)		
Low prevocational education	846 (17.0)	222 (23.0)
Medium prevocational education	1,541 (27.4)	358 (33.6)
High prevocational education	1,384 (26.8)	209 (19.0)
Pre-university education	1,512 (28.7)	265 (24.5)
Family affluence, n (weighted %)		
Low	853 (16.4)	359 (35.6)
Middle	3,106 (59.8)	542 (52.2)
High	1,218 (23.8)	132 (12.2)

Note. n represent the unweighted number of participants. % represent the percentages weighted for educational level, school grade, gender, and urbanicity.

Table 3.2 Immigration background and adolescent self-reported mental health problems

	Conduct problems		Emotional symptoms		Peer relationship problems		Hyperactivity-inattention problems					
	B	SE	B	SE	B	SE	B	SE				
Immigration background	0.28*	0.04	0.36	-0.03	0.02	-0.04	0.21*	0.03	0.39	-0.22*	0.04	-0.29

Note. Reference category = native Dutch adolescents.

* $p < 0.001$.

Dutch) resulted in an increase in emotional symptoms, an increase in peer relationship problems, but a decrease in hyperactivity-inattention problems through changes in family affluence. Non-western immigrant adolescents were less likely to report a high family affluence than native Dutch adolescents (Appendix 3.3). Adolescents in more affluent families reported somewhat lower levels of emotional symptoms and peer relationship problems but somewhat higher levels of hyperactivity-inattention problems (Figure 3.1).

No significant indirect effects were found for immigration background on conduct problems ($B = 0.03$, $\beta = 0.02$, 99% CI [-0.08, 0.14]), emotional symptoms ($B = 0.00$, $\beta = 0.00$, 99% CI [-0.01, 0.01]), peer relationship problems ($B = 0.01$, $\beta = 0.02$, 99% CI [-0.04, 0.06]), and hyperactivity-inattention problems ($B = 0.02$, $\beta = 0.02$, 99% CI [-0.07, 0.10]) through adolescent educational level. Results did however indicate a significant indirect effect of immigration background on conduct problems ($B = 0.04$, $\beta = 0.04$, 99% CI [0.02, 0.07]), peer relationship problems ($B = 0.02$, $\beta = 0.03$, 99% CI [0.01, 0.03]), and hyperactivity-inattention problems ($B = 0.03$, $\beta = 0.03$, 99% CI [0.02, 0.05]) via family affluence *and* adolescent educational level. No indirect effect was found for immigration background on emotional symptoms ($B = 0.00$, $\beta = 0.00$, 99% CI [-0.01, 0.01]) via family affluence *and* adolescent educational level. Being a non-western immigrant (compared to native Dutch) resulted in an increase in conduct problems, peer relationship problems, and hyperactivity-inattention problems through changes in the adolescents' family affluence and educational level. Compared to native Dutch adolescents, non-western immigrant adolescents were less likely to report high levels of family affluence. Native Dutch and non-western immigrant adolescents in highly affluent families were more likely to attend higher educational levels (Appendix 3.3). Adolescents attending higher educational levels reported lower levels of conduct problems, peer relationship problems, and hyperactivity-inattention problems (Figure 3.1).

All indirect effects were fairly small in size. Furthermore, comparing the model without family affluence and educational level (Table 3.2) with the mediation model including family affluence and educational level (Figure 3.1), non-western immigrants still reported more conduct problems and peer relationship problems, less hyperactivity-inattention problems, and equally high levels of emotional symptoms as their native Dutch peers.

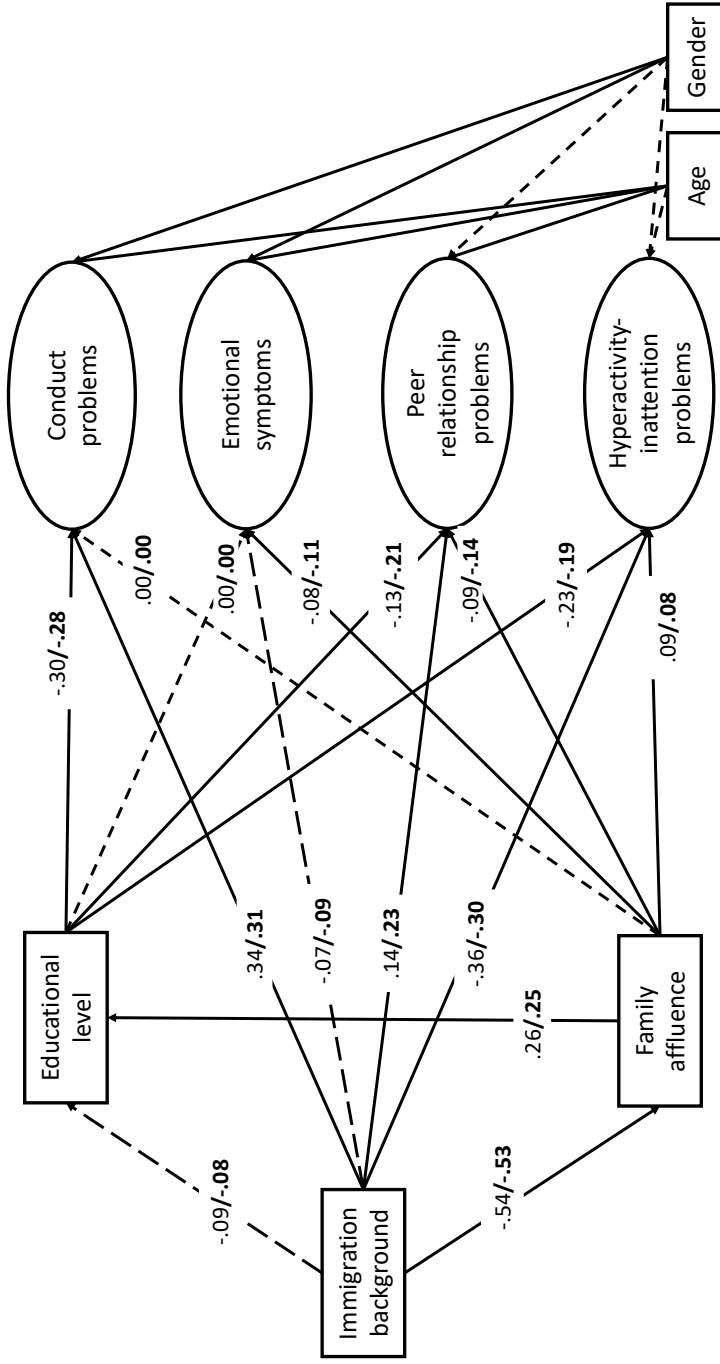


Figure 3.1 Sequential two-mediator model showing the association between immigration background and adolescent mental health problems mediated by family affluence and educational level. Continuous lines indicate significant ($p < 0.01$) and dotted lines indicate non-significant ($p > 0.01$) regression coefficients. Non-bold numbers represent unstandardized and bold numbers represent standardized regression coefficients (using STD standardization, except for the probit regressions using STDY standardization). The rectangles represent observed variables and the ovals represent latent variables. To increase readability, latent factor indicators, (co)variances, and residual error terms were not shown.

The differential impact of family affluence and adolescent educational level

The association between immigration background and conduct problems (Wald $\chi^2(2) = 11.14, p = 0.004$) and hyperactivity-inattention problems (Wald $\chi^2(2) = 12.31, p = 0.002$) differed across family affluence levels. In contrast, the associations between immigration background and emotional symptoms (Wald $\chi^2(2) = 2.37, p = 0.31$) and peer relationship problems (Wald $\chi^2(2) = 3.06, p = 0.22$) were equal across family affluence levels. In families with relatively low levels of affluence, non-western immigrant adolescents reported equal levels of conduct problems ($B = 0.10, \beta = 0.13, p = 0.11, 99\% \text{ CI } [-0.06, 0.26]$) as native Dutch adolescents, whereas in families with middle ($B = 0.37, \beta = 0.45, p < 0.001, 99\% \text{ CI } [0.21, 0.52]$) and high ($B = 0.36, \beta = 0.44, p < 0.001, 99\% \text{ CI } [0.10, 0.61]$) levels of affluence, non-western immigrant adolescents reported higher levels of conduct problems than native Dutch adolescents. Family affluence did not impact the level of conduct problems of non-western immigrant adolescents, while middle or high levels of family affluence decreased the conduct problems for native Dutch adolescents compared to a low family affluence (Figure 3.2).

In addition, in families with low ($B = -0.29, \beta = -0.40, p < 0.001, 99\% \text{ CI } [-0.46, -0.13]$) and middle ($B = -0.22, \beta = -0.30, p < 0.001, 99\% \text{ CI } [-0.35, -0.09]$) levels of affluence non-western immigrant adolescents reported lower levels of hyperactivity-inattention problems than native Dutch adolescents, whereas in highly affluent families

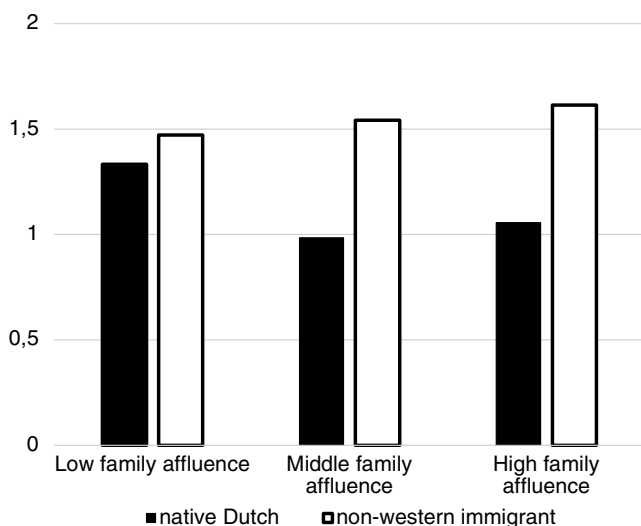


Figure 3.2 Differences in conduct problems between native Dutch and non-western immigrant adolescent in low, middle, and high affluent families.

($B = 0.05$, $\beta = 0.07$, $p = 0.53$, 99% CI [-0.15, 0.25]) equal levels of hyperactivity-inattention problems were reported by both groups. Figure 3.3 shows that family affluence was not related to the hyperactivity-inattention problems in native Dutch adolescents, while for non-western immigrant adolescents, high levels of family affluence increased the hyperactivity-inattention problems compared to low and middle levels of family affluence.

No educational differences were found in the association between immigration background adolescent mental health problems. The association between immigration background and conduct problems (Wald $\chi^2(3) = 4.52$, $p = 0.21$), emotional symptoms (Wald $\chi^2(3) = 0.44$, $p = 0.93$), peer relationship problems (Wald $\chi^2(3) = 7.47$, $p = 0.06$), and hyperactivity-inattention problems (Wald $\chi^2(3) = 7.07$, $p = 0.07$) was similar across all four educational levels.

The differential impact of gender

The association between immigration background and adolescent mental health problems did also not vary with the gender of the adolescent. Associations between immigration background and conduct problems (Wald $\chi^2(1) = 2.48$, $p = 0.12$), emotional symptoms (Wald $\chi^2(1) = 1.70$, $p = 0.19$), peer relationship problems (Wald $\chi^2(1) = 4.20$, $p = 0.04$), and hyperactivity-inattention problems (Wald $\chi^2(1) = 4.30$, $p = 0.04$) were equal for boys and girls.

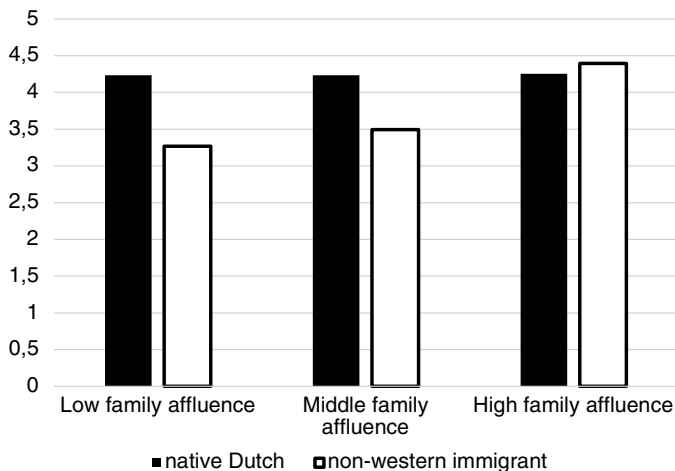


Figure 3.3 Differences in hyperactivity-inattention problems between native Dutch and non-western immigrant adolescent in low, middle, and high affluent families.

Discussion

It has been theorized – but rarely explicitly examined – that SES and gender play an important role in the association between immigration background and adolescent mental health problems. Interestingly, the result of this study illustrate that the association between immigration background and adolescent mental health problems is largely independent of SES and gender. First, although non-western immigrant adolescents were less likely to grow up in highly affluent families, this explained only a very small proportion of their higher risk for conduct problems and peer relationship problems compared to the native Dutch adolescents. Second, these differences in mental health problems were quite robust across family affluence levels, educational levels, and boys and girls. Only two interactions were revealed: for native Dutch adolescents higher levels of family affluence were associated with less conduct problems, while there was no association between family affluence and conduct problems for non-western immigrants. No association between family affluence and hyperactivity-inattention problems was revealed for native Dutch adolescents, while for non-western immigrants a high level of family affluence was associated with more hyperactivity-inattention problems.

Studies testing the unique mediational pathways of family SES and educational level in the association between immigration background and adolescent mental health problems are rare. Using advanced statistical methods, we were able to model the association between family affluence and adolescent educational level (e.g., Melby et al., 2008) and to test the explanatory role of family affluence and adolescent educational level alone *and* together. Our finding that immigration background had an indirect effect on adolescent internalizing problems (i.e., emotional symptoms) and social problems (i.e., peer relationship problems), but not on externalizing problems (i.e., conduct problems) via family affluence is largely in line with previous studies (Darwish Murad et al., 2003; Stevens et al., 2015). However, the size of these indirect effects was very small, which may be due to the weak association between family affluence and adolescent mental health problems. In a high income country like the Netherlands, low levels of family affluence may still reflect relatively high material living standards. Therefore, adolescents may have few material desires (Maslow, 1943), which may diminish the impact of family affluence on adolescent mental health problems. Alternatively, the Dutch universal health care system that provides health care allowances for low income families may explain the weak associations found between family affluence and adolescent mental health problems.

In line with former results (Darwish Murad et al., 2003), adolescent educational level did not explain differences in mental health problems between non-western immigrant

and native Dutch adolescents either. This is not surprising as there were no educational differences between non-western immigrant and native Dutch adolescents. Although, via family affluence, adolescent educational level had some explanatory power, again the size of these indirect effects was fairly small. Thus, in the Netherlands, other factors than SES may explain the higher risk for conduct problems and peer relationship problems of non-western immigrant adolescents. Given increasingly negative attitudes towards immigrants in Europe (Ceobanu & Escandell, 2010), and evidence of an increasingly negative socio-political climate towards immigrants in the Netherlands (Geddes & Scholten, 2016; Thijs et al., 2018), perceptions of discrimination may be a relevant factor.

Although intersectionality theory (Crenshaw, 1989) clearly emphasizes the need to study the intersections of adolescents' social group memberships (e.g., immigration background, SES, gender), studies examining the role of SES and gender in the link between immigration background and adolescent mental health problems are scarce, especially in Europe (Ghavami et al., 2016). Contributing to the scarce and inconsistent literature (Adkins et al., 2009; Cheng et al., 2015; Jackson & Goodman, 2011; Vollebergh et al., 2005), our results indicated that differences in mental health problems between non-western immigrant and native Dutch adolescents were largely comparable for different family affluence and educational levels. This was also the case for gender differences, which is in line with previous Dutch studies (Stevens et al., 2003; Vollebergh et al., 2005). Two (out of a possible twelve) interactions between immigration background and family affluence were found, however.

Supporting the diminishing returns hypothesis, only for native Dutch adolescents higher levels of family affluence were associated with less conduct problems. Immigrants with a higher SES may be more aware of discrimination (Verkuyten, 2016) and such perceptions of discrimination may diminish the protective effect of a high family SES for immigrant adolescents (Cheng et al., 2015). However, this effect was only found for conduct problems and not robust over the whole spectrum of adolescent mental health problems.

For hyperactivity-inattention problems findings at first seemed counterintuitive. Non-western immigrants reported lower levels of hyperactivity-inattention problems than their native peers and high levels of family affluence increased the hyperactivity-inattention problems of non-western immigrant adolescents only. Studies show that higher SES immigrants have more contacts with natives than lower SES immigrants (Martinović, 2013; Verkuyten, 2016) and that Dutch adolescents report relatively high levels of hyperactivity-inattention problems compared to their European age mates (Duinhof et al., 2020). Due to influence processes (Veenstra, Dijkstra, Steglich, &

Van Zalk, 2013) immigrant adolescents in higher SES families – who are assumed to have more contacts with natives – may become more similar in their behavior and/or attitudes towards hyperactive and inattentive behavior to native peers and report higher levels of hyperactivity-inattention problems.

Using a nationally representative sample of Dutch adolescents, two indicators of SES (family affluence and adolescent educational level), a broad spectrum of adolescent mental health problems, and a rigorous methodological design, this study showed that the role of SES and gender in the association between immigration background and adolescent mental health problems is at best small. Still, some limitations and alternative explanations of our findings should be considered. First, the cross-sectional nature of our data does not allow for causal inferences about the explanatory role of SES. Our findings suggest that higher SES environments may protect against mental health problems. However, the opposite may also be true; mental health problems may negatively impact adolescents' educational careers (Conger et al., 2010). Second, although by establishing measurement invariance we made sure that the native Dutch and non-western immigrant adolescents did not systematically differ in their responses on the mental health problems measures, we cannot rule out that cultural differences in socialization practices may have contributed to differences in the mental health problems of the non-western immigrant and native Dutch adolescents (Weisz, Suwanlert, Chaiyasit, & Walter, 1987).

Third, the HBSC study is designed to gather a nationally representative sample of Dutch adolescents. This is a clear advantage as our findings are generalizable to the overall population of Dutch adolescents. However, our sample design did not allow for analyses stratified by specific immigrant group characteristics (i.e., country of origin, generational status, reasons for immigration). It remains to be seen whether this has sizeable consequences for our results, as previous Dutch studies that distinguished between immigrants with specific ethnic backgrounds found highly similar mental health differences in the different immigrant groups (Adriaanse, Veling, Doreleijers, & Van Domburgh, 2014; Bevaart et al., 2012; Zwirs, Burger, Schulpen, & Buitelaar, 2006). Also, in Europe, evidence for an immigration paradox (suggesting that later generations immigrants are doing worse than earlier generations) is much less convincing than in the United States (García Coll et al., 2012; Marks, Ejesi, & García Coll, 2014; Mood, Jonsson, & Laftman, 2016; Sam, Vedder, Liebkind, Neto, & Virta, 2008; Stevens et al., 2015). Notwithstanding these former findings, future studies testing the generalizability of our results in a broad scale of specific immigrant groups from different countries of origin (including western countries), different generational statuses, and with different reasons for immigration (e.g., labor, refugees) are highly relevant. Fourth, our

questionnaire was only available in the Dutch language. For a small group of immigrant adolescents, especially those from the first generation who recently immigrated to the Netherlands, a language barrier may have impacted their self-reports. Finally, in this study we only used one measure of family SES; family affluence. Studies show that the association between family SES and adolescent mental health problems may vary with the operationalization of family SES (Reiss, 2013). However, given that especially for younger adolescents it is difficult to report on their parents' occupation, parents' educational level or family income, adolescents' reports of family affluence provide a particularly reliable measure of family SES (Currie et al., 2008).

Conclusion

With non-western immigrant adolescents only reporting higher levels of conduct problems and peer relationship problems, our study does not unequivocally support the risk perspective of immigration (Dimitrova et al., 2016; Mock-muñoz de Luna et al., 2019; Stevens et al., 2015). The risk perspective of immigration may thus vary with the type of mental health problems. Family affluence and adolescent educational level could not explain the higher risk of conduct problems and peer relationship problems of non-western immigrant adolescents compared to native Dutch adolescents. Even more, these differences in mental health problems were quite robust across different family affluence levels, adolescent educational levels, and between boys and girls. Thus, although it is theorized that SES and gender play an important role in the association between immigration background and adolescent mental health problems, our findings indicate that in the Netherlands the role of SES and gender is limited.

Taken together, our results imply that not only immigrant adolescents from low SES backgrounds, but immigrants (both boys and girls) from a wide range of SES backgrounds may need prevention and intervention programs targeting their mental health, specifically concerning conduct problems and peer relationship problems. Future studies should test whether other factors – such as perceptions of discrimination – may account for differences in the mental health of immigrant and native adolescents. Moreover, internationally comparative research examining the intersection of immigration background with SES and gender is needed to examine the generalizability of our findings outside the Netherlands and to map mental health inequalities between immigrant and native adolescents with more precision.

Appendix 3.1

Testing measurement invariance of the SDQ-R

Invariance testing was done to see if the SDQ-R allowed for valid comparisons of the mental health problems between (a) native Dutch and non-western immigrants, (b) the three family affluence levels, (c) the four educational levels, and (d) boys and girls. We used a three-step method testing configural, metric, and scalar models. First, a configural model with factor loadings and thresholds freely estimated across groups was tested. Second, a metric model with factor loadings constrained equal across groups was examined. Third, a scalar model with factor loadings and thresholds constrained equal across groups was tested. Changes in CFI values ($\Delta\text{CFI} \geq -0.010$) and RMSEA values ($\Delta\text{RMSEA} \geq 0.015$) compared to the configural and metric model were used to evaluate whether invariance criteria were met (Chen, 2007; Cheung & Rensvold, 2002). Given the large sample size of our study, we did not conduct chi-square difference tests. In large samples, the chi-square difference statistic nearly always suggests significant differences between groups in item factor loadings/ thresholds (Cheung & Rensvold, 2002; Hooper, Coughlan, & Mullen, 2008). ΔCFI and ΔRMSEA indicated negligible changes between the metric and configural model and metric and scalar model (see Table A3.1 below). Thus, scalar measurement invariance was established. The means of the four latent factors measuring adolescent mental health problems could be validly compared between natives and non-western immigrants, the three family affluence levels, the four educational levels, and boys and girls (Dimitrov, 2010; Van de Schoot, Lugtig, & Hox, 2012). The Mplus syntax used can be found on <https://osf.io/cmga8/>.

Table A3.1 Fit indices of the models testing for invariance using the SDQ-R

Models	χ^2	df	CFI	RMSEA	Δ CFI	Δ RMSEA	Model comparisons
Immigration background							
1. Configural	1,135.25*	168	0.941	0.043	–	–	–
2. Metric	1,088.97*	179	0.945	0.040	0.004	-0.003	2 vs 1
3. Scalar	1,060.79*	190	0.947	0.038	0.002	-0.002	3 vs 2
Family affluence							
4. Configural	1,279.60*	252	0.941	0.044	–	–	–
5. Metric	1,262.16*	274	0.944	0.042	0.003	-0.002	5 vs 4
6. Scalar	1,238.56*	296	0.946	0.039	0.002	-0.003	6 vs 5
Educational level							
7. Configural	1,200.05*	336	0.941	0.040	–	–	–
8. Metric	1,262.12*	369	0.939	0.039	-0.002	-0.001	8 vs 7
9. Scalar	1,280.16*	402	0.940	0.037	0.001	-0.002	9 vs 8
Gender							
10. Configural	1,153.85*	168	0.943	0.043	–	–	–
11. Metric	1,301.43*	179	0.936	0.044	-0.007	0.001	11 vs 10
12. Scalar	1,295.05*	190	0.937	0.043	0.001	-0.001	12 vs 11

* $p < 0.001$.

Appendix 3.2

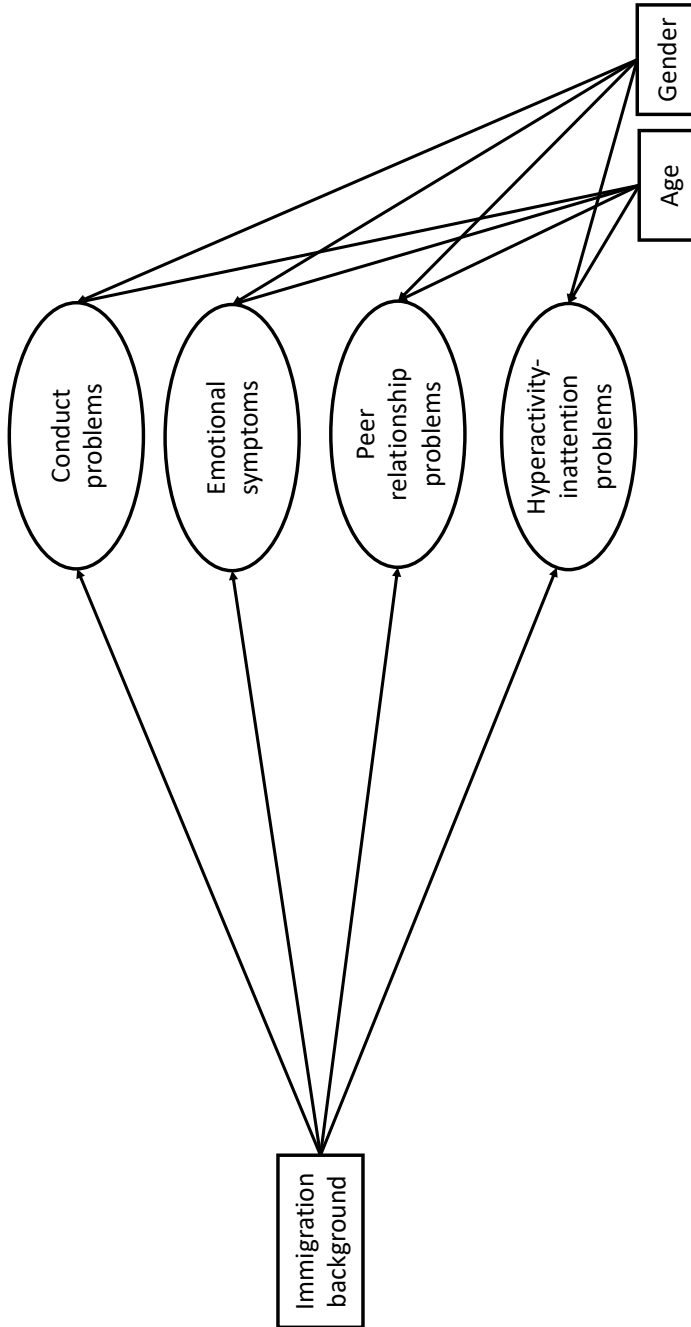


Figure A3.1 Structural equation model (Model 1) showing the association between immigration background and adolescent self-reported mental health problems. The rectangles represent observed variables and the ovals represent latent variables. To increase readability latent factor indicators, (co)variances, and residual error terms were not shown.

Appendix 3.3

Probit regression probabilities

Table A3.2 Probit regression probabilities for the path from immigration background to family affluence

	native Dutch	non-western immigrant
Family affluence		
Low family affluence	0.149	0.310
Middle family affluence	0.586	0.570
High family affluence	0.265	0.121

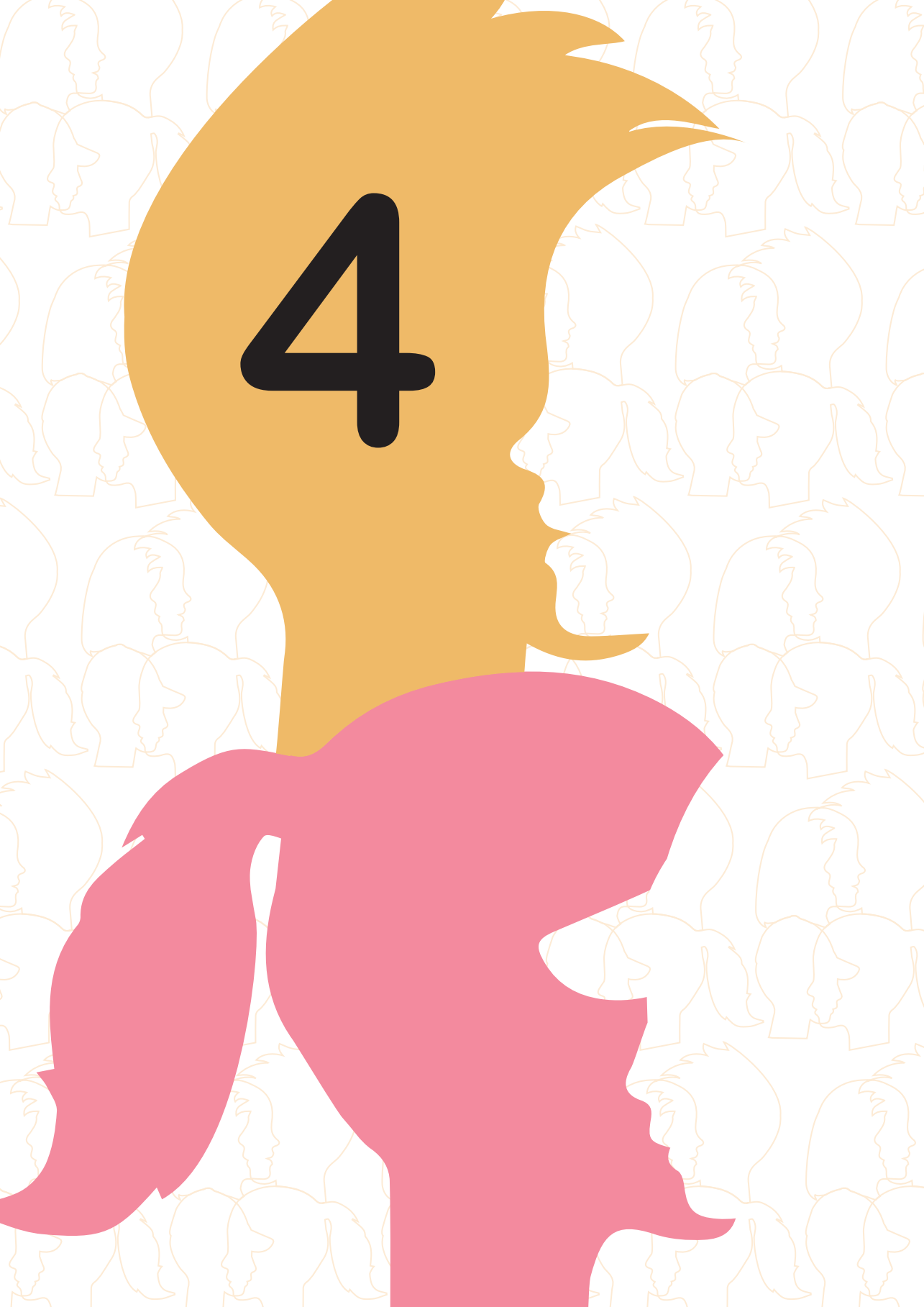
Note. Due to rounding, probabilities for non-western immigrants do not add up to precisely 1. An example of how to interpret the probabilities for family affluence: for native Dutch adolescents, probabilities are highest for middle family affluence, followed by high family affluence and low family affluence. For non-western immigrants probabilities are also highest for middle family affluence. However, for non-western immigrants the probability of low family affluence is higher than high family affluence. Thus, non-western adolescents are more likely to report low levels of family affluence than high levels of family affluence, while this is the other way around for native Dutch adolescents.

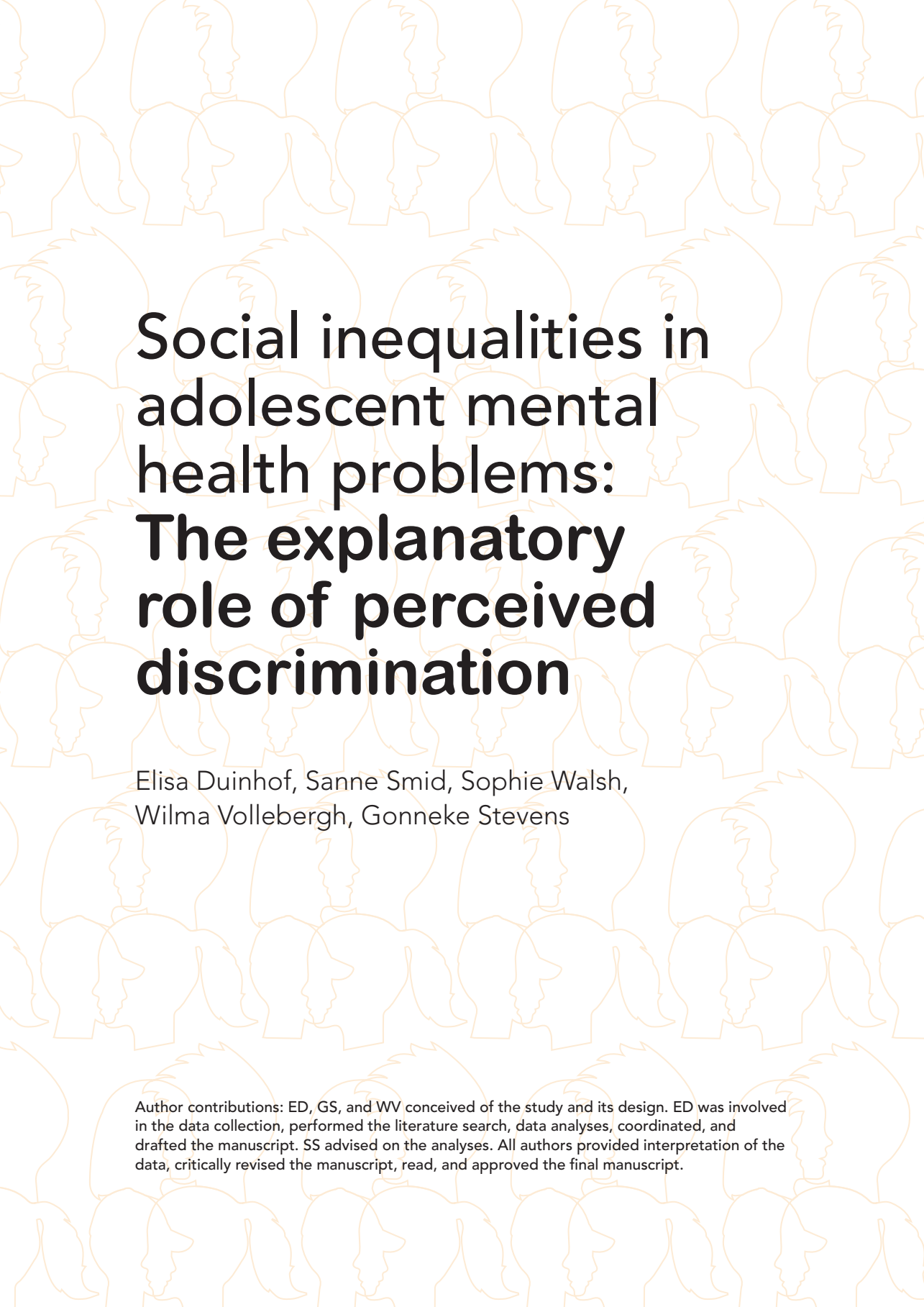
Table A3.3 Probit regression probabilities for the paths from family affluence and immigration background to adolescent educational level

Educational level	Low family affluence		Middle family affluence		High family affluence	
	native Dutch	non-western immigrant	native Dutch	non-western immigrant	native Dutch	non-western immigrant
Low prevocational	0.226	0.252	0.156	0.178	0.103	0.119
Medium prevocational	0.316	0.323	0.283	0.295	0.239	0.254
High prevocational	0.246	0.236	0.266	0.261	0.271	0.271
Pre-university	0.213	0.189	0.294	0.266	0.388	0.356

Note. Due to rounding, probabilities may not add up to 1 within each of the six combinations of family affluence and immigration background. An example of how to interpret the probabilities: for low family affluence both native Dutch and non-western immigrant adolescents have the highest probabilities for middle prevocational education and the lowest probabilities for pre-university education. For high family affluence both native Dutch and non-western immigrant adolescents have the highest probabilities for pre-university education and the lowest probabilities for low prevocational education. Thus, adolescents in families with high levels of affluence are more likely to attend higher educational levels, while adolescents in families with low levels of affluence are more likely to attend lower educational levels.

4





Social inequalities in adolescent mental health problems: The explanatory role of perceived discrimination

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Author contributions: ED, GS, and WW conceived of the study and its design. ED was involved in the data collection, performed the literature search, data analyses, coordinated, and drafted the manuscript. SS advised on the analyses. All authors provided interpretation of the data, critically revised the manuscript, read, and approved the final manuscript.

Abstract

Using a nationally representative sample of 7,860 10- to 16-year-old Dutch adolescents, we examined the explanatory role of perceived discrimination in inequalities according to family affluence, immigration background, and gender in adolescent self-reported conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems. Structural equation models indicated that non-western immigrant adolescents were far more likely to perceive discrimination than native Dutch adolescents and this explained their higher risk for conduct problems and peer relationship problems. Boys perceived somewhat more discrimination than girls, but this only explained a very small proportion of their higher risk for conduct problems. No association between family affluence and perceptions of discrimination was found once immigration background and gender were taken into account. Findings highlight the important explanatory role of perceived discrimination in the association between immigration background and adolescent mental health problems.

Introduction

Social inequalities in adolescent mental health problems are a world-wide phenomenon (Inchley et al., 2016; Patton et al., 2016). Among others, adolescents who grow up in a family with a low socioeconomic status (SES), and/or have an immigration background, report higher levels of mental health problems than adolescents in families with a higher SES and natives (McMahon et al., 2017; Reiss, 2013; Stevens et al., 2015). Clear gender differences exist as well, with boys reporting higher levels of externalizing problems and girls reporting higher levels of internalizing problems (De Looze et al., 2019; Pickett et al., 2013; Thapar et al., 2012). Previous studies indicated that these differences according to family SES, immigration background, and gender – referred to as *social inequalities* in the remainder of this article – in adolescent mental health problems may be explained by an unequal distribution of stressors and resources (Devenish, Hooley, & Mellor, 2017; Kuehner, 2017; Stevens & Vollebergh, 2008). Discrimination – the unfair treatment by others because of one’s social group membership (Major & Sawyer, 2009) – is a unique source of stress for members of stigmatized social groups (e.g., low SES, immigration background, girls) (Thoits, 2010), and has been hypothesized to be an important mechanism in explaining social inequalities in adolescent mental health problems (García Coll et al., 1996).

As objective discrimination is often difficult to establish with certainty (Major & Sawyer, 2009), (mental) health research typically focuses on adolescents’ subjective perceptions of discrimination (Marks et al., 2015). Adolescents’ subjective perceptions of personally experiencing unfair and negative treatments because of their social group memberships – referred to as *perceived discrimination* in the remainder of this article –, are highly relevant as they likely determine if discriminatory events are salient, important, and stressful to them (Clark, Anderson, Clark, & Williams, 1999). To date, we know little about the extent to which perceived discrimination explains social inequalities in (adolescent) mental health problems (Priest et al., 2013; Schwartz & Meyer, 2010; Williams & Mohammed, 2009). Therefore, using a nationally representative sample of 10- to 16-year-old Dutch adolescents, the present study examined the extent to which perceived discrimination (on the basis of family SES, immigration background, and gender) could *explain* social inequalities according to these respective social group memberships in a broad spectrum of adolescent self-reported mental health problems. By analyzing the explanatory role of perceived discrimination, our study can inform efforts aimed at reducing social inequalities in adolescent mental health problems.

Social inequalities in perceived discrimination

It can be expected that adolescents who are members of *stigmatized* social groups – devalued social groups of low social, economic, and/or political power – are more likely to be the target of discrimination (García Coll et al., 1996; Major, Quinton, & McCoy, 2002; Marks et al., 2015). As such, adolescents belonging to stigmatized social groups may also be more likely to *perceive* being discriminated than adolescents who belong to non-stigmatized social groups (Brown & Bigler, 2005; Major et al., 2002), although it is also important to acknowledge that some adolescents may fail to perceive discrimination that exists or perceive discrimination that does not exist (Major & Sawyer, 2009; Paradies, 2006). Indeed, previous studies found that ethnic minority adolescents reported more racism than ethnic majority adolescents (Bogart et al., 2013; Bucchianeri et al., 2013, 2016; Coker et al., 2009; Grollman, 2012; Verkuyten & Thijs, 2006). Far less attention has been paid to other types of perceived discrimination. The available studies suggest that adolescents growing up in lower SES families report somewhat higher levels of SES-based discrimination than their peers in higher SES families (Bucchianeri et al., 2013; Grollman, 2012), and that girls report more gender-based discrimination than boys (Bucchianeri et al., 2016; Grollman, 2012). In addition, some social groups were found to perceive relatively high levels of multiple types of discrimination (Bucchianeri et al., 2013, 2016; Grollman, 2012). To illustrate, adolescents in lower SES families perceived not only more SES-based but also more race-based discrimination than adolescents in higher SES families (Grollman, 2012).

Former research also indicated that perceptions of race/ethnic-based discrimination are relatively frequent as compared to SES-based discrimination and gender-based discrimination (Bucchianeri et al., 2013, 2016; Grollman, 2012). This might be partly due to the fact that adolescent's immigration background is a more visible and more easily detected social group characteristic than adolescents' SES (Chaudoir, Earnshaw, & Andel, 2013). With evidence of increasingly negative attitudes towards immigrants in Europe (Ceobanu & Escandell, 2010), it may also be that the social and political climate is more negative towards immigrant adolescents than to other stigmatized social groups. As such, especially in a relatively income-equal and gender-equal country like the Netherlands, immigration-based discrimination may be more frequently perceived than SES-based and gender-based discrimination. Consequently, differences in perceived discrimination may be especially pronounced between immigrant adolescents and native adolescents.

Taken together, these findings suggest that adolescents belonging to stigmatized social groups – and especially adolescents with an immigration background who hold an ethnic minority status in the Netherlands – are more likely to perceive discrimination

than adolescents in more privileged social groups. Previous studies on adolescent perceived discrimination were almost exclusively conducted in the United States (US), mainly including African American, Latino, and Asian ethnic minorities, and focused on perceptions of race/ethnic-based discrimination (Benner et al., 2018; Priest et al., 2013). Consequently, in Europe, little is known about the extent to which different social groups perceive SES-, immigration background-, and gender-based types of discrimination.

The explanatory role of perceived discrimination

Perceiving discrimination is expected to be stressful because it signals rejection and exclusion by others. This may threaten the fulfillment of adolescents' fundamental needs to be included and accepted (Major et al., 2002). Such threat appraisals may trigger psychological stress responses of decreased positive emotions and increased negative emotions (e.g., anger, anxiety, frustration, fear) that may lead to mental health problems (Clark et al., 1999; Pascoe & Smart Richman, 2009; Sanders-Phillips, Settles-Reaves, Walker, & Brownlow, 2009). Ample studies have focused on the associations between perceived discrimination and adolescent mental health problems (Marks et al., 2015; Priest et al., 2013). For instance, previous meta-analytic reviews found that adolescents' perceptions of discrimination were associated with higher levels of internalizing problems and externalizing problems (Benner et al., 2018; Schmitt et al., 2014). Longitudinal studies, which controlled for prior levels of mental health problems, also provided evidence that perceiving discrimination increases levels of adolescent mental health problems (Hou, Kim, Wang, Shen, & Orozco-Lapray, 2015; Schmitt et al., 2014). These longitudinal studies, however, mostly investigated internalizing problems (see Brody et al., 2006; Simons, Chen, Stewart, & Brody, 2003 for exceptions), and, albeit weaker in size (Brody et al., 2006) and among adolescents older than in our sample (Hou et al., 2015), also found some evidence in the opposite direction with depressive symptoms and conduct problems preceding adolescents' perceptions of discrimination.

The previous assumes that perceptions of discrimination might play an important role in the explanation of social inequalities in adolescent mental health problems. Adolescents who belong to stigmatized social groups are more likely to perceive discrimination than their more privileged peers (Brown & Bigler, 2005; Bucchianeri et al., 2013, 2016; Grollman, 2012), and perceptions of discrimination are positively related to adolescent mental health problems (Benner et al., 2018; Schmitt et al., 2014). Nevertheless, studies testing the explanatory role of perceived discrimination in social inequalities in adolescent mental health problems are extremely scarce. Only a

few studies in the US tested the explanatory role of perceived discrimination in social inequalities in the mental health of young people. One study found that perceived racism explained little of the racial differences in internalizing problems among young adults (Taylor & Turner, 2002), while others revealed that perceptions of (general and race/ethnic-based) discrimination partly explained racial/ethnic differences in externalizing problems among early adolescents (Bogart et al., 2013) and internalizing problems among college students (Cokley, Hall-Clark, & Hicks, 2011). Also, one study indicated that perceiving multiple types of discrimination partly explained social inequalities in internalizing problems among adolescents and young adults (Grollman, 2012). Thus, studies examining the explanatory role of perceived discrimination in social inequalities in adolescent mental health problems are extremely rare and it remains to be seen whether the findings from US-based research can be generalized to the European context.

Research question and hypotheses

Using a nationally representative sample of 10- to 16-year-old Dutch adolescents, this study sets out to examine the explanatory role of perceived discrimination (on the basis of family SES, immigration background, and gender) in social inequalities (according to family affluence, immigration background, and gender) in adolescent self-reported conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems. Given that adolescents belonging to stigmatized social groups are found to be more likely to perceive discrimination, which in turn, is related to higher levels of mental health problems, we hypothesize that perceived discrimination explains at least part of the association between family affluence, immigration background, and gender, and adolescent self-reported mental health problems. As differences in perceived discrimination between immigrant and native Dutch are hypothesized to be relatively large due to the relatively visibility of this social group and the relatively negative social climate towards immigrants in the Netherlands, we expect perceived discrimination to be more important as an explanation for the association between immigration background and adolescent mental health problems than for the association between either family affluence or gender and adolescent mental health problems.

Method

Participants

The present study used data from the 2017 Dutch Health Behaviour in School-aged Children (HBSC) study. HBSC is a cross-sectional, school-based survey that is conducted every four years in over 40 countries in Europe, North America, and the Middle East. Using a standardized research protocol, self-report paper and pencil (primary education) or computerized (secondary education) questionnaires were administered in the classroom. A clustered sampling design was used with schools being the initial sampling units. Samples were stratified according to the level of urbanization and drawn separately for primary education and secondary education. The school response rate was 39% in primary education and 37% in secondary education. Main reasons for school non-response were participation in other surveys (primary education = 18%; secondary education = 38%) or too frequent research participation requests (primary education = 37%, secondary education = 19%). In primary and secondary education the student non-response level was low (primary education = 4%, secondary education = 8%) and mainly due to illness or truancy (only in secondary education). More information about the data collection can be found elsewhere (Inchley et al., 2016; Stevens et al., 2018).

The HBSC study is designed to gather a nationally representative sample of Dutch adolescents and does not oversample specific immigrant groups. Reflecting the immigration history of the Netherlands, where mass immigration started around 1960 predominantly from so-called non-western countries (Geddes & Scholten, 2016), non-western immigrants constitute by far the largest group of immigrant adolescents in our sample (75%). Because of the distinctive social and economic positions of immigrants with a non-western background and western background (Hoff et al., 2019; Kalmijn, 2015; Netherlands Inspectorate of Education, 2018), and the relatively small sample size of immigrants with a western background in our sample, we excluded adolescents with a western immigration background ($n = 446$, 5.4% of the total sample). The final sample included 7,860 10- to 16-year-old adolescents ($M = 13.34$, $SD = 1.70$), of whom 49.1% were girls and 18% had a non-western immigration background (for more sample information see the first column of Table 4.2).

Measures

Mental health problems. Adolescents filled in the Dutch translation of the problem scales of the self-report Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), which includes 20 ordinal items with the answer categories: "Not true" = 0; "Somewhat true" = 1; "Certainly true" = 2. Items are divided into four subscales

measuring conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems (for more information see www.sdqinfo.org). We used a revised version of the problem scales of the self-report SDQ that excluded the five reverse worded items: the SDQ-R (Duijnhof et al., 2020). Confirmatory factor analyses (CFA) showed that the 15-item SDQ-R showed a much better fit to the data ($\chi^2(84) = 1,292.36, p < 0.001, CFI = 0.944, TLI = 0.931, RMSEA = 0.043$) than the original self-report SDQ ($\chi^2(164) = 3,174.09, p < 0.001, CFI = 0.875, TLI = 0.855, RMSEA = 0.048$). Acceptable internal consistencies were found for the conduct problems (ordinal $\alpha = 0.74$), emotional symptoms (ordinal $\alpha = 0.80$), and hyperactivity-inattention problems (ordinal $\alpha = 0.79$) SDQ-R subscales. A somewhat lower internal consistency was found for the peer relationship problems SDQ-R subscale (ordinal $\alpha = 0.61$). Measurement invariance tests indicated that the SDQ-R allowed for valid comparisons of mental health problems between the three family affluence levels, native Dutch and non-western immigrant adolescents, and boys and girls (see Appendix 4.1). In the final sample, the amount of missing values on the individual SDQ-R items was small and ranged between 47 (0.6% of the total sample) and 74 (0.9% of the total sample).

Perceived discrimination. To assess different types of perceived discrimination, we used the first three questions of an existing measure of perceived ethnic discrimination among adolescents (Phinney, Madden, & Santos, 1998). Adolescents filled in how often they were treated unfairly or negatively by schoolteachers, other adults outside of school, and pupils at school because of their: family SES ("because of the amount of money your family has"), immigration background ("because of where you, your parents, or grandparents were born"), and gender ("because you are a boy or a girl"). Item answer categories were measured on a 5-point Likert scale with answer categories: "never" = 0, "seldom" = 1, "sometimes" = 2, "often" = 3, and "very often" = 4. In the final sample, the number of missing values on each item were low and ranged between 170 (2.2%) and 181 (2.3%). To describe the percentage of adolescent perceived discrimination, item answer categories were dichotomized into "never" and "ever" (i.e., seldom, sometimes, often, very often).

Since this is a newly developed instrument, we first evaluated the psychometric properties of the perceived discrimination scale before proceeding with the analyses. A CFA indicated that the expected three-factor structure (tapping into family SES-, immigration background-, and gender-based discrimination) showed a good fit to the data ($\chi^2(24) = 342.88, p < 0.001, CFI = 0.986, TLI = 0.980, RMSEA = 0.042$). However, when proceeding with our analyses we had difficulties with multicollinearity: the three latent factors correlated highly with each other (r ranging between 0.79 and 0.84). To explore the dimensionality of the nine items that measure perceived discrimination, we

ran an exploratory factor analysis (EFA) using oblique geomin rotation (allowing latent factors to correlate) and the weighted least squares and variances adjusted (WLSMV) estimator. Interestingly, the scree plot and eigenvalues clearly supported a one-factor solution: only one factor had eigenvalues above one (eigenvalue = 6.64) (see https://osf.io/qvrt3/?view_only=1acef7a740b9478883e28e2a631ffa98).

A CFA indicated that this one-factor solution had a good model fit ($\chi^2(27) = 1,060.42$, $p < 0.001$, CFI = 0.956, TLI = 0.941, RMSEA = 0.071) and that all items loaded highly on the underlying latent factor (> 0.76) (see Appendix 4.2). The one-factor solution also had good internal consistency (Cronbach's $\alpha = 0.88$) and allowed for valid comparisons of perceived discrimination between the three family affluence levels, native Dutch and non-western immigrant adolescents, and boys and girls (see Appendix 4.3 for the results of the measurement invariance tests). Based on these results, we continued our analyses using the one-factor solution tapping into more "overarching" perceptions of discrimination.

Family affluence. Family affluence was used as a proxy for family SES and measured using the Revised Family Affluence Scale (FAS-III) which was developed specifically for children and adolescents. The FAS has been found to provide a valid indication of family wealth (Hartley, Levin, & Currie, 2016; Torsheim et al., 2016). FAS consists of six items asking adolescents about material assets in their family, such as: "Does your family own a car, van, or truck?" and "Do you have your own bedroom for yourself?" Item responses were summed into a total FAS score. In line with former studies (De Looze et al., 2018; Inchley et al., 2016), based upon the FAS distribution in the total sample, adolescents were identified as belonging to families with a low (lowest 20%), middle (middle 60%), or high (highest 20%) level of affluence. Two dummy variables were created, and high family affluence was set as the reference category.

Immigration background. Adolescents were asked to indicate the country of birth of both their parents. In line with previous Dutch studies (Vollebergh et al., 2005), and the definition of Statistics Netherlands, if at least one of the parents was born in a non-western country [Africa, Latin America, Asia (excluding Indonesia or Japan), and Turkey] adolescents were considered having a non-western immigration background. If both parents were born in the Netherlands, adolescents were considered having a native Dutch background. Adolescents with a native Dutch background were set as the reference group.

Gender. Adolescents reported their gender by responding to the question: "Are you a boy or a girl?" Girls were set as the reference category.

Analytic strategy

We used structural equation modeling in Mplus version 8.2 (Muthén & Muthén, 2017) and the weighted least squares and variances adjusted (WLSMV) estimator. Data were weighted for educational level, school grade, gender, and urbanicity to assure national representativeness. Analyses were corrected for cluster effects of adolescents in the same school (the primary sampling unit) and controlled for age. Given the large sample size, a more conservative significance level of $p \leq 0.01$ was applied.

First, we examined the percentages of perceived discrimination in the total sample, and stratified by family affluence, immigration background, and gender. No gender differences ($F(1,156) = 5.75, p = 0.02$) in the sample composition of the native Dutch and non-western immigrant adolescents were found, but non-western immigrant adolescents ($F(1.66,259.04) = 62.04, p < 0.001$) and girls ($F(1.89,294.28) = 16.63, p < 0.001$) were overrepresented in low affluent families. To control for this interrelatedness, in subsequent analyses the social inequality indicators were analyzed together in one model.

Second, direct associations between the social inequality indicators (i.e., family affluence, immigration background, and gender) and the four latent factors measuring adolescent self-reported conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems (Model 1) were examined, as well as the direct associations between the social inequality indicators and the latent factor measuring perceived discrimination (Model 2). To examine the size of social inequalities in adolescent mental health problems and social inequalities in adolescent perceived discrimination, standardized regression coefficients were interpreted using Cohen's d as a guideline [negligible ($d < 0.20$), small ($d = 0.20$ to 0.50), medium ($d = 0.50$ to 0.80), large ($d > 0.80$)] (Cohen, 1992).

Finally, a mediation model (Model 3) was tested to examine the extent to which perceived discrimination explained social inequalities in adolescent self-reported mental health problems (see Figure 4.1). Percentile bootstrapped confidence intervals (using 5,000 replications) were obtained to compute the indirect effects of family affluence, immigration background, and gender on adolescent mental health problems through perceived discrimination. Partially standardized effects were used to interpret the size of indirect effects (Miočević et al., 2018). The size of the direct relations between perceived discrimination and adolescent mental health problems were examined by interpreting standardized linear regression coefficients as correlation coefficients [negligible ($r < 0.01$), small ($r = 0.10$ to 0.30), medium ($r = 0.30$ to 0.50), large ($r > 0.50$)] (Cohen, 1992). The Mplus output of all abovementioned models can be found on https://osf.io/qvrt3/?view_only=1acef7a740b9478883e28e2a631ffa98.

Results

Descriptive statistics

In the total sample, with scales ranging from 0 to 10, mean levels were low for conduct problems ($M = 1.15$, $SD = 1.71$), emotional symptoms ($M = 2.39$, $SD = 2.20$), and peer relationship problems ($M = 1.86$, $SD = 1.98$), and moderate for hyperactivity-inattention problems ($M = 4.11$, $SD = 2.94$). The percentage of perceived discrimination in the total sample was also rather low (ranging between 3.7% and 12.6%) and adolescents more often perceived discrimination from their pupils at school than from schoolteachers and adults outside of school (see Table 4.1). Clear differences between non-western immigrants and native Dutch adolescents were found, with the non-western immigrants perceiving more discrimination on all items than their native Dutch peers. Differences between non-western immigrants and native Dutch adolescents were however strongest for perceptions of discrimination on the basis of immigration background. Family affluence and gender differences were smaller in magnitude. Compared to their peers in more affluent families, adolescents in families with relatively low levels of affluence were more likely to report perceptions of discrimination (this was true for eight out of nine indicators of perceived discrimination). Boys more often perceived discrimination than girls (for five indicators of perceived discrimination boys were more likely to perceive discrimination, while for one indicator girls were more likely to perceive discrimination than boys).

Social inequalities in adolescent mental health problems and perceived discrimination

Table 4.2 shows that adolescents in families with relatively lower levels of affluence reported significantly higher levels of emotional symptoms and peer relationship problems. Largest differences were found between low- and high-affluent families, with medium-sized differences for peer relationship problems and small differences for emotional symptoms. Although adolescents in families with low levels of affluence reported somewhat more conduct problems than their peers in highly affluent families, the size of this difference was small. No family affluence differences were found for adolescent hyperactivity-inattention problems.

Adolescents with a non-western immigration background reported significantly higher levels of conduct problems and peer relationship problems, lower levels of hyper-activity-inattention problems, and equal levels of emotional symptoms as compared with native Dutch adolescents. These differences were all small in size. Boys reported somewhat more conduct problems, far less emotional symptoms, and equal

Table 4.1 The proportion of adolescents reporting any perceived discrimination (% "ever") in the final sample and stratified by family affluence, immigration background, and gender

Treated unfairly because of	Total (weighted %)	Family affluence (weighted %)			Immigration background (weighted %)		Gender (weighted %)	
		Low	Middle	High	Native ^a	Non-western	Girls	Boys
Family SES								
By schoolteachers	3.7	5.0	3.1	4.2	2.8	7.7	2.6	4.7
By adults outside of school	5.0	7.5	3.7	6.1	4.0	9.4	4.0	6.0
By pupils at school	11.8	15.6	10.3	12.6	10.8	16.1	10.9	12.7
Immigration background								
By schoolteachers	7.5	9.8	6.7	7.3	4.6	20.5	6.2	8.8
By adults outside of school	8.7	12.6	7.8	7.0	4.8	26.4	7.7	9.6
By pupils at school	12.6	18.7	11.3	10.3	8.3	32.5	10.9	14.3
Gender								
By schoolteachers	9.2	9.1	8.7	10.9	8.3	13.5	6.7	11.7
By adults outside of school	7.6	9.7	7.1	6.9	6.5	12.2	7.8	7.3
By pupils at school	11.1	13.2	10.9	9.7	10.0	15.9	12.9	9.3

Note: ^anative Dutch. % are weighted for educational level, school grade, gender, and urbanicity. % "ever" perceived discrimination = the combined percentage of adolescents who perceived discrimination seldom, sometimes, often, or very often. Significant ($p \leq 0.01$) family affluence, immigration background, and gender differences for each item of perceived discrimination are shown in bold. For example: boys (4.7%) significantly ($p \leq 0.01$) more often perceived family SES-based discrimination by schoolteachers than girls (2.6%).

levels of hyperactivity-inattention problems compared to girls. Boys also reported significantly higher levels of peer relationship problems than girls, but the size of this difference was negligible.

Looking at social inequalities in the latent factor measuring perceived discrimination, no family affluence differences were found, whereas medium-sized differences in perceived discrimination were found between the native Dutch and non-western immigrant adolescents. Boys reported somewhat higher levels of perceived discrimination than girls (see Table 4.2).

The explanatory role of perceived discrimination

The mediation model (Figure 4.1) showed a good fit to the data ($\chi^2(337) = 2,458.24$, $p < 0.001$, CFI = 0.955, TLI = 0.947, RMSEA = 0.029) and explained a significant amount of the variance in adolescent conduct problems ($R^2 = 0.29$, $p < 0.001$), emotional symptoms ($R^2 = 0.24$, $p < 0.001$), peer relationship problems ($R^2 = 0.21$, $p < 0.001$), hyperactivity-inattention problems ($R^2 = 0.07$, $p < 0.001$), and perceived discrimination ($R^2 = 0.08$, $p < 0.001$). In line with Table 4.2, the mediation analysis showed that non-western immigrant adolescents and boys were more likely to perceive discrimination than, respectively, native Dutch adolescents and girls, whereas family affluence was not associated with perceived discrimination. Differences in perceived discrimination were especially pronounced for non-western immigrant compared to native Dutch adolescents (see Figure 4.1, $\beta = 0.64$ indicating a medium effect). Furthermore, adolescents who perceived higher levels of discrimination reported more conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems. Associations were especially strong for conduct problems (see Figure 4.1, $\beta = 0.51$ indicating a large effect).

In line with these findings, significant indirect effects were *only* found for immigration background and gender – and not for family affluence – on adolescent conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems through perceived discrimination (see Table 4.3). On average, being a non-western immigrant (compared to native Dutch), resulted in an increase in conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems via changes in perceived discrimination. Similarly, on average, being a boy (compared to a girl), resulted in an increase in conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems through changes in perceived discrimination.

The indirect effects of immigration background on adolescent mental health problems via perceived discrimination were stronger than for gender, and especially

Table 4.2 Social inequalities in adolescent mental health problems and perceived discrimination

	<i>n</i> (weighted %)	Conduct problems			Emotional symptoms			Peer relationship problems			Hyperactivity-inattention problems			Perceived discrimination		
		<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Family affluence^a																
High	1,608 (21.0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Middle	4,513 (58.8)	-0.02	0.03	-0.03	0.09**	0.02	0.14	0.13**	0.03	0.25	-0.04	0.03	-0.05	-0.08	0.04	-0.09
Low	1,530 (20.2)	0.13*	0.04	0.18	0.18**	0.03	0.29	0.27**	0.03	0.51	-0.05	0.04	-0.06	0.05	0.05	0.06
Immigration background^b																
native Dutch	6,520 (82.0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
non-western	1,338 (18.0)	0.23**	0.03	0.31	-0.04	0.02	-0.07	0.15**	0.03	0.28	-0.23**	0.04	-0.30	0.55**	0.04	0.61
Gender																
Girls	4,039 (49.1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boys	3,821 (50.9)	0.21**	0.03	0.28	-0.44**	0.02	-0.73	0.08**	0.02	0.14	0.04	0.02	0.05	0.16**	0.04	0.18

Note. *n* represent the unweighted number of participants. % are weighted for educational level, school grade, gender, and urbanicity. Reference categories are, respectively, high family affluence, native Dutch, and girls. ^a209 missing values on family affluence in the total sample, ^bTwo missing values for immigration background in the total sample. * *p* < 0.01. ** *p* < 0.001.

pronounced for conduct problems and peer relationship problems (see β 's in Table 4.3). Further evidence for the substantiality of the indirect effects is found in the comparison of the model with the indirect effects (Figure 4.1) and the model without the indirect effects of perceived discrimination (Table 4.2). In the mediation model that includes perceived discrimination as an explanatory variable (Figure 4.1), non-western immigrant adolescents reported equal instead of higher levels of conduct problems and peer relationship problems, lower instead of equal levels of emotional symptoms, and even lower levels of hyperactivity-inattention problems than native Dutch adolescents. In contrast, in the mediation model, boys still reported more conduct problems, less emotional symptoms, and equal levels of hyperactivity-inattention problems as girls. The relation between gender and peer relationship problems was no longer significant in the mediation model, but this relationship already was negligible in size (see Table 4.2). Hardly any differences between the model with and without perceived discrimination were found for the association between family affluence and adolescent mental health problems (see Table 4.2 and Figure 4.1).

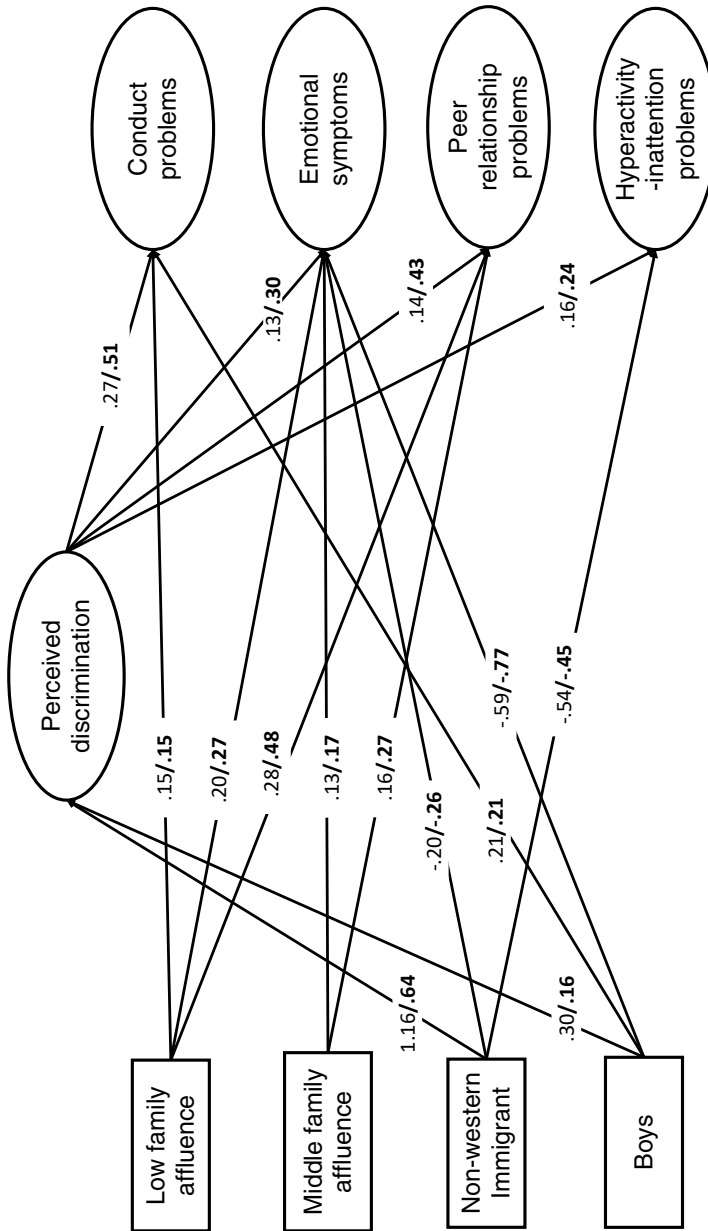


Figure 4.1 Mediation model showing the associations between family affluence, immigration background, and gender, and adolescent mental health problems mediated by perceived discrimination. Reference categories are high family affluence, native Dutch background, and girls. Non-bold numbers represent unstandardized and bold numbers represent standardized regression coefficients (using STD standardization). The rectangles represent observed variables and the ovals represent latent variables. To increase readability, the control variable age, non-significant regression paths ($p > 0.01$), latent factor indicators, (co)variances, and residual error terms were not shown.

Table 4.3 Model estimates of the indirect effects of family affluence, immigration background, and gender on mental health problems via perceived discrimination

	Conduct problems			Emotional symptoms			Peer relationship problems			Hyperactivity-inattention problems		
	B	β	99% CI	B	β	99% CI	B	β	99% CI	B	β	99% CI
Low family affluence	0.03	0.03	-0.05, 0.11	0.01	0.02	-0.02, 0.05	0.01	0.02	-0.03, 0.05	0.02	0.01	-0.03, 0.07
Middle family affluence	-0.04	-0.05	-0.10, 0.01	-0.02	-0.03	-0.05, 0.01	-0.02	-0.04	-0.05, 0.01	-0.03	-0.02	-0.06, 0.01
Non-western immigrant	0.32	0.33	0.25, 0.39	0.15	0.19	0.11, 0.18	0.16	0.27	0.12, 0.20	0.18	0.15	0.13, 0.24
Boys	0.08	0.08	0.03, 0.13	0.04	0.05	0.01, 0.07	0.04	0.07	0.01, 0.07	0.05	0.04	0.02, 0.08

Note. CI = Confidence interval. Reference categories are: high family affluence, native Dutch, and girls. If the confidence interval includes zero, the indirect effect is not significantly different from zero, indicating no indirect effect.

Discussion

Using a nationally representative sample of 10- to 16-year-old Dutch adolescents, the current study sought to examine the explanatory role of perceived discrimination in inequalities in adolescent mental health problems, according to family affluence, immigration background, and gender. Our study showed that non-western immigrant adolescents perceived considerably more discrimination than native Dutch adolescents, while boys perceived slightly more discrimination than girls, and no differences in perceived discrimination according to family affluence were found once gender and immigration background were taken into account. The higher level of perceived discrimination of the non-western immigrant adolescents explained their higher risk for conduct problems and peer relationship problems as compared to native Dutch adolescents. The important role of perceived discrimination is further emphasized by our finding that when the explanatory role of perceived discrimination is accounted for, non-western immigrant adolescents reported lower levels of emotional symptoms than native Dutch adolescents, and their already lower risk of hyperactivity-inattention problems became even more pronounced. Boys perceived somewhat more discrimination than girls, but this explained only a small proportion of their higher risk for conduct problems compared to girls.

According to the risk perspective on immigration, immigrant adolescents are at increased risk for mental health problems for multiple reasons, such as that they are more likely to encounter economic deprivation, receive less social support from their parents because of processes of asymmetric acculturation, and face more discrimination than native adolescents (Foner & Dreby, 2011; García Coll et al., 1996; Stevens & Vollebergh, 2008). Possibly the most important message of this study is our finding that non-western immigrant adolescents' personal experiences of discrimination fully explain their higher risk for conduct problems and peer relationship problems. As such, our findings seem to specify the risk perspective, by suggesting that the reception in society of non-western immigrant adolescents, and more specifically their personal experiences of being unfairly and negatively treated, should be seen as a "core" risk factor underlying their higher risk for mental health problems.

In line with our expectations, results indicated that non-western immigrant adolescents perceived by far the highest levels of discrimination. The strong relation between having a non-western immigration background and perceiving discrimination may reflect an intolerant social and political climate towards immigrants with a non-western background in the Netherlands (Geddes & Scholten, 2016; Thijs et al., 2018). Moreover, considering the fact that the Netherlands is a relatively gender-equal and relatively highly income-equal country, it may also be the case that immigration-based

discrimination is more salient than SES-based and gender-based discrimination. Contradicting previous findings from the US on family SES (Bucchianeri et al., 2013; Grollman, 2012), our study found no association between family affluence and perceived discrimination. This may be explained by the fact that family SES is a less visible social group characteristic compared to immigration background and gender (Chadoir et al., 2013). In addition, although children at the age of 10 to 12 years already seem aware of their own SES (Mistry, Brown, White, Chow, & Gillen-O'Neel, 2015), findings suggest that SES becomes an especially central aspect of identity in emerging adulthood (e.g., Thomas and Azmitia 2014). Family SES may therefore not be as important for their identity as their immigration background or gender. This may explain why adolescents from families with different levels of affluence did not differ much in their perceptions of being discriminated.

Also in contrast to previous findings (Bucchianeri et al., 2016; Grollman, 2012), boys – and not girls – reported somewhat higher levels of perceived discrimination, although differences were small. Gender differences were especially pronounced for gender-based discrimination by schoolteachers. This suggests that especially in Dutch educational settings, where teachers are overwhelmingly female (especially in primary education) (Onderwijs in cijfers, n.d.) and girls increasingly outperform boys (Hartgers et al., 2018), boys may feel that they hold a disadvantaged position compared to girls. To understand why Dutch boys perceive more discrimination than girls, additional studies are needed to examine why, in what contexts, by whom, and in what ways boys and girls perceive discrimination.

Interestingly and unexpectedly, our nine-item perceived discrimination scale did not tap into three distinct types of family SES-, immigration background-, and gender-based perceived discrimination, but one factor measuring “overarching” perceptions of discrimination irrespective of the adolescents’ social group membership. This unexpected finding can be explained in multiple ways. First, according to *intersectionality theory* (Crenshaw, 1989) adolescents’ daily life experiences are shaped by multiple, intertwined social group memberships. Adolescents might therefore not distinguish between discriminatory experiences based on single social group memberships as they perceive their social group memberships simultaneously and not separately (e.g., Bowleg, 2008). In line with this theoretical thinking, it has been suggested to measure interpersonal discrimination on the basis of “who you are”, which does not require attributions to specific social group memberships (Schein & Bauer, 2019). Thus, our findings may indicate that asking adolescents how often they experience discrimination on the basis of specific social group memberships is not that relevant, as they have more “overarching” experiences of discrimination.

Second, it is also possible that adolescents, who are in the process of identity formation (Erikson, 1968) and developing a social identity (Tanti, Stukas, Halloran, & Foddy, 2011), do not make clear distinctions between their social group memberships because they are still developing and exploring these social identities. Related, in this process of developing a social identity, experiences of discrimination on the basis of specific social group memberships may be generalized to other social group memberships and influence the perceptions of other experiences. Both processes might explain why adolescents do not attribute negative and unfair treatments to specific social group memberships.

Finally, this finding could be explained by the inherent perception bias in self-report measures of perceived discrimination (Lewis, Cogburn, & Williams, 2015). Perceptions of discrimination do not necessarily overlap with objective occurrences of discrimination: adolescents may fail to perceive discrimination that exists or perceive discrimination that does not exist (Major & Sawyer, 2009; Paradies, 2006). This may be explained by the fact that discrimination is often ambiguous and difficult to recognize (Major & Sawyer, 2009; Paradies, 2006), and adolescents may differ in their readiness to perceive ambiguous events as discrimination (Kaiser & Major, 2006). Thus, perceptions of discrimination may to a certain extent reflect personality characteristics, such as hostility and rejection sensitivity, that increase adolescents' *general* tendency to perceive discrimination (Lewis et al., 2015; Major et al., 2002). Such personality characteristics are also known to be related to (externalizing) mental health problems (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Adolescents' personal tendencies may therefore *confound* the relation between perceived discrimination and mental health (Lewis et al., 2015; Lui & Quezada, 2019; Major et al., 2002). Our finding that perceptions of discriminations are most strongly related to conduct problems may point in this direction. This may also be an alternative explanation for our finding that boys perceived more discrimination than girls: boys reported more conduct problems, and studies show that in ambiguous situations (like discrimination) aggressive children tend to attribute hostile intentions to others (Orobio de Castro et al., 2002). Put differently, especially those adolescents that are more likely to have externalizing problems may also be more likely to attribute ambiguous situations to discrimination, suggesting reversed causality. Future experimental research is needed that investigates the interplay between facing discrimination, personality characteristics that either increase (e.g., rejection sensitivity) or decrease (e.g., just world beliefs) adolescents' tendencies to perceive discrimination, and adolescent mental health.

Strengths and limitations

Using a nationally representative sample of Dutch adolescents, who reported on three types of perceived discrimination and a broad spectrum of mental health problems, our study adds to the scarce literature on the importance of perceived discrimination as an explanatory variable for social inequalities in adolescent mental health. The finding that perceptions of discrimination may play a crucial role in the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems as compared to native Dutch adolescents, is an important result in this respect. Despite these strengths, our study also has limitations. First, we used cross-sectional data, so we cannot make claims of causality about the explanatory role of perceived discrimination. The field is clearly in need of longitudinal studies that are able to test the temporal ordering of the relation between perceived discrimination and adolescent mental health problems. Second, aiming to provide a snapshot of the health and well-being of the general population of Dutch adolescents, the design of the HBSC study does not allow for analyses stratified by the country of origin and the generational status of immigrant adolescents. This is unfortunate, as evidence suggests that perceptions of discrimination may differ between specific ethnic minority groups, and that especially second generation immigrants (who constitute 85% of our sample of non-western immigrants) may be likely to perceive discrimination (Huijnk & Andriessen, 2016). Future studies are encouraged to examine intra-group variability in immigrant adolescents' perceptions of discrimination. Finally, we had no information available about personality characteristics of the adolescents. This is unfortunate, as personality characteristics such as rejection sensitivity, negative emotionality, and attribution style may confound the relation between perceived discrimination and mental health (Lewis et al., 2015; Lui & Quezada, 2019; Major et al., 2002). Although the scarcely available studies suggests that the association between perceived discrimination and (mental) health remains when accounting for such personality variables (Fuller-Rowell, Curtis, Chae, & Ryff, 2018; Huebner, Nemeroff, & Davis, 2005; Hunte, King, Hicken, Lee, & Lewis, 2013; Lewis et al., 2015), clearly, future studies are needed to test how personality variables impact on the relation between perceived discrimination and adolescent mental health problems.

Conclusion

The present study revealed the important role of perceived discrimination in the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems as compared to native Dutch adolescents. Our findings imply

that in order to reduce inequalities in the mental health problems of immigrant and native adolescents, adolescents' personal experiences with discrimination should be taken into consideration. Our findings also suggest that questions asking adolescents about their personal experiences of discrimination based on specific social group memberships may tap into a deeper, underlying general tendency to perceive discrimination. Future studies are encouraged to explore the mechanisms underlying and driving adolescent perceived discrimination.

Appendix 4.1

Testing measurement invariance of the SDQ-R

A three-step method testing configural, metric, and scalar invariance was used. First, a configural model with factor loadings and thresholds freely estimated across groups was tested. Second, a metric model with factor loadings constrained equal across groups was examined. Third, a scalar model with factor loadings and thresholds constrained equal across groups was tested. Changes in CFI values ($\Delta\text{CFI} \geq -0.010$) and RMSEA values ($\Delta\text{RMSEA} \geq 0.015$) compared to the configural or metric model were used to evaluate whether invariance criteria were met (Chen, 2007; Cheung & Rensvold, 2002). Given the large sample size of our study, we did not conduct chi-square difference tests. In large samples, the chi-square difference statistic nearly always rejects measurement invariance (Cheung & Rensvold, 2002; Hooper et al., 2008). ΔCFI and ΔRMSEA indicated negligible changes between the metric and configural model and metric and scalar model (see Table A4.1). Thus, the SDQ-R allowed for valid comparisons of mental health problems between the three family affluence levels, native Dutch and non-western immigrant adolescents, and boys and girls (following interpretation of Dimitrov, 2010; Van de Schoot, Lugtig, & Hox, 2012). The Mplus output can be found on https://osf.io/qvrt3/?view_only=1acef7a740b9478883e28e2a631ffa98.

Table A4.1 Fit indices of the models testing for invariance of the SDQ-R

Models	χ^2	df	CFI	RMSEA	ΔCFI	ΔRMSEA	Model comparison
Family affluence							
1. Configural	1,433.41*	252	0.945	0.043	–	–	–
2. Metric	1,410.25*	274	0.947	0.040	0.002	-0.003	2 vs 1
3. Scalar	1,380.46*	296	0.950	0.038	0.003	-0.002	3 vs 2
Immigration background							
4. Configural	1,282.48*	168	0.946	0.041	–	–	–
5. Metric	1,229.13*	179	0.949	0.039	0.003	-0.002	5 vs 4
6. Scalar	1,194.19*	190	0.951	0.037	0.002	-0.002	6 vs 5
Gender							
7. Configural	1,272.38*	168	0.950	0.041	–	–	–
8. Metric	1,449.49*	179	0.942	0.043	-0.008	0.002	8 vs 7
9. Scalar	1,445.59*	190	0.943	0.041	0.001	-0.002	9 vs 8

* $p < 0.001$.

Appendix 4.2

Table A4.2 Fully standardized factor loadings of the one-factor model of the perceived discrimination scale

How often do the following people treat you unfairly or negatively...	Fully standardized factor loadings (R^2)
Because of the amount of money your family has?	
Teachers	0.94 (0.88)
Other adults outside of school	0.95 (0.89)
Pupils at school	0.77 (0.59)
Because of where you, your parents, or grandparents were born?	
Teachers	0.90 (0.81)
Other adults outside of school	0.88 (0.78)
Pupils at school	0.79 (0.62)
Because you are a boy or a girl?	
Teachers	0.83 (0.69)
Other adults outside of school	0.91 (0.84)
Pupils at school	0.82 (0.68)

Note. All loadings were significant at $p < 0.001$.

Appendix 4.3

Testing measurement invariance of the one-factor model of the perceived discrimination scale

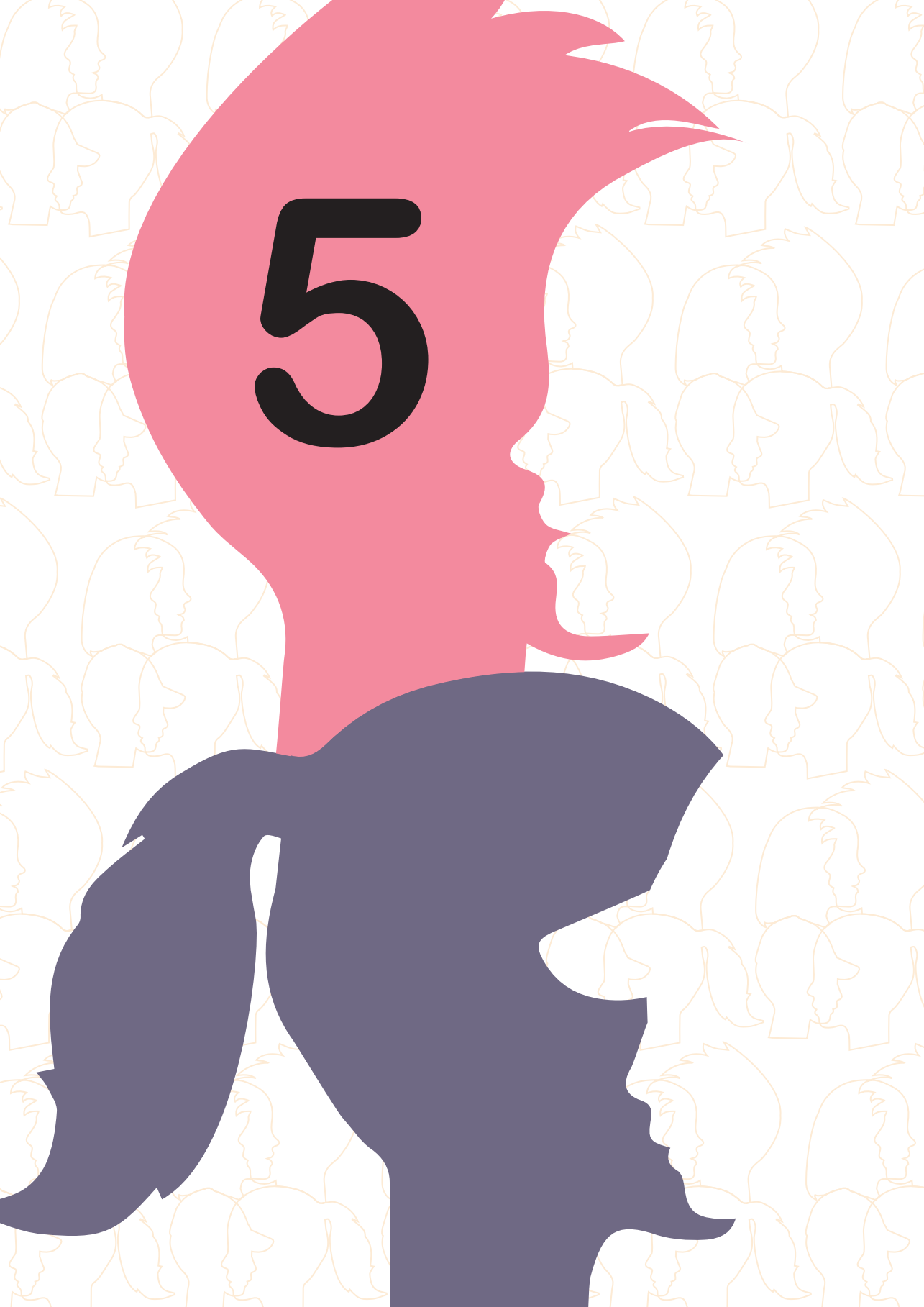
A three-step method testing configural, metric, and scalar invariance was used (see Appendix 4.1 for more information). Δ CFI and Δ RMSEA indicated negligible changes between the metric and configural model and the metric and scalar model (see Table A4.3). Thus, the perceived discrimination scale allowed for valid comparisons between the three family affluence levels, native Dutch and non-western immigrant adolescents, and boys and girls (Dimitrov, 2010; Van de Schoot et al., 2012). The Mplus output can be found on https://osf.io/qvrt3/?view_only=1acef7a740b9478883e28e2a631ffa98.

4

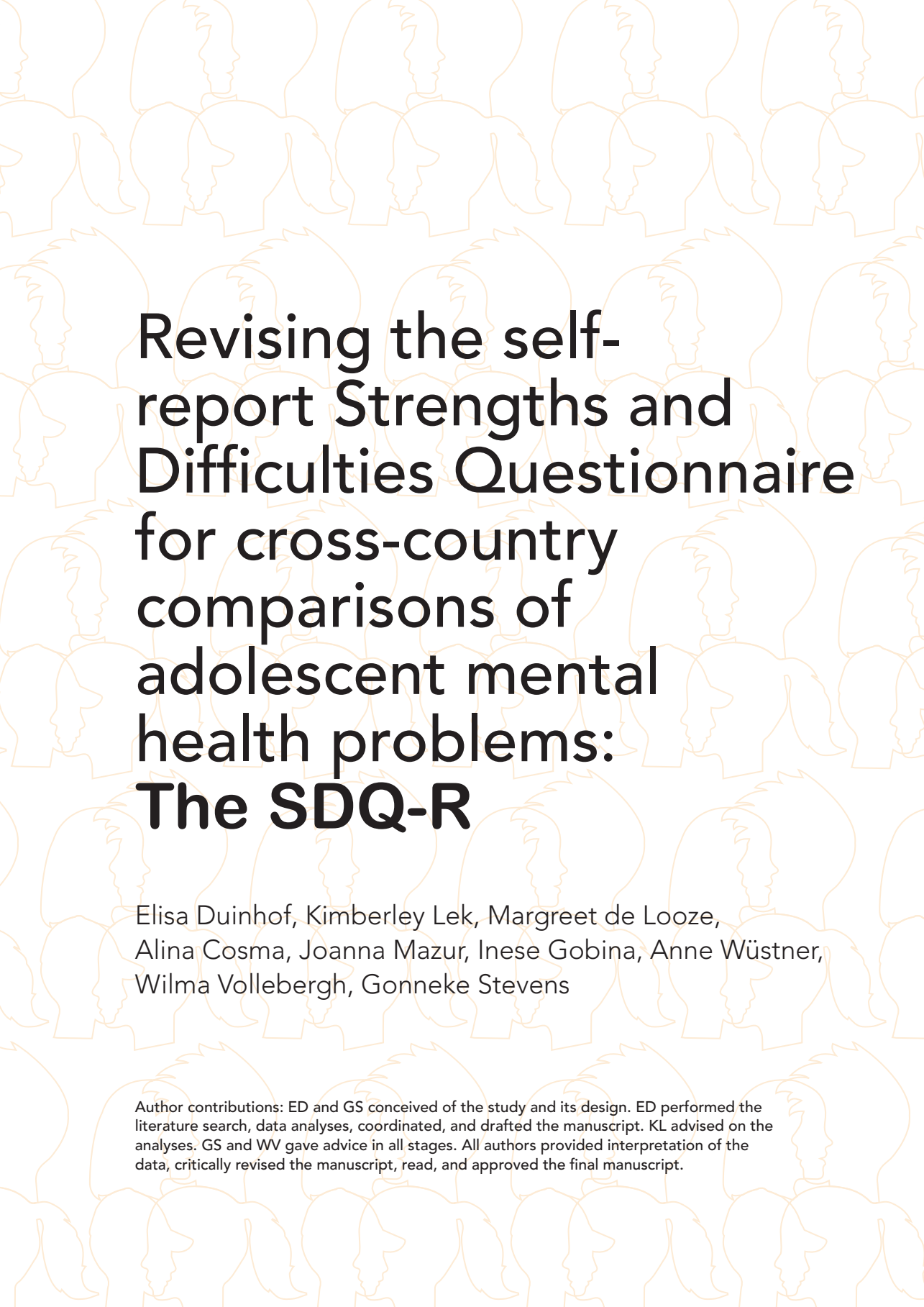
Table A4.3 Fit indices of the models testing for invariance of the one-factor model of the perceived discrimination scale

Models	χ^2	df	CFI	RMSEA	Δ CFI	Δ RMSEA	Model comparison
Family affluence							
1. Configural	1,284.21*	81	0.962	0.076	–	–	–
2. Metric	1,352.82*	97	0.960	0.071	-0.002	-0.005	2 vs 1
3. Scalar	1,266.84*	149	0.965	0.054	0.005	-0.017	3 vs 2
Immigration background							
4. Configural	1,199.88*	54	0.966	0.074	–	–	–
5. Metric	1,325.75*	62	0.963	0.073	-0.003	-0.001	5 vs 4
6. Scalar	1,302.82*	88	0.964	0.060	0.001	-0.013	6 vs 5
Gender							
7. Configural	1,263.40*	54	0.958	0.076	–	–	–
8. Metric	1,349.87*	62	0.956	0.073	-0.002	-0.003	8 vs 7
9. Scalar	1,357.59*	88	0.956	0.061	0.000	-0.012	9 vs 8

* $p < 0.001$.



5



Revising the self-report Strengths and Difficulties Questionnaire for cross-country comparisons of adolescent mental health problems: **The SDQ-R**

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Author contributions: ED and GS conceived of the study and its design. ED performed the literature search, data analyses, coordinated, and drafted the manuscript. KL advised on the analyses. GS and WV gave advice in all stages. All authors provided interpretation of the data, critically revised the manuscript, read, and approved the final manuscript.

Abstract

Aims. The Strengths and Difficulties Questionnaire (SDQ) has been used in many epidemiological studies to assess adolescent mental health problems, but cross-country comparisons of the self-report SDQ are scarce and so far failed to find a good-fitting, common, invariant measurement model across countries. The present study aims to evaluate and establish a version of the self-report SDQ that allows for a valid cross-country comparison of adolescent self-reported mental health problems.

Methods. Using the Health Behaviour in School-aged Children study, the measurement model and measurement invariance of the 20 items of the self-report SDQ measuring adolescent mental health problems were evaluated. Nationally representative samples of 11-, 13-, and 15-year-old adolescents ($n = 33,233$) from seven countries of different regions in Europe (Bulgaria, Germany, Greece, the Netherlands, Poland, Romania, Slovenia) were used.

Results. In order to establish a good-fitting and common measurement model, the five reverse worded items of the self-report SDQ had to be removed. Using this revised version of the self-report SDQ, the SDQ-R, partial measurement invariance was established, indicating that latent factor means assessing conduct problems, emotional symptoms, peer relationships problems, and hyperactivity-inattention problems could be validly compared across the countries in this study. Results showed that adolescents in Greece scored relatively low on almost all problem subscales, whereas adolescents in Poland scored relatively high on almost all problem subscales. Adolescents in the Netherlands reported the most divergent profile of mental health problems with the lowest levels of conduct problems, low levels of emotional symptoms and peer relationship problems, but the highest levels of hyperactivity-inattention problems.

Conclusions. With six factor loadings being non-invariant, partial measurement invariance was established, indicating that the 15-item SDQ-R could be used in our cross-country comparison of adolescent mental health problems. To move the field of internationally comparative research on adolescent mental health forward, studies should test the applicability of the SDQ-R in other countries in- and outside Europe, continue to develop the SDQ-R as a cross-country invariant measure of adolescent mental health, and examine explanations for the found country differences in adolescent mental health problems.

Introduction

Worldwide, a significant percentage of adolescents experience mental health problems (Polanczyk et al., 2015). As these problems are likely to continue into adulthood (Rutter, Kim-Cohen, & Maughan, 2006), mental health promotion efforts in adolescence are a global public health priority (Patel, Flisher, Hetrick, & McGorry, 2007). To advance population-based knowledge of adolescent mental health, cross-country comparisons are essential (Achenbach, Rescorla, & Ivanova, 2012). There is clear evidence of cross-country variation in adolescent *subjective well-being* (e.g., life satisfaction) in Europe (Bradshaw & Richardson, 2009; Inchley et al., 2016; Klocke et al., 2014), but global prevalence data on adolescent *mental health problems* are scarce (Erskine et al., 2017).

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is one of the most frequently used instruments to assess mental health problems (i.e., emotional, behavioral, and relational problems) in adolescents. It has been included in epidemiological studies in various individual countries to assess population levels of adolescent mental health problems (see www.sdqinfo.org). However, cross-country comparisons based on the self-report SDQ are relatively scarce and faced methodological challenges which are lined out below (De Vries, Davids, Mathews, & Aarø, 2018; Essau et al., 2012; Ortuño-Sierra et al., 2015; Ravens-Sieberer, Erhart, Gosh, et al., 2008; Stevanovic et al., 2015).

First, samples that are compared should be nationally representative and sample characteristics, sampling methods, and data collection methods should be comparable across countries (Achenbach et al., 2012). However, this is often not the case in the available cross-country literature. Of the few cross-country studies that used the self-report SDQ, some only included adolescents from specific regions within countries (Essau et al., 2012; Stevanovic et al., 2015), they compared national samples with different gender or age distributions (Essau et al., 2012; Ortuño-Sierra et al., 2015; Stevanovic et al., 2015), or they compared national samples that were collected with different sampling methods (i.e., school- versus household-based surveys) (Ravens-Sieberer, Erhart, Gosh, et al., 2008), or data collection methods (e.g., collective or individual questionnaire administration) (Ortuño-Sierra et al., 2015; Ravens-Sieberer, Erhart, Gosh, et al., 2008), that each may impact estimates of adolescent mental health problems (e.g., Vollebergh et al., 2006). Thus, it is not clear whether the cross-country variation observed in these studies reflect actual or methodological differences in adolescent mental health problems between countries (Achenbach et al., 2012).

Second, to make valid comparisons, studies should test whether the structure of the underlying constructs measured by the SDQ (a common measurement model), and the meanings ascribed to these underlying constructs (measurement invariance)

are comparable across countries. Only some of the cross-country studies on the self-report SDQ tested the (meaning of the) underlying constructs of the SDQ. These studies either did not find a common measurement model across different countries (Stevanovic et al., 2015), or had to allow correlated residuals between items (Ortuño-Sierra et al., 2015) to establish a common measurement model. Such modifications may however not replicate in different data sets (Kyriazos, 2018). Often, model fit issues were related to the five reverse worded items of the SDQ: they cross-loaded on the prosocial behavior subscale or negatively affected the overall model fit (Essau et al., 2012; Ortuño-Sierra et al., 2015). Those studies that did establish a common measurement model did not find evidence for measurement invariance (Essau et al., 2012) or established partial measurement invariance (Ortuño-Sierra et al., 2015).

Because of these challenges, it has been argued that the self-report SDQ in its present form is not suitable for cross-country comparisons (Stevanovic et al., 2017) and needs to be revised (Essau et al., 2012; Ortuño-Sierra et al., 2015; Stevanovic et al., 2015). More specifically, it has been suggested that the reverse worded items of the SDQ should be re-worded or removed (Essau et al., 2012). Also, it has been argued that the measurement model should be examined in countries across different regions in- and outside Europe (De Vries et al., 2018; Ortuño-Sierra et al., 2015).

The present study sets out to evaluate and establish a version of the self-report SDQ that can be used to validly compare mental health problems of 11-, 13, and 15-year-old adolescents across seven European countries. We attempt to overcome the former methodological challenges by: (1) using national representative samples of adolescents with similar sample characteristics, assessed with similar sampling, and data collection methods in seven countries of different regions in Europe (Bulgaria, Germany, Greece, the Netherlands, Poland, Romania, Slovenia), (2) establishing a good-fitting, common measurement model using cross-validation to assess the replicability of model modifications, and (3) testing the invariance of this common measurement model.

Methods

Participants

Data on the self-report SDQ from the Health Behaviour in School-aged Children (HBSC) study that were collected in the 2005/2006 (Poland), 2009/2010 (Germany, Greece), and 2013/2014 (Bulgaria, the Netherlands, Slovenia, Romania) surveys were used. HBSC is a cross-sectional, school-based survey that is conducted every four years across

more than 40 countries in Europe and North America. Using a standardised research protocol, self-report questionnaires are administered to nationally representative samples of 11-, 13- and 15-year-olds in the classroom. Samples are drawn using cluster sampling, with schools or school classes as primary sampling units. School response rates varied by country but were >80% in all countries except in the Netherlands (49%). At the student-participant level, response rates ranged from 78% to 94%. More information can be found elsewhere (Currie et al., 2010, 2014).

In the Netherlands (2005/2006, 2009/2010, 2013/2014) and Bulgaria (2005/2006, 2013/2014) self-report SDQ data were collected in *multiple* HBSC surveys. Results showing that the measurement model of the SDQ is invariant across these timepoints in the Netherlands (Duijnhof, Stevens, Van Dorsselaer, Monshouwer, & Vollebergh, 2015) and Bulgaria (Appendix, Table A5.1), justify the inclusion of only the most recent 2013/2014 data for the Netherlands and Bulgaria. We merge the 2013/2014 data of the Netherlands and Bulgaria with the 2005/2006, 2009/2010, and 2013/2014 data of the other countries, assuming that in these countries the self-report SDQ would be invariant over different timepoints as well.

The total sample consisted of 33,233 11-, 13-, and 15-year-old adolescents, 51% were girls (ranging between 47.7% and 53.3% across countries). No significant ($p > 0.001$) gender and age distribution differences were found across the country samples. Adolescents who did not fill in the SDQ ($n = 279$, 0.8% of the total sample) were excluded from the analyses. For the remaining samples, missing item responses ranged from 0.1% to 3.3%.

Measures

Mental health problems. Adolescents filled in the self-report SDQ (Goodman, 1997) in their national language. The self-report SDQ is a 25-item questionnaire for 11-17 year olds. It consists of four subscales measuring mental health problems (conduct problems, emotional symptoms, peer relationship problems, hyperactivity-inattention problems) and one subscale measuring strengths (prosocial behavior). In the present study, data were only available for the problem subscales. Each subscale comprises five items that are scored on a three-point ordinal Likert scale (0 = "Not true"; 1 = "Somewhat true"; 2 = "Certainly true"). Items are phrased in the direction of their subscales, with higher scores indicating higher problem levels, except for five reverse worded items: obedient, has good friend, generally liked, thinks before acting, and good attention. The exact wording of the items and abbreviations used in this study can be found in the Appendix, Table A5.2.

Demographic variables. Adolescents indicated their gender by responding to the question: "Are you a boy or a girl?". Age was determined based upon the participant's month and year of birth and the date of survey administration.

Analytical strategy

Analyses were performed in Mplus 8.2 (Muthén & Muthén, 2017), using the weighted least squares mean and variance adjusted (WLSMV) estimator and the theta parameterisation. Analyses were corrected for cluster effects of adolescents in the same school.

Step 1: Establishing a common measurement model

To establish a common measurement model we collated the data from all countries. A common measurement model was *only* established if the model showed an acceptable to good fit in this total sample and in each individual country. Based on preliminary analyses (see Appendix, Table A5.3) and findings from previous cross-country comparisons supporting a first-order five-factor model (Essau et al., 2012; Ortuño-Sierra et al., 2015), a first-order model with four correlated factors measuring mental health problems was used as a starting point.

Using confirmatory factor analysis (CFA), a common measurement model was established considering the following guidelines. First, to find a parsimonious common measurement model that corresponds to the theoretical structure introduced by Goodman (1997) and to protect against non-theory-driven model modifications that might not replicate in other samples (Hermida, 2015; Kyriazos, 2018), correlated item residuals and cross-loadings of items were not allowed. Second, items with nonsignificant factor loadings and/or standardised factor loadings below 0.40 were considered unacceptable (Ford et al., 1986). When supported by previous empirical findings, these items were removed. Third, the overall model fit was evaluated (acceptable fit = RMSEA < 0.080 and CFI > 0.900; good fit = RMSEA < 0.050, CFI > 0.960) (Browne & Cudeck, 1992; Hu & Bentler, 1999; Yu, 2002). If models did not show acceptable fits, model modification indices (MI) were consulted to review misspecified model parameters. As MI may be driven by characteristics of the sample on which the measurement model is tested (Byrne, 2012), cross-validation was used. Of the total sample, 9/10th was used to test and modify models using MI while a random 1/10th was used for validation purposes. Only if a good fitting model was established in both the test and validation set, validation was ended.

Internal consistency of the problem subscales was examined as a quality indicator of the final common measurement model using the ordinal alpha coefficient. Ordinal

alpha values above 0.70 were considered acceptable (Nunnally & Bernstein, 1967; Gadermann et al., 2012).

Step 2: Invariance testing

To make valid cross-country comparisons, a common measurement model should be established (configural invariance), items should have invariant relationships to their latent factors across countries (metric invariance), and adolescents in different countries should report invariant average scores on the items (scalar invariance). The three-step method testing configural, metric, and scalar models was used. First, a configural model with factor loadings and thresholds freely estimated across countries was tested. Second, a metric model with factor loadings constrained equal across countries was examined. Third, a scalar model with factor loadings and thresholds constrained equal across countries was tested.

If invariance tests indicated a lack of metric or scalar invariance, partial invariance can be established and latent means scores can still be compared across countries (Bowen & Masa, 2015; Steinmetz, 2013). Partial measurement invariance was established by freeing the factor loading/threshold of one item at the time, starting with the factor loading/threshold with the highest MI (Dimitrov, 2010). Our analyses showed that only MI accompanied by a meaningful expected parameter change increased model fit. Hence, both values were inspected to identify non-invariant item factor loadings/thresholds. Changes in CFI values ($\Delta\text{CFI} \geq -0.010$) and RMSEA values ($\Delta\text{RMSEA} \geq 0.015$) compared to the configural or metric model were used to evaluate whether (partial) invariance criteria were met (Chen, 2007; Cheung & Rensvold, 2002). Following Dimitrov (2010), partial measurement invariance was established if less than 20% of the factor loadings and thresholds were non-invariant across all countries.

Step 3: Cross-country comparisons

If (partial) measurement invariance was established, latent means were compared across countries. Since significant latent mean differences are easy to find in large samples, we applied a stringent significance level ($p < 0.001$) and examined the substantially of the latent mean differences by evaluating the size of the *standardised* latent mean differences using Cohen's *d* (Cohen, 1992). In multi-group CFA, Mplus by default fixes the means of the latent variables in the first group to zero. Bulgaria was arbitrarily set as the reference country.

Results

Step 1: Establishing a common measurement model

Table 5.1 shows the fit indices of the models tested to establish a common measurement model. Models testing and validating the first-order four factor model failed to demonstrate acceptable CFI values (Table 5.1; Model 1 and Model 2). The reverse worded item *obedient* was not related to the conduct problem subscale in both the first ($\beta = 0.01$, $p = 0.52$, $R^2 = 0.00$), and second model ($\beta = -0.03$, $p = 0.17$, $R^2 = 0.00$). Standardised factor loadings of the other reverse worded items belonging to the peer relationship problems and hyperactivity-inattention problems subscales were unsatisfactorily low with standardised factor loadings below 0.40. Only in the validation model *good attention* loaded just satisfactory on the hyperactivity-inattention problems subscale ($\beta = -0.41$, $R^2 = 0.17$).

To increase model fit, the non-significant item *obedient* was removed. Model 3 and Model 4 show that after removing this item CFI values remained unacceptably low. Similar to Model 1 and Model 2, factor loadings of the remaining reverse worded items were unsatisfactorily low ($\beta < 0.40$), and only a small proportion of their variance was explained by their corresponding latent factors (R^2 range = 0.08 to 0.13). The MIs of Model 3 and Model 4 also indicated problems with the reverse worded items. In both models, the two largest MIs suggested to correlate the residuals of the reverse worded items belonging to the same subscale (peer relationship problems or hyperactivity-inattention problems). Given these findings, our aim to establish a parsimonious common measurement model that replicates in future studies, and the numerous studies indicating problems with the reverse worded items (e.g., Essau et al., 2012; Ortuño-Sierra et al., 2015), we decided to remove the remaining reverse worded items. This resulted in a good model fit (Table 5.1; Model 5 and Model 6), with CFI values nearing 0.960 and RMSEA values below 0.050. Therefore we took this model without the reverse worded items as the final measurement model and tested its fit on the total sample and in each individual country. The final common measurement model showed a good fit on the total sample (Table 5.1; Model 7) and acceptable factor loadings were found for all items ($\beta > 0.40$) (Table 5.4). The final measurement model reached an acceptable to good fit in Bulgaria, the Netherlands, Germany, Greece, and Poland, with CFI values near 0.960 and RMSEA values below or close to 0.050, and an acceptable model fit in Slovenia and Romania, with CFI values of or above 0.900, and RMSEA below 0.080 (Table 5.1). Except for the items *steals* ($\beta = 0.33$) and *prefers adult* ($\beta = 0.34$) in Poland, in all countries, items loaded satisfactorily on their latent factors ($\beta > 0.40$). Table 5.2 shows that in all countries, the emotional symptoms

and hyperactivity-inattention subscales showed acceptable internal consistencies (α close to or above 0.70). The conduct problems subscale showed acceptable internal consistencies in most countries, with Greece and Slovenia reporting ordinal α values slightly below 0.70. Only in Poland, an unsatisfactorily low ordinal α value was found for the conduct problem subscale ($\alpha = 0.60$). In all countries, the peer relationship problems subscale had a low internal consistency.

Table 5.1 Fit indices of the models tested to establish a common measurement model

Models	n^a	χ^2	df	CFI	RMSEA
Total sample					
1. Basic model	29,910	17,905.45*	164	0.816	0.060
2. Validation of model 1	3,323	2,258.08*	164	0.850	0.062
3. Remove obeys	29,903	14,635.08*	146	0.849	0.058
4. Validation of model 3	3,323	2,319.08*	146	0.845	0.067
5. Remove other reverse worded items	29,896	5,763.07*	84	0.933	0.048
6. Validation of model 5	3,324	747.96*	84	0.942	0.049
7. Final common measurement model	33,220	6,336.69*	84	0.931	0.047
Individual countries					
Bulgaria	4,712	1,407.32*	84	0.946	0.058
Germany	4,991	888.10*	84	0.932	0.044
Greece	4,910	979.01*	84	0.937	0.047
Netherlands	4,241	864.92*	84	0.945	0.047
Poland	5,486	1,259.26*	84	0.936	0.051
Romania	3,886	1,078.16*	84	0.899	0.055
Slovenia	4,994	2,298.02*	84	0.903	0.073

Note. ^aSeven adolescents in Bulgaria, five adolescents in Romania, and one adolescent in Greece had missing values on all SDQ items of the final common measurement model and were excluded from the analyses.

* $p < 0.001$.

Table 5.2 Ordinal alpha values of the problem subscales in each country

Country	Conduct problems	Emotional symptoms	Peer relationship problems	Hyperactivity-inattention problems
Bulgaria	0.70	0.82	0.65	0.69
Germany	0.72	0.78	0.55	0.71
Greece	0.66	0.79	0.60	0.70
Netherlands	0.72	0.81	0.59	0.81
Poland	0.60	0.76	0.55	0.74
Romania	0.71	0.79	0.58	0.68
Slovenia	0.68	0.82	0.61	0.77

Step 2: Invariance testing

Measurement invariance was tested across countries (Table 5.3). The configural model (i.e., the common measurement model), with no equality constraints across countries, showed an acceptable fit to the data. Constraining factor loadings equal across countries decreased the model fit ($\Delta\text{CFI} \geq -0.010$), showing that latent factors had no equivalent relationships with *all* items across countries and that metric invariance was not supported. After the factor loadings of six items were set free in specific countries (see footnote Table 5.3), partial metric invariance was established. After establishing partial metric invariance, we tested for scalar invariance. Scalar invariance was found ($\Delta\text{CFI} = -0.006$). With six factor loadings being non-invariant of the total 45 parameters in the measurement model (i.e., 15 factor loadings and 30 thresholds), the observed percentage of non-invariance across all countries was 13.3%. The resulting final partially invariant model showed an acceptable fit to the data (Table 5.3; Model 4).

Table 5.4 shows that in the final partially invariant model all items loaded satisfactorily on their latent factors ($\beta_s > 0.40$). Only in Poland the *prefers adult* item loaded unsatisfactorily low ($\beta = 0.33$) on the peer relationship problems subscale and the *fight*s and *steals* items loaded just satisfactorily ($\beta_s = 0.40/0.41$) on the conduct problems subscale. The final model included a warning about the high correlations between the latent factors in Romania. The results of Table 5.4 support this warning, especially the correlation between peer relationship problems and conduct problems is exceptionally high in Romania ($r = 0.98$). In general, latent factor intercorrelations were high (see Table 5.4), indicating that models with less factors might be a better fit to the data. However, additional CFA analyses testing a one-factor solution (measuring general mental health problems) and a two-factor solution (measuring internalizing and externalizing mental health problems) did not support this (see Appendix, Table A5.4).

Table 5.3 Fit indices of the models testing for invariance across countries

Models	χ^2	df	CFI	RMSEA	Δ CFI	Δ RMSEA	Model comparison
1. Configural	8,619.29*	588	0.929	0.054	-	-	-
2. Metric	10,862.83*	654	0.910	0.057	-0.019	0.003	2 vs 1
3. Partial Metric ^a	9,733.16*	644	0.920	0.055	-0.009	0.001	3 vs 1
4. Scalar	10,425.72*	710	0.914	0.054	-0.006	-0.001	4 vs 3

Note. ^aFactor loadings of *figh*ts in Greece and Slovenia, *lies* in Greece and the Netherlands, *clingy* in the Netherlands, *prefers adult* in Poland and the Netherlands, *fidgety* in Greece and Germany, and *distractable* in Romania set free.

* $p < 0.001$.

Step 3: Cross-country comparisons

To describe cross-country differences in adolescent mental health problems, Table 5.5 displays country rankings for each problem subscale based on the *unstandardised* latent mean differences, with Bulgaria as the reference country. Higher rankings indicate higher latent mean levels of adolescents' self-reported problems. Setting other countries as the reference country resulted in similar rankings. To evaluate the substantiality of these cross-country differences, Table 5.5 also includes *standardised* latent means differences (d). Only significant ($p < 0.001$) and substantial ($d > 0.20$) latent mean differences were considered indicative of cross-country differences. Adolescents in Poland reported the highest levels of emotional symptoms and conduct problems. Adolescents in Greece reported the lowest levels of emotional symptoms (together with adolescents in Bulgaria), peer relationship problems, and hyperactivity-inattention problems. Adolescents in Bulgaria, Germany, and Slovenia reported the highest levels of peer relationship problems. Adolescents in the Netherlands reported the lowest levels of conduct problems, but the highest levels of hyperactivity-inattention problems.

Table 5.4 Fully standardised factor loadings and latent factor correlations of the final common measurement model (Step 1) and the final partially invariant model for each country (Step 2)

Problem subscales	Common measurement model	Fully standardised factor loadings (R^2)						
		Bulgaria	Germany	Greece	Netherlands	Poland	Romania	Slovenia
Conduct problems								
Temper	0.67 (0.45)	0.67 (0.45)	0.71 (0.51)	0.68 (0.46)	0.77 (0.59)	0.68 (0.46)	0.68 (0.47)	0.71 (0.50)
Fights	0.50 (0.25)	0.50 (0.25)	0.56 (0.31)	0.57 (0.33)	0.48 (0.23)	0.40 (0.16)	0.56 (0.31)	0.52 (0.27)
Lies	0.63 (0.40)	0.64 (0.41)	0.66 (0.44)	0.52 (0.27)	0.69 (0.47)	0.53 (0.28)	0.66 (0.43)	0.60 (0.36)
Steals	0.51 (0.26)	0.57 (0.32)	0.54 (0.29)	0.55 (0.30)	0.46 (0.21)	0.41 (0.17)	0.54 (0.29)	0.51 (0.26)
Emotional symptoms								
Somatic symptoms	0.56 (0.32)	0.62 (0.39)	0.51 (0.26)	0.59 (0.35)	0.53 (0.28)	0.51 (0.26)	0.63 (0.40)	0.57 (0.33)
Worries	0.68 (0.46)	0.73 (0.53)	0.62 (0.39)	0.66 (0.44)	0.66 (0.44)	0.71 (0.51)	0.64 (0.41)	0.76 (0.58)
Unhappy	0.80 (0.64)	0.79 (0.62)	0.82 (0.67)	0.75 (0.57)	0.88 (0.77)	0.79 (0.63)	0.80 (0.65)	0.82 (0.67)
Clingy	0.65 (0.43)	0.73 (0.53)	0.63 (0.40)	0.70 (0.49)	0.66 (0.44)	0.61 (0.37)	0.61 (0.37)	0.70 (0.49)
Fears	0.60 (0.36)	0.58 (0.34)	0.65 (0.42)	0.59 (0.35)	0.65 (0.43)	0.54 (0.29)	0.57 (0.32)	0.61 (0.38)
Peer relationship problems								
Solitary	0.59 (0.34)	0.74 (0.55)	0.50 (0.25)	0.64 (0.41)	0.49 (0.24)	0.69 (0.48)	0.61 (0.37)	0.57 (0.33)
Bullied	0.67 (0.45)	0.70 (0.49)	0.65 (0.42)	0.66 (0.43)	0.72 (0.51)	0.62 (0.38)	0.63 (0.40)	0.74 (0.55)
Prefers adult	0.44 (0.19)	0.42 (0.17)	0.46 (0.21)	0.46 (0.21)	0.51 (0.26)	0.33 (0.11)	0.44 (0.19)	0.46 (0.21)
Hyperactivity-inattention problems								
Restless	0.67 (0.45)	0.69 (0.48)	0.76 (0.58)	0.61 (0.38)	0.77 (0.59)	0.66 (0.44)	0.55 (0.30)	0.75 (0.57)
Fidgety	0.71 (0.51)	0.61 (0.37)	0.59 (0.35)	0.75 (0.56)	0.81 (0.66)	0.78 (0.60)	0.67 (0.45)	0.87 (0.75)
Distractable	0.71 (0.50)	0.65 (0.43)	0.70 (0.49)	0.64 (0.40)	0.72 (0.52)	0.69 (0.48)	0.74 (0.55)	0.76 (0.58)
Latent factor correlations^a								
EMO with COND	0.72	0.87	0.52	0.71	0.59	0.82	0.82	0.74
PEER with COND	0.80	0.88	0.70	0.75	0.70	0.71	0.98	0.82
PEER with EMO	0.77	0.83	0.69	0.79	0.67	0.79	0.87	0.72
HYP with COND	0.72	0.86	0.60	0.90	0.60	0.85	0.88	0.69
HYP with EMO	0.64	0.89	0.40	0.71	0.44	0.75	0.76	0.61
HYP with PEER	0.48	0.63	0.29	0.59	0.25	0.53	0.68	0.45

Note. All factor loadings, explained variance (R^2), and correlations between latent factors were significant at $p < 0.001$. *EMO = Emotional symptoms; COND = Conduct problems; PEER = Peer relationship problems; HYP = Hyperactivity-inattention problems.

Table 5.5 Cross-country rankings based on unstandardised latent mean differences and standardised latent mean differences (*d*) across countries

Country	Conduct problems		Emotional symptoms		Peer relationship problems		Hyperactivity-inattention problems	
	Ranks	<i>d</i>	Ranks	<i>d</i>	Ranks	<i>d</i>	Ranks	<i>d</i>
Bulgaria	4	0	1	0	6	0	4	0
Germany	2	-0.41*	5	0.30*	7	0.06	5	0.11
Greece	6	0.13	2	0.07	1	-0.64*	1	-0.26*
Netherlands	1	-0.61*	3	0.22*	2	-0.31*	7	0.36*
Poland	7	0.33*	7	0.54*	4	-0.23*	3	-0.10
Romania	3	-0.25*	4	0.24*	3	-0.24*	2	-0.12
Slovenia	5	0.12	6	0.34*	5	-0.02	6	0.09

Note. Higher rankings indicate higher mean levels of problems.

* $p < 0.001$.

Discussion

By applying cross-validation and using nationally representative samples of seven countries of different European regions assessed with similar sampling and data collection methods, this study established a revised version for the problem subscales of the self-report SDQ (SDQ-R). To construct this good-fitting, common measurement model, the five reverse worded items of the self-report SDQ had to be removed. The SDQ-R was found to have a *sufficient* amount of invariant items, indicating that adolescent mental health problems could be validly compared across the seven countries in this study. By establishing the SDQ-R, this study contributes to the scarce literature on the cross-cultural validity of scales that examine adolescent mental health problems (Stevanovic et al., 2017).

Our findings are in line with previous internationally comparative studies, that also indicated problems with the five reverse worded items of the SDQ (Essau et al., 2012; Ortuño-Sierra et al., 2015). The removal of the reverse worded items led to a common measurement model that showed an acceptable to good fit in each individual country. The finding that the reverse worded items had no significant or substantial relationships with their underlying latent factors might be explained by a methodological phenomenon called reversal ambiguity (Weijters & Baumgartner, 2012). Adolescents may not interpret the reverse worded items as opposites of the construct being measured and thus agree with both the reverse worded and positively worded items of the SDQ subscales. To illustrate, adolescents may agree with both the reverse worded item “I have one good friend or more” and the positively worded item “Other children or young people pick on me or bully me” of the peer relationship problems subscale. It is also possible that the reverse worded items tap into a different construct (e.g., Van de Looij-Jansen, Goedhart, De Wilde, & Treffers, 2011), and do not adequately measure a positive equivalence of mental health problems. Both these explanations substantiate our decision to remove the reverse worded items in order to establish the SDQ-R.

Notwithstanding the former, invariance tests indicated that the factor loadings of the *fight*s, *lies*, *clingy*, *prefers adult*, *fidgety*, and *distractible* items were non-invariant across all countries. Except for the *fidgety* item, these findings are in accordance with results from previous cross-country comparisons (Essau et al., 2012; Ortuño-Sierra et al., 2015). As such, partial measurement invariance is established, which means that *latent* means can still be compared across countries (Steinmetz, 2013). To facilitate the interpretation of latent mean differences we presented cross-country rankings.

Looking at the cross-country rankings found in this study, previous studies on cross-country variation in adolescents’ *subjective well-being* found highly similar country

rankings, with Greece and the Netherlands at the top and Poland at the bottom (Bradshaw & Richardson, 2009; Inchley et al., 2016; Klocke et al., 2014). Whereas a recent meta-analysis found no cross-country variation in adolescents' attention-deficit/hyperactivity disorders (ADHD) (Willcutt, 2012), this study found clear cross-country differences in adolescent self-reported hyperactivity-inattention problems. Interestingly, while Dutch adolescents reported the lowest levels of conduct problems, and low levels of emotional symptoms and peer relationship problems, they reported by far the highest levels of hyperactivity-inattention problems. Future studies are encouraged to further investigate the found country differences in adolescent mental health problems.

In evaluating the SDQ-R some limitations should be considered. First, this study included data from different HBSC surveys. Although a recent trend analysis in the Netherlands based on the self-report SDQ revealed rather stable mental health problem levels over a 10-year period (Duijnhof et al., 2015), we cannot exclude the possibility that our country rankings to some extent reflect time interval differences. Second, by removing the reverse worded items, the SDQ-R measures slightly different concepts of conduct problems, peer relationship problems, and hyperactivity-inattention than the original self-report SDQ. To illustrate, the original hyperactivity-inattention subscale was designed to represent the three behavioral dimensions of a DSM-IV diagnoses of ADHD (American Psychiatric Association, 2013) and includes items measuring hyperactivity, inattention, and impulsiveness (Goodman, 2001). By removing the reverse worded item from the hyperactivity-inattention problems subscale, the impulsiveness dimension of ADHD is not included in the SDQ-R anymore, and only one item taps into the inattention dimension. However, more generally, being a *brief* instrument for assessing adolescent mental health problems, one can debate whether the multidimensional nature of ADHD can be captured adequately by the SDQ at all (e.g., Garrido et al., 2018).

Third, the three-step method of invariance testing requires a referent indicator to identify the model (Muthén & Muthén, 2017), that is assumed to be perfectly invariant across groups. Non-invariant referent indicators may negatively impact the model fit and affect the results of invariance testing (Cheung & Rensvold, 1999; Johnson et al., 2009). A sensitivity analyses was conducted to make sure that the choice for the referent indicator did not influence the results negatively. For these, we ran several metric models by setting items consecutively as the referent indicator. The default setting (the first item as the referent indicator) showed one of the best model fits, and we continued with this metric model. Fourth, there is debate about whether factor loadings and thresholds should be tested separately or in tandem to

establish measurement invariance. We choose to test factor loadings and thresholds separately as this approach is less conservative and more explicit about the source of non-invariance (Bowen & Masa, 2015). Finally, CFA is known to produce inflated latent factor correlations if cross-loadings are meaningfully departing from zero in the population (Asparouhov & Muthén, 2009; Garrido et al., 2018). For example, in Romania the MI suggested a cross-loading between the *distractible* item of the hyperactivity-inattention problems subscale and the peer relationship problems subscale. In CFA, such nonzero cross-loadings are fixed to zero, which may have been an overly stringent requirement for Romania, and resulted in overestimated latent factor intercorrelations. Thus, the latent factor correlations in this study need to be interpreted with care.

Conclusion

Cross-country comparison using the SDQ have the great potential to advance our understanding of adolescent mental health. It can inform and drive global and national intervention and prevention efforts. The present study introduces a revised version of the self-report SDQ, the SDQ-R, that allowed for a valid comparison of adolescent mental health problems across seven countries of different regions in Europe. Mental health was relatively high in Greece, relatively low in Poland, and most divergent in the Netherlands. To build our knowledge of adolescent mental health in- and outside Europe, future studies should further test the applicability of the SDQ-R, and further develop the self-report SDQ-R as a cross-country invariant measure of adolescent mental health problems.

Appendix

Table A5.1 Fit indices of the models testing for invariance between the 2005/2006 and 2013/2014 HBSC surveys in Bulgaria

Models	χ^2	df	CFI	RMSEA	Δ CFI	Δ RMSEA	Model comparisons
1. Configural	6,717.90*	328	0.835	0.064	-	-	-
2. Metric	6,242.54*	344	0.848	0.060	0.013	-0.004	2 vs 1
3. Scalar	6,237.68*	360	0.848	0.059	0.000	-0.001	3 vs 2

* $p < 0.001$.

Table A5.2 Items of the self-report SDQ in English and item abbreviations used in this study

Items in English	Item abbreviations
Conduct problems	
I get very angry and often lose my temper	Tempers
I usually do as I am told	Obedient
I fight a lot. I can make other people do what I want	Fights
I am often accused of lying or cheating	Lies
I take things that are not mine from home, school or elsewhere	Steals
Emotional symptoms	
I get a lot of headaches, stomach-aches or sickness	Somatic symptoms
I worry a lot	Worries
I am often unhappy, down-hearted or tearful	Unhappy
I am nervous in new situations. I easily lose confidence	Clingy
I have many fears, I am easily scared	Fears
Peer relationship problems	
I am usually on my own. I generally play alone or keep to myself	Solitary
I have one good friend or more	Has good friend
Other people my age generally like me	Generally liked
Other children or young people pick on me or bully me	Bullied
I get on better with adults than with people my own age	Prefers adult
Hyperactivity-inattention problems	
I am restless, I cannot stay still for long	Restless
I am constantly fidgeting or squirming	Fidgety
I am easily distracted, I find it difficult to concentrate	Distractible
I think before I do things	Thinks before acting
I finish the work I'm doing. My attention is good	Good attention

Note. Items in bold are the reverse worded items.

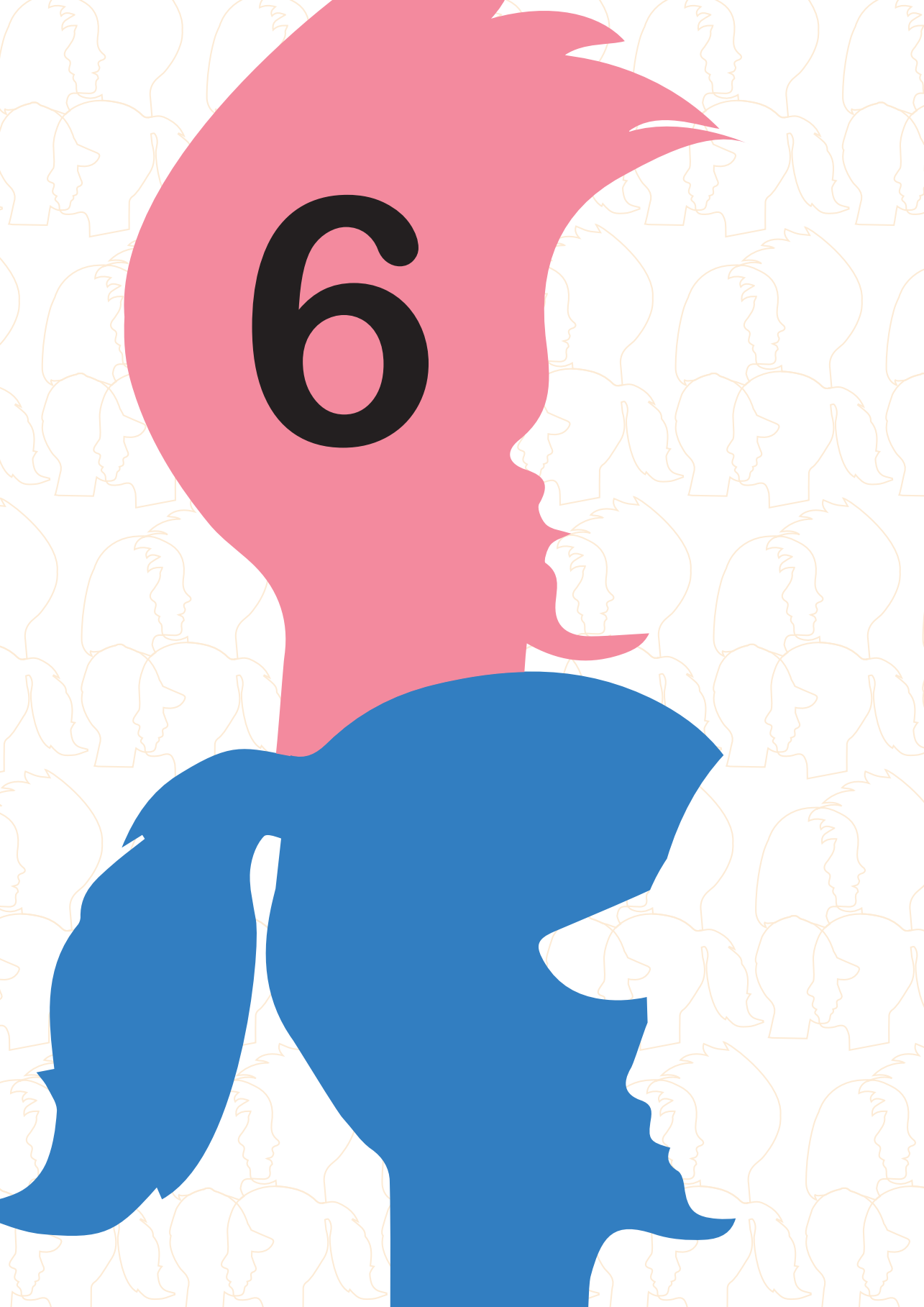
Table A5.3 Fit indices of the first-order factor models in the total sample

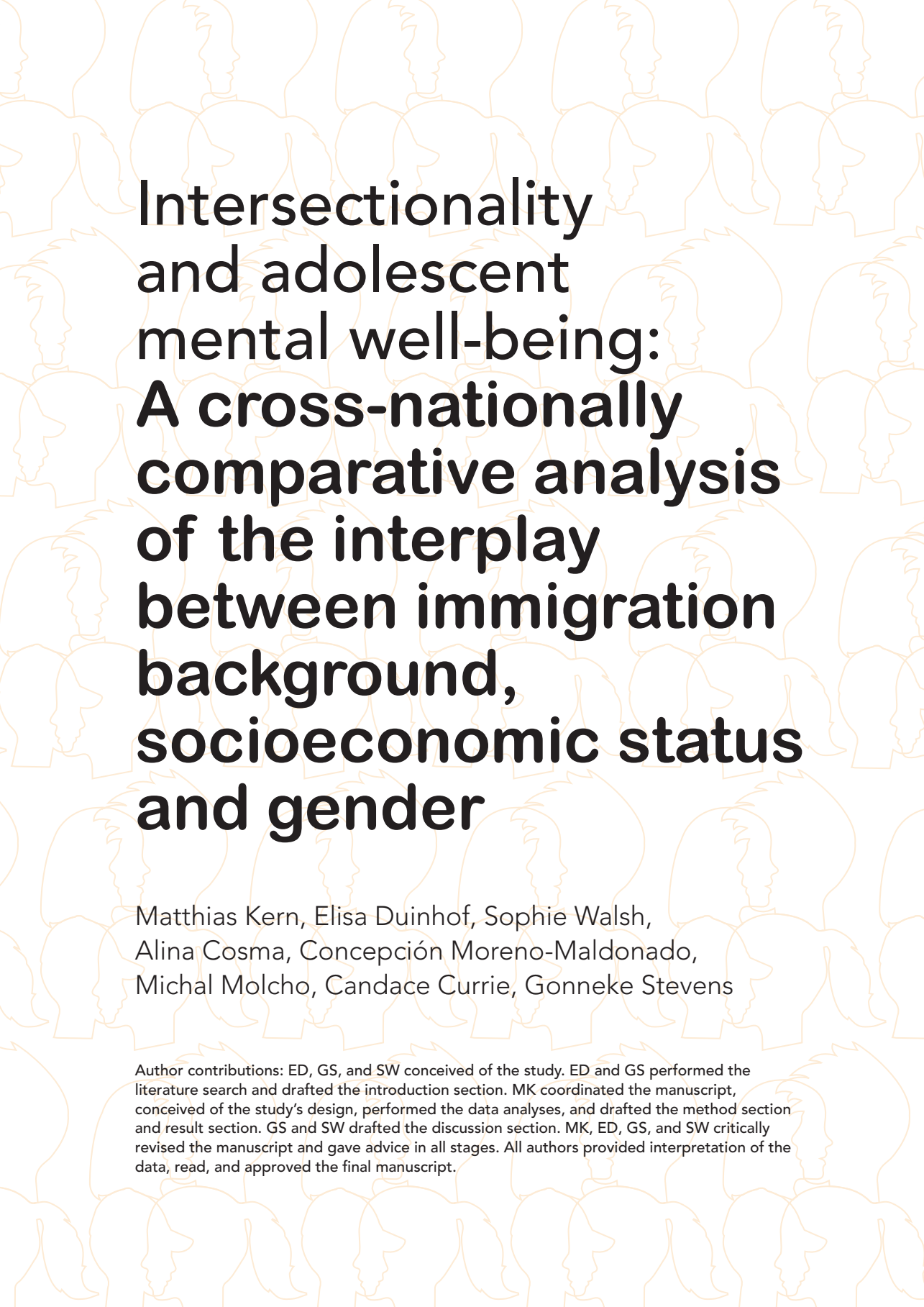
Models	<i>n</i>	χ^2	df	CFI	RMSEA
First-order one-factor model	33,233	26,599.32*	170	0.748	0.068
First-order two-factor model	33,233	22,985.14*	169	0.782	0.064
First-order four-factor model	33,233	19,370.88*	164	0.817	0.059

* $p < 0.001$.**Table A5.4** Fit indices of a first-order one-factor and first-order two-factor model based on the 15-item SDQ-R in the total sample and individual countries

	<i>n</i>	χ^2	df	CFI	RMSEA
First-order one-factor model					
Total sample	33,220	12,872.72*	90	0.860	0.065
Bulgaria	4,712	1,727.31*	90	0.933	0.062
Germany	4,991	3,238.00*	90	0.735	0.084
Greece	4,910	1,659.40*	90	0.889	0.060
Netherlands	4,241	3,210.33*	90	0.780	0.090
Poland	5,486	1,930.83*	90	0.901	0.061
Romania	3,886	1,379.07*	90	0.869	0.061
Slovenia	4,994	4,397.22*	90	0.811	0.098
First-order two-factor model					
Total sample	33,220	9,466.10*	89	0.897	0.056
Bulgaria	4,712	1,665.61*	89	0.936	0.061
Germany	4,991	1,808.02*	89	0.855	0.062
Greece	4,910	1,083.27*	89	0.930	0.048
Netherlands	4,241	1,744.87*	89	0.883	0.066
Poland	5,486	1,467.57*	89	0.925	0.053
Romania	3,886	1,237.90*	89	0.883	0.058
Slovenia	4,994	3,292.75*	89	0.860	0.085

* $p < 0.001$.





Intersectionality and adolescent mental well-being: A cross-nationally comparative analysis of the interplay between immigration background, socioeconomic status and gender

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Author contributions: ED, GS, and SW conceived of the study. ED and GS performed the literature search and drafted the introduction section. MK coordinated the manuscript, conceived of the study's design, performed the data analyses, and drafted the method section and result section. GS and SW drafted the discussion section. MK, ED, GS, and SW critically revised the manuscript and gave advice in all stages. All authors provided interpretation of the data, read, and approved the final manuscript.

Abstract

Purpose. Intersectionality theory highlights the importance of the interplay of multiple social group memberships in shaping individual mental well-being. This paper investigates elements of adolescent mental well-being (life dissatisfaction and psychosomatic complaints) from an intersectional perspective. It tests mental well-being consequences of membership in combinations of multiple social groups and examines to what extent such intersectional effects depend upon the national context (migration and integration policies, income equality, and gender equality).

Methods. Using Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy, we assessed the role of the national context in shaping the interplay between immigration background, socioeconomic status, and gender, utilizing data from 33 countries from the 2017/2018 Health Behaviour in School-aged Children survey.

Results. We found no uniform intersectionality effects across all countries. However, when allowing the interplay to vary by national context, results did point toward some intersectional effects. Some aggravated negative effects were found for members of multiple disadvantaged social groups in countries with low levels of income equality and restrictive migration policies, whereas enhanced positive effects were found for members of multiple advantaged groups in these countries. Similarly, mitigated negative effects of membership in multiple disadvantaged groups were shown in countries with higher levels of income equality and more inclusive migration policies, whereas mitigated positive effects were found for multiply advantaged individuals. Although for national-level gender equality results pointed in a similar direction, girls' scores were counterintuitive. High national-level gender equality disproportionately benefitted groups of disadvantaged boys, whereas advantaged girls were doing worse than expected, and reversed effects were found for countries with low gender equality.

Conclusions. To fully understand social inequalities in adolescent mental well-being, the interplay between individual-level and national-level indicators must be explored.

Introduction

Many adult mental health problems have their onset in childhood and adolescence (Kessler et al., 2007; Rutter et al., 2006). The global prevalence rate of mental health problems among children and adolescents has been estimated to be 13.4% with little international or intercontinental variation (Polanczyk et al., 2015), rendering adolescent mental health a global public health priority (Blakemore, 2019; Patel et al., 2007, 2018). Adolescent mental health has been defined as an overarching, multi-faceted concept that includes both the absence of mental health problems and the presence of subjective well-being. In the present paper, we focus on elements of both parts of mental health and use the term mental well-being throughout the paper. Extensive research, based on ecological models, shows that adolescent mental well-being is influenced by a broad range of individual and contextual factors. From a sociology of health perspective, effects of individuals' social group memberships are of special interest. Inequalities in adolescent well-being, based on their social group membership, are well documented. Although their magnitude is contingent on the social context, their direction tends to be quite stable with adolescents with (1) an immigration background, (2) from low socioeconomic status (SES) families, and (3) girls reporting lower levels of mental well-being than natives, adolescents from middle-to-high SES families, and boys (Dimitrova et al., 2016; Reiss, 2013; Thapar et al., 2012). However, people's experiences, resources, and identities are not only shaped by *multiple* individual characteristics such as immigration background, SES, and gender but also by their specific combinations. In line with this, intersectional theory stresses that membership in particular combinations of social groups represents a unique state of being and a particular set of social experiences with distinctive consequences for the lives and mental well-being of individuals, and particularly those of adolescents who are in a process of social identity formation (Ghavami et al., 2016).

From an intersectional perspective, it can thus be argued that studies that examine the effect of having such characteristics singularly, rather than combined, provide an incomplete picture of social inequalities in adolescent mental well-being, as the effect of membership in particular combinations of social groups might differ from the sum of the effect of each of those individual group memberships. According to the *multiple jeopardy hypothesis* (King, 1988), the negative effect of simultaneously being a member of multiple marginalized social groups is greater than the combined negative effect of all social group memberships. Thus, the combination of having an immigration background, coming from a low SES family, and being a girl may have an aggravating (multiplicative) rather than a simply cumulative (additive) negative effect on adolescent mental health.

To our knowledge, only very few studies have addressed the intersection of immigration background, SES, and gender on mental well-being among adolescent and young adult samples, and the few that have were exclusively conducted in the United States (US). Results of these studies support an additive model, where the effect of membership in particular combinations of social groups equals the sum of the effects of each of those individual group memberships, rather than an intersectional one (Evans & Erickson, 2019; Jackson & Goodman, 2011). To assess whether the same holds true outside of the US context, the current study, as a first step, aims to investigate the interplay between immigration background, SES, and gender by examining the effect of membership in all possible combinations of these variables using data from a large-scale, cross-nationally comparative study (including primarily European countries). Following the multiple jeopardy hypothesis, we assume that members of multiple disadvantaged social groups experience negative mental health effects that go above the combined negative effects of all their group memberships.

The role of the national context

Intersectionality theory does not only emphasize that membership in particular combinations of social groups establishes a unique set of social experiences and structural constraints (Else-Quest & Hyde, 2016), it also stresses that these experiences and constraints are shaped by the social context (Else-Quest & Hyde, 2016; Ghavami et al., 2016). Accordingly, the necessity of context-sensitive intersectional research is widely acknowledged in the field (Evans, 2019). Quantitative intersectional research explicitly modeling this context dependency of the effect of membership in particular combinations of social groups, however, is extremely sparse (Evans, 2019). Research examining the effect of immigration background and SES on adolescent mental well-being individually found that it varied with certain national-level characteristics. Specifically, in countries with inclusive migration and integration policies (Dimitrova et al., 2016; Malmusi et al., 2017) and low national-level income inequality (Alemán-Díaz et al., 2016; Elgar et al., 2015; Pickett & Wilkinson, 2007), social inequalities in adolescent mental well-being according to immigration background and SES tend to be relatively small. For countries with high levels of gender equality, comparable processes may be at play (Torsheim et al., 2006). The exact impact of these national-level characteristics on the mental well-being of adolescents belonging to particular combinations of social groups is unknown. However, given that national-level inclusive migration and integration policies, income equality, and gender equality reduce social inequalities in adolescent mental well-being, we suggest that the aggravated (as opposed to cumulative) negative effect of membership in multiple marginalized social groups is less likely in more inclusive and equal countries.

This study

The current study uses data from the cross-national 2017/2018 Health Behaviour in School-aged Children (HBSC) study to investigate the interplay between immigration background, SES, and gender on two indicators of adolescent mental well-being (life dissatisfaction and psychosomatic complaints) in a large, representative sample of adolescents between the ages of 10 and 16 from 33 primarily European countries (Research question 1). It also tests whether this interplay varies between countries categorized according to indices of their migration and integration policies and their national-level income equality and gender equality (Research question 2). To investigate this interplay we use the new “gold standard” for research into health inequalities: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) that allows for an exploration of the complex interaction structures between a large number of social group memberships (Evans, Williams, Onnela, & Subramanian, 2018; Jones, Johnston, & Manley, 2016; Merlo, 2018) (See Appendix for a more detailed discussion of the advantages of MAIHDA). In doing so, this study aims to shed light on the complex nature of social inequalities in adolescent mental well-being and how they are shaped by the national context. As outlined above, the multiple jeopardy hypothesis assumes that the combination of having an immigration background, coming from a low SES family and being a girl, may have an aggravating (multiplicative) rather than a simply cumulative (additive) effect on adolescent mental well-being. Given the general tendency for social inequalities in mental well-being to be less pronounced in more equal/inclusive societies, we argued that this aggravated effect may be less likely in countries with inclusive migration and integration policies and in more income and gender-equal countries.

Methods

Sample

HBSC is a large cross-sectional, school-based survey carried out every four years in collaboration with the WHO Regional Office for Europe. The study included data from the 2017/2018 HBSC survey, for which 47 countries collected self-report data, nationally representative for 11-, 13-, and 15-year-old adolescents using a standardized study protocol. Samples were drawn using cluster sampling, with school classes or the whole school as the primary sampling unit. Data collection procedures and questionnaires were standardized and strictly followed the international research protocol (Inchley, Currie, Cosma, & Piper, 2018). Each country obtained ethical board approval. Thirty-

three countries collected data on all individual level variables used in the present study. National-level data on income equality and gender equality were available for all 33 countries, and data on migration and integration policies were available for 26 countries. For the different steps of analyses, sample sizes ranged from 127,556 participants in 26 countries to 154,229 participants in 33 countries. The share of girls ranged from 49.0% in Croatia to 54.5% in Albania. The share of immigrants ranged from 4.2% in Albania to 72.2% in Luxembourg. The age of participants in our study ranged between 10.0 and 16.5 years, coinciding with early and middle adolescence. The mean age per country ranged from 13.0 years in Norway to 13.9 years in Finland (for more sample information and country specific descriptive statistics, see Appendix).

Measures

Dependent variables

Life dissatisfaction. The Cantril ladder was used to assess life dissatisfaction (Cantril, 1965). Participants rated how satisfied they were with their life on a visual analogous scale ranging from (0) "the worst possible life" to (10) "the best possible life". The Cantril Ladder is easily understood and has shown good reliability and convergent validity among adolescents (Levin & Currie, 2014). For the purpose of this study, responses were reverse coded so that higher scores indicated more life dissatisfaction.

Psychosomatic complaints. Items from the HBSC Multiple Health Complaints Checklist were used to assess the frequency of seven health complaints (headache, abdominal pain, backache, feeling low, irritability, feeling nervous, and dizziness) (Haugland & Wold, 2001; Ravens-Sieberer, Gosch, et al., 2008). Adolescents indicated how often they had experienced each complaint over the last six months. Response categories ranged from (1) "about every day" to (5) "rarely or never". This instrument has adequate test-retest reliability and psychometric properties (Haugland & Wold, 2001) and is commonly used as an indicator of adolescent mental well-being (e.g., Hagquist, Välimaa, Simonsen, & Suominen, 2017). In our sample, the scale had an acceptable reliability ($\alpha = 0.80$). The responses were reverse coded, and a sum score was built so that a higher number would indicate more psychosomatic complaints (range 0-28). In line with the literature (Haugland & Wold, 2001; Levin & Currie, 2014), both dependent variables were treated as continuous.

Independent variables

Individual-level

Immigration background. Adolescents reported where they themselves, their mother, and their father were born. Participants were considered as having an immigration background if at least one of their parents was born outside of the survey country (for more information, see Appendix).

Family SES. The revised Family Affluence Scale (FAS III) was used to assess family SES (Torsheim et al., 2016). FAS measures material family wealth with six items, including, for instance, number of family cars, having a bedroom of one's own, number of bathrooms, and the number of family holidays in the last year (Torsheim et al., 2016). Several studies have confirmed its validity (Hartley et al., 2016; Hobza, Hamrik, Bucksch, & De Clercq, 2017). Responses were summed in a total FAS score. To take the international differences in family affluence into consideration, we estimated FAS by comparing the individuals' summary scores on the FAS to that of all other participants of their age and gender in their respective country using a proportional rank (Inchley et al., 2018). Subsequently, proportional ranks were categorized into tertiles.

Gender and age. Respondents were asked to indicate whether they are a boy or a girl, and to report their date of birth (month/year). Based on this, their gender and their age at the moment of data collection were computed.

Country-level

Migration and integration policies. Data were obtained from the Migrant Integration Policy Index (MIPEX) from 2014, which has been developed by the British Council and the Migration Policy Group (Huddleston & Vink, 2015). It consists of eight indicators, such as policies about labor market mobility, family reunification, education, and antidiscrimination. The higher the MIPEX score, the better the policy meets the highest standard for equal treatment of natives and immigrants.

Income equality. Income equality was measured with the Gini coefficient. The Gini coefficient measures income inequality at the national level and has a theoretical range from 0 (everyone having equal income) to 1 (one person having all the income). We used the most recent World Bank Gini estimate available for each country from the World Development Indicators online database (see Table A6.1 in the Appendix). The income equality for each country was computed by subtracting the national Gini index from 1.

Gender equality. Gender equality was measured with the Gender Inequality Index (GII) obtained from the 2017 United Nations Development Program Human Development Report. The GII measures gender inequalities in three important aspects

of human development: reproductive health, empowerment, and economic status. Gender equality was computed by inverting the GII.

All national-level indicators were categorized into tertiles: high, medium, and low (for more information, see Appendix, Table A6.1). Individuals with missing values on any of the variables were excluded from further analyses.

Analytic strategy

Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) was conducted (Fisk et al., 2018), which requires that all possible unique combinations of social group memberships (often referred to as strata) are treated as higher level units in a two-level hierarchical random effects model (Evans et al., 2018). In our study, first, separately for both outcome variables, MAIHDA was performed with individuals nested in 12 strata representing all unique combinations of individual characteristics – immigration background (native/immigrant), SES (high/middle/low), and gender (boy/girl) – (Research question 1). Then, again separately for both outcome variables, the same analyses were repeated three times (i.e., once for each national-level variable), to investigate the role of national-level MIPEX, income equality, and gender equality in shaping this interplay (Research question 2). To this end, individuals were nested in 36 strata representing all unique combinations of the national-level variable in question (which was categorized into high, medium, and low), and individual-level variables of immigration background, SES, and gender (Table A6.2 in the Appendix shows the sample sizes per stratum for all four sets of strata that were used). Analyses pertaining to Research question 1 were based on data from 33 countries. Analyses pertaining to Research question 2 were based on data from 33 countries when assessing the role of income equality and gender equality and on data from 26 countries when assessing the role of migration and integration policies.

In all four analyses, first, a null model was fit including only the overall intercept (i.e., the overall mean of the outcome variable) as well as the estimated stratum-level residuals for all strata (i.e., the difference between the stratum means and the overall mean). This model was additionally adjusted for age. In MAIHDA, the variance partition coefficient (VPC) of the null model serves as a measure of Discriminatory Accuracy (Evans et al., 2018; Fisk et al., 2018). Akin to a model fit statistic like R^2 , it indicates how well individual scores on the outcome variable can be predicted based on the individual's combination of social group memberships (see Appendix for the formula used to calculate the VPC). Second, a main effects model was fit that additionally included dummy variables to control for the additive effects of all social group memberships (Bell, Holman, & Jones, 2019). We also controlled for age and survey

country to take into account age and country differences in the distributions of life dissatisfaction and psychosomatic complaints. Because additive effects of social group memberships were adjusted for, in the main effects model, stratum-level residuals did not capture the difference between stratum means and the overall mean, but between stratum means and the means that would be expected for those strata by a purely additive model. Accordingly, inspection of stratum-level residuals and their associated credible intervals can reveal potential intersectional effects for particular combinations of social group memberships (Research question 1) or intersectional effects for particular combinations of social group memberships in particular national contexts (Research question 2). While stratum-level residuals, thus, provide us with a measure of stratum-specific intersectional effects, a measure of general intersectionality can be found in the Proportional Change in Variance (PCV) (Bell et al., 2019). The PCV relates the variance of the stratum-level residuals in the main effects model (the difference between the stratum mean and the expected mean for that stratum based on an additive model) to the variance of stratum-level residuals in the null model (the difference between stratum means and the overall mean) and informs us about how much of the differences between individuals in different strata is explained by additive main effects. Accordingly, the unexplained part is attributable to intersectional effects (see Appendix for the formula used to calculate the PCV).

All models were fit in MLwiN 3.02 (University of Bristol) using Bayesian Markov Chain Monte Carlo estimation. The burn-in length was 500 iterations, and the total amount of iterations was 5000. Bayesian 95% credible intervals for the fixed effect parameters as well as the strata-level residuals were obtained from the posterior distribution following procedures laid out by Fisk and colleagues (Browne, 2017; Fisk et al., 2018).

Results

Main effects

Main effect parameters (Table 6.1) revealed significantly increased levels of life dissatisfaction and psychosomatic complaints among adolescents with an immigration background, from low SES families, and girls when compared with natives, adolescents from middle and high SES families, and boys. Accordingly, based on an additive model, irrespective of the national context, we would expect the highest levels of both outcome variables among low SES immigrant girls and the lowest among high SES native boys.

Table 6.1 Main effect regression coefficients for individual-level characteristics

	Life dissatisfaction	Psychosomatic complaints
Girl	0.31* (0.25, 0.37)	2.27* (2.18, 2.36)
Immigrant	0.21* (0.14, 0.27)	0.49* (0.39, 0.59)
Middle SES	-0.30* (-0.37, -0.23)	-0.28* (-0.39, -0.17)
High SES	-0.51* (-0.59, -0.43)	-0.29* (-0.40, -.18)
Intercept	1.95* (1.83, 2.06)	5.16* (4.84, 5.47)

Note. SES = socioeconomic status. Models are additionally adjusted for age and survey country. Individuals are nested in strata based on their immigration background, SES, and gender. Main effect parameters are comparable for other models tested and can be found in Table 3 in the Appendix. Bayesian 95% Credible Interval in parentheses. Natives, low family SES, and boys were set as the reference groups.

* $p < 0.001$.

Discriminatory accuracy

Table 6.2 shows that for all estimated null models, VPCs were relatively modest, ranging from 3.1% to 6.4%. These show that immigration background, SES, gender, the national context variables, and their combinations contribute to individuals' life dissatisfaction and psychosomatic complaints but are by no means the only contributing factors.

The interplay of immigration background, SES, and gender

We did not find evidence for intersectional effects at all when investigating the interplay between immigration background, SES, and gender across all national contexts. PCV scores for both outcome variables revealed that differences between the 12 social strata were almost entirely (98.4% for life dissatisfaction and 99.9% for psychosomatic complaints) accounted for by cumulative (additive) main effects (see Table 6.2). In line with this, for neither life dissatisfaction nor psychosomatic complaints did any of the residuals associated with the 12 strata significantly differ from zero (see Figure A6.1 and Figure A6.2 in the Appendix).

Table 6.2 PCV and VPC scores of the four models tested

Life dissatisfaction				
	Only individual level	MIPEX	Income equality	Gender equality
PCV	98.41	95.74	97.16	91.32
VPC ^a	4.0 (1.53-9.33)	3.14 (1.99-4.99)	3.14 (1.98-4.97)	3.44 (2.17-5.46)
Psychosomatic complaints				
	Only individual level	MIPEX	Income equality	Gender equality
PCV	99.85	98.47	99.32	96.54
VPC ^a	6.37 (2.51-14.42)	5.55 (3.55-8.64)	4.81 (3.08-7.50)	4.55 (2.90-7.13)

Note. MIPEX = Migrant Integration Policy Index; PCV = Proportional Change in Variance; VPC = Variance Partition Coefficient. ^aFor the null model with Bayesian 95% confidence intervals.

Cross-country variation in the interplay between immigration background, SES, and gender

Table 6.2 shows that, while PCV scores are generally lower when the national context is considered, most interstrata differences can still be explained by additive main effects instead of intersectional effects. In line with this, only 24 out of 216 stratum-level residuals significantly differed from zero (see Table 6.3 for an integrated summary of the stratum level residuals displayed in Figure A6.3 to Figure A6.8 in the Appendix).

General intersectionality in models investigating the interplay between national-level migration and integration policies, immigration background, SES, and gender amounted to 4.3% for life dissatisfaction and 1.5% for psychosomatic complaints (Table 6.2). Examination of stratum-level residuals revealed that in low and medium MIPEX countries (i.e., countries with relatively restrictive migration and integration policies), low SES immigrant girls did worse on life dissatisfaction than predicted by a purely additive model, whereas specific groups of native girls (low SES native girls in low MIPEX countries and high SES native girls in medium MIPEX countries) did better than predicted. Conversely, in high MIPEX countries, high SES native boys did significantly worse than expected on life dissatisfaction, whereas low SES immigrant boys did significantly better. For psychosomatic complaints, only two stratum-level residuals showed significant intersectional effects. As we saw for life dissatisfaction, particularly low SES native girls were doing significantly better than expected in low MIPEX countries, whereas the same group was doing significantly worse than expected in medium MIPEX countries (Table 6.3; Figure A6.3 and Figure A6.4 in the Appendix).

General intersectionality in models investigating the interplay between national-level income equality and immigration background, SES, and gender was even lower with 2.8% for life dissatisfaction and 0.7% for psychosomatic complaints (Table 6.2). Obtained stratum-level residuals revealed that in highly income equal countries, high and middle SES native boys did significantly worse, and low SES immigrant girls did significantly better on life dissatisfaction. In contrast, in countries with low levels of income equality, low SES immigrant girls scored significantly worse on life dissatisfaction than would be expected based on an additive model. Similar to life dissatisfaction, in highly income equal countries high SES native boys showed more psychosomatic complaints than would be expected based on an additive model, whereas in countries with low levels of income equality this same group showed fewer problems (Table 6.3; Figure A6.5 and Figure A6.6 in the Appendix).

General intersectionality in models investigating the interplay between national-level gender equality, immigration background, SES, and gender amounted to 8.7% for life dissatisfaction and 3.5% for psychosomatic complaints (Table 6.2). Inspection of stratum-level residuals revealed some seemingly counterintuitive results (Table 6.3; Figure A6.7 and Figure A6.8 in the Appendix). These residuals showed that, in the most gender-equal countries, high SES girls, both immigrant and native, scored significantly worse on life dissatisfaction than would be expected based on additive effects. In contrast, in those same countries, low SES boys, both immigrant and native, scored significantly better than predicted. In countries with low levels of gender equality the reverse was found to be true: low SES immigrant boys scored significantly worse, whereas high SES native girls scored significantly better than would be expected based on additive effects. For psychosomatic complaints, somewhat comparable patterns were found. As seen for life dissatisfaction, the only group in countries with low levels of gender equality doing significantly worse than would be expected based on an additive model were low SES immigrant boys. In those same countries, native girls were again doing better than would be expected. However, now this was only true for native girls with middle and low (instead of high) SES. In contrast, in countries with medium gender equality, low SES native girls reported significantly more psychosomatic complaints than would be expected.

Table 6.3 Significant intersectional effects for the interplay between immigration background, SES, gender, and the national context

	Low	Medium	High
MIPEX			
Life dissatisfaction	More than expected ^a	Girl - immigrant - low SES	Boy - native - high SES
	Less than expected ^a	Girl - native - low SES	Boy - immigrant - low SES
Psychosomatic complaints	More than expected ^a	–	–
	Less than expected ^a	Girl - native - low SES	–
Income equality			
Life dissatisfaction	More than expected ^a	Girl - immigrant - low SES	Boy - native - high SES Boy - native - middle SES
	Less than expected ^a	–	Girl - immigrant - low SES
Psychosomatic complaints	More than expected ^a	–	–
	Less than expected ^a	Boy - native - high SES	–
Gender equality			
Life dissatisfaction	More than expected ^a	Boy - immigrant - low SES	Girl - immigrant - high SES Girl - native - high SES
	Less than expected ^a	Girl - native - high SES	Boy - immigrant - low SES Boy - native - low SES
Psychosomatic complaints	More than expected ^a	Boy - immigrant - low SES	–
	Less than expected ^a	Girl - native - middle SES Girl - native - low SES	–

Note: MIPEX = Migrant Integration Policy Index; SES = socioeconomic status. Empty cells with a “–” indicate no evidence for intersectional effects. ^aBased on additive effects.

Discussion

In the present study, we examined the interplay between immigration background, SES, and gender on adolescent mental well-being across 33 countries. We also examined national-level variations in this interplay, according to migration and integration policies, income equality, and gender equality. As expected, across all national contexts, being a member of any of the three disadvantaged social groups (i.e., immigrants, adolescents from low SES families, and girls) increased scores for life dissatisfaction and psychosomatic complaints, in comparison to adolescents from less disadvantaged groups (i.e., natives, adolescents from middle- and high SES families, and boys). In line with the multiple jeopardy hypothesis (King, 1988), we conjectured that being a member of multiple disadvantaged social groups would have an aggravated (and not just additive) negative effect. However, no such effect and no evidence for intersectionality, in general, was found when examining the interplay without allowing it to vary between different national contexts: members of particular combinations of social groups did not report better or worse mental health than expected based on just adding up effects from separate social group memberships. However, when allowing this interplay to vary based on country-level migration and integration policies, income equality, and gender equality, we did find evidence for intersectionality.

The observed lack of intersectional effects when examining the interplay between immigration background, SES, and gender over all national contexts might be due to its context dependency. While, for instance, in high gender equality countries, high SES native girls did significantly worse and low SES immigrant boys significantly better on life dissatisfaction than would be expected by an additive model, the exact opposite was the case for both groups in low gender equality countries. These intersectional effects in opposite directions depending on the national context might have cancelled each other out. Results like this are relatively numerous in our findings and highlight the importance of taking the national context into consideration when investigating this interplay.

Although small in number, and accounting only for a small share of the overall social inequalities in adolescent mental well-being, the intersectional effects that were found for different national contexts are nevertheless meaningful and warrant some further exploration. In line with our hypothesis, we found aggravated negative effects of membership in multiple disadvantaged social groups in national contexts that were characterized by low levels of immigrant inclusivity and economic equality. Conversely, in those same countries, members of multiple privileged social groups were doing better than expected based on an additive model. Interestingly, in countries with high levels of immigrant inclusivity and income equality, members

of multiple disadvantaged social groups were actually doing better than would be predicted by an additive model. Conversely, in those same countries, members of multiple privileged social groups were doing worse than would be expected based on an additive model. Possibly, vulnerable groups have a better chance of optimal development in countries that attempt to reduce social inequalities by focusing on inclusive migration and integration policies and restricting income inequality than in other countries. Such contexts may reduce traditional real or symbolic privileges for advantaged groups.

To illustrate, in countries with relatively restrictive migration policies, a clear aggravated negative effect was found in that the most disadvantaged group (i.e., low SES immigrant girls) reported more life dissatisfaction than expected based on additive effects. Conversely, in countries with the most inclusive migration policies, a relatively disadvantaged group, that is low SES immigrant boys, showed less life dissatisfaction than an additive model would suggest, while the most privileged group (i.e., high SES native boys) reported more life dissatisfaction than would be expected. Similar intersectional patterns were found when examining income equality. Privileged high SES native boys showed more life dissatisfaction and more psychosomatic complaints in countries with high levels of income equality, whereas they showed less psychosomatic complaints than would be expected in countries with low levels of income equality. Conversely, low SES immigrant girls growing up in countries with the lowest national-level income equality showed higher life dissatisfaction, whereas the same group of girls reported less life dissatisfaction than expected in countries with high levels of income equality.

In the case of gender equality too, some evidence was found for the notion that aggravated negative effects of membership in multiple disadvantaged social groups are less likely in more equal contexts. However, what stood out here was the finding that high SES girls, either with or without an immigration background, were reporting more life dissatisfaction than expected in highly gender-equal countries, whereas low SES boys, again either with or without an immigration background, were reporting less life dissatisfaction than an additive model would suggest in this national context. Conversely, in countries with relatively low levels of gender equality, low SES immigrant boys did worse than would be expected on life dissatisfaction and psychosomatic complaints and high SES native girls better on life dissatisfaction. In those same countries, less psychosomatic complaints than would be expected were reported by middle and low SES native girls. Previous literature has suggested that gender equality is positive for adolescent life satisfaction, and that this effect is significant for boys and girls even when controlling for national wealth and income equality (De Looze et al.,

2018). However, the current findings suggest that high SES girls may not benefit from gender equality, whereas it is the low SES boys that do. A comprehensive understanding of the reasons behind this is beyond the scope of the paper, yet we can suggest some preliminary understandings. In line with previous studies and theory (Mensing, Bonifazi, & Larosa, 2007), we suggest that high levels of gender equality may actually place a burden on high SES girls, as they may simultaneously feel pressures to fulfill traditional gender roles as well as to achieve academically and succeed. This relates to a concept which has been termed the “superwoman ideal” (Steiner-Adair, 1986). This may be especially acute in adolescence as young people are still trying to consolidate a gender identity (McLean & Breen, 2009), based on identification and internalization of familial and social role models. At the same time, high levels of gender equality might place less emphasis on competition and masculine dominance (De Looze et al., 2019), which may particularly put less pressure on the socially disadvantaged groups of boys (i.e., low SES immigrant boys).

There are some limitations to the current study. There are limits to the instruments we were able to use. In particular, the item “Are you a girl or a boy?” may conflate sex and gender and does not allow for a third option, accordingly some adolescents might have been unable to answer the question and had to be excluded from subsequent analyses or were misclassified. Furthermore, because the most up to date information on migration and integration policies was from the year 2014, we cannot rule out that changes in these policies in the meantime might have led us to misclassify some countries as more or less inclusive than they are today. However, we want to argue that such misclassifications are not likely because the overall MIPLEX score is a composite measure generated from 167 indicators from eight policy areas. Accordingly, although the different indicators may fluctuate over time, it seems unlikely that many of them have changed in such a short period of time. Furthermore, for our analyses, MIPLEX scores were categorized into tertiles, and as such, in order to affect our results, changes would have had to be large enough to move a country from one category into another. In addition, although our outcomes have been used in ample former studies showing associations with relevant constructs for adolescents throughout Europe (Haugland & Wold, 2001; Ravens-Sieberer, Erhart, Torsheim, et al., 2008), they are not without weaknesses. Although the Cantril ladder, which we used to assess life dissatisfaction, has been shown to have a good reliability and convergent validity among adolescents (Levin & Currie, 2014), it might be susceptible to language effects and cultural measurement bias. Similarly, although our measure of psychosomatic complaints has adequate test-retest reliability and psychometric properties (Haugland & Wold, 2001), it might be prone to recall-bias. Although these weaknesses are unlikely

to have substantially contributed to the observed interaction patterns, we cannot rule out entirely that the results may have been impacted by differences in the validity of the instruments between different social groups and national contexts. In addition, our study would have benefited from the inclusion of mental ill-health indicators, such as anxiety, depression, ADHD or conduct problems, as this would have provided us with a more complete picture of adolescent mental health. To test the generalizability of our findings, we encourage future studies to replicate our analyses with variables tapping into different aspects, or correlates (such as social relations), of adolescent mental health.

Another limitation lies in the fact that our sample largely consists of European countries, as such, results might not be generalizable to other world regions. A further limitation is the relatively small number of investigated dimensions. The inclusion of different individual and context characteristics, such as sexual orientation, ethnicity, or local or regional level area deprivation might have led to different findings. Finally, some caution is warranted regarding the distinction between qualitative differences in the lived experiences of individuals occupying particular intersections and quantitative differences in their scores on the investigated outcome variables. Qualitative research might deliver a more in-depth picture of the categories adolescents employ in making sense of society and their place in it and how they experience membership in combinations of those categories.

Using a novel methodological approach on a uniquely large scale, cross-nationally comparative sample, we were able to investigate the interplay between immigration background, SES, and gender on adolescent mental well-being and the variation in this interplay between different national contexts. Our research clearly showed that immigrants, adolescents from low SES families, and girls had a higher risk for reporting low mental well-being. Over all national contexts, no evidence of intersectional effects between those social group memberships were found. However, when allowing for potential variation in this interplay between different national contexts, we did find evidence for intersectionality. Particularly, findings suggest that in immigrant inclusive and income equal countries, members of multiple privileged social groups are doing worse and members of multiple disadvantaged social groups are doing better than would be expected based on a purely additive model. Albeit in different directions, both these processes reduce social inequalities in adolescent mental well-being in more inclusive and equal countries. Future studies are encouraged to further test the context dependency of the intersection of multiple social group memberships, particularly focusing on other indicators on the national level such as the quality of support or services and more proximal environments, such as the schools and school

classes. On a policy level, findings support the importance of policies that encourage the mental well-being of immigrants, adolescents growing up in low SES families, and girls. Schools particularly can also be encouraged to develop resilience programs for young people who are members of one or more socially disadvantaged groups. Also, our results suggest the importance of policies that aim to reduce income inequality and stimulate the integration of immigrants in order to broadly decrease social inequalities in adolescent mental well-being. In addition, findings suggest that special attention should be given to high SES adolescent girls in countries with higher gender equality, as they may be worse off than expected in specifically these countries.

Appendix

Additional information on the sample

Data were drawn from the 2017/2018 survey round of the Health Behaviour in School-Aged Children (HBSC) study. In the 2017/2018 survey, 47 countries and regions across Europe, North America, and the Middle East collected data using the same study protocol (Inchley et al., 2018). Two of those countries, Israel and Turkey are missing from the international dataset, as data for both countries were not submitted in time. Armenia, Canada, England, France, Georgia, Greenland, Latvia, Lithuania, Slovakia, and North Macedonia had to be excluded from the analyses due to not collecting data on immigration background. Datasets for Belgium (French) and Belgium (Flemish) were merged and the same was done for datasets from Scotland and Wales. Among the remaining 33 countries, country level data on income equality and gender equality were available for all countries, and data on migration and integration policies (MIPEX) were available for all countries except Albania, Azerbaijan, Kazakhstan, Moldova, Serbia, Russia, and Ukraine (in total 26 countries).

Country-specific descriptive statistics

Table A6.1 below details for each country the total sample size, the MIPEX, Gini, and GII scores, the years from which Gini data stems, the sample size available for our analyses, separate for life dissatisfaction and psychosomatic complaints, the percentage of girls, the percentage of immigrants, mean age, mean life dissatisfaction, and mean psychosomatic complaints.

Additional information on the measures

Immigration background. Adolescents were asked where they themselves, their mother and their father were born. The response options included the name of the national survey country (1), the countries from which the top five immigrant groups come at national level for the survey country (2 to 6), and other (open response question) (7). Adolescents were considered as having an immigration background if at least one of their parents were born outside of the survey country. For historical reasons adolescents in Denmark were not regarded as immigrants if their parents were born in Greenland, adolescents in the Republic of Ireland were not regarded as immigrants if their parents were born in Northern Ireland, and adolescents in former Yugoslavian countries were not regarded as immigrants if their parents were born in another former Yugoslavian country.

Additional information on MAIHDA

The conventional approach to quantitatively establishing intersectionality entails fitting a regression model with main effect parameters as well as a complete inventory of all possible first-, second-, and higher-order interaction terms. If one of those interactions terms shows a significant effect this is seen as evidence of intersectionality (Evans & Erickson, 2019). In recent years, however, researchers have been pointing out a number of weaknesses in this approach. In particular, they argue that this approach becomes unfeasible once a larger number of dimensions of social inequality is considered, because every added dimension grows the number of main effects-, first-, second-, and higher-order interaction terms that need to be estimated geometrically. This (a) limits the parsimoniousness and scalability of the model (Evans & Erickson, 2019), (b) complicates the interpretation of results (Evans et al., 2018), and (c) might lead to false positive intersectional effects as a result of multiple testing (Bell et al., 2019).

As a solution to these issues they suggest an intersectional repurposing of Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) (Fisk et al., 2018). Rather than interacting all dimensions of social inequality with one another, they treat all possible unique combinations of those dimensions as strata in a two-level hierarchical random effects model. Adjusting for main effects for all dimensions of social inequality, remaining strata-level residuals serve as evidence of intersectionality. Such a model is (a) more parsimonious and scalable, as inclusion of further dimensions of social inequality only adds further main effects parameters to the model and increases the number of strata (Evans & Erickson, 2019), (b) more easily interpretable, as for each strata we obtain an estimate of how the actual mean in the stratum differs from what would be expected based on additive main effects (Evans et al., 2018), and (c) less prone to false positive intersectional effects since stratum-level residuals are shrunken as a function of strata size, inter-, and intra-strata variance (Bell et al., 2019; Browne, 2017).

In MAIHDA analyses, first a null model is fit:

In MAIHDA the null model only includes the overall intercept β_0 (i.e., the overall mean of the dependent variable) as well as the estimated strata level residuals μ_j for all j strata, and individual level residuals e_{ij} for the i individuals in the j strata:

$$\begin{aligned}y_{ij} &= \beta_0 + \mu_j + e_{ij} \\ \mu_j &\sim N(0, \sigma_\mu^2) \\ e_{ij} &\sim N(0, \sigma_e^2)\end{aligned}$$

Then a main effects model is fit:

The main effects model additionally includes $(L - 1) K$ main effect dummies for the L values of the K dimensions of social inequality (Bell et al. 2019):

$$y_{ij} = \beta_0 + \sum_{k=1}^K \sum_{l=1}^{L-1} \beta_{kl} X_{kl} + \mu_j + e_{ij}$$

$$\mu_j \sim N(0, \sigma_\mu^2)$$

$$e_{ij} \sim N(0, \sigma_e^2)$$

The stratum-level residuals μ_j in the main effects model in conjunction with their associated Bayesian 95% credible intervals inform us about which strata perform better or worse than would be expected based on additive main effects.

Variance partition coefficient

In MAIHDA the variance partition coefficient (VPC) of the null model serves as a measure of discriminatory accuracy (Evans et al., 2018; Fisk et al., 2018). Akin to a model fit statistic like R^2 , it indicates how well individual scores on the outcome variable can be predicted based on the individual's combination of social group memberships.

Based on the null model the VPC is calculated as follows:

$$\text{VPC} = \frac{\text{Between Strata Variance}}{\text{Total Variance}} \cdot 100\% = \frac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma_e^2} \cdot 100\%$$

Proportional change in variance

The proportional change in variance (PCV) relates the variance of the stratum-level residuals in the main effects model (the difference between the stratum mean and the expected mean for that stratum based on an additive model) to the variance of stratum-level residuals in the null model (the difference between stratum means and the overall mean) and informs us about how much of the differences between individuals in different strata is explained by additive main effects. Accordingly, the unexplained part is attributable to intersectional effects. Based on the null model and the main effects model the PCV is calculated as follows:

$$\text{PCV} = \frac{\text{Between Strata Variance}_{\text{Null Model}} - \text{Between Strata Variance}_{\text{Main Effects Model}}}{\text{Between Strata Variance}_{\text{Null Model}}} \cdot 100\%$$

$$= \frac{\sigma_{\mu, \text{Null Model}}^2 - \sigma_{\mu, \text{Main Effects Model}}^2}{\sigma_{\mu, \text{Null Model}}^2} \cdot 100\%$$

Additional information on the results

Strata. Table A6.2 below details sample sizes per stratum for all four sets of strata examined in our study.

Main effect parameters. Table A6.3 below details main effect parameters for all estimated MAIHDA main effects models.

Stratum-level residuals. Figure A6.1 to Figure A6.8 below show the stratum-level residuals for all estimated MAIHDA main effects models. If the plotted Bayesian 95% Credible Intervals do not contain the value zero this means that the mean for the stratum in question significantly differs from what would be expected based on additive effects.

Table A6.1 Country specific descriptive statistics

Country	Total <i>n</i>	MIPEX ^b	Gini ^b	Gini year	GII ^b	<i>n</i> Life dissatisfaction
Albania	1,765	N.A. ^c	29.00	2012	0.24	1,376
Austria	4,129	50.10	30.50	2015	0.07	3,554
Azerbaijan	4,586	N.A. ^c	26.60	2005	0.32	4,269
Belgium ^a	8,353	67.45	27.70	2015	0.05	7,416
Bulgaria	4,548	41.86	37.40	2014	0.22	4,280
Croatia	5,169	42.73	31.10	2015	0.12	4,645
Czech Republic	11,564	45.03	25.90	2015	0.12	10,661
Denmark	3,181	58.62	28.20	2015	0.04	2,772
Estonia	4,725	45.84	32.70	2015	0.12	4,437
Finland	3,146	68.83	27.10	2015	0.06	2,876
Germany	4,347	60.68	31.70	2015	0.07	3,929
Greece	3,863	43.74	36.00	2015	0.12	3,644
Hungary	3,789	45.06	30.40	2015	0.26	3,541
Iceland	6,996	45.05	27.80	2014	0.06	6,362
Ireland	3,833	51.78	31.80	2015	0.11	3,243
Italy	4,144	58.86	35.40	2015	0.09	3,964
Kazakhstan	4,868	N.A. ^c	27.50	2017	0.20	4,435
Luxembourg	4,070	57.43	33.80	2015	0.07	3,540
Malta	2,576	39.68	29.40	2015	0.22	2,314
Moldova	4,686	N.A. ^c	25.90	2017	0.23	1,414
Netherlands	4,698	60.06	28.20	2015	0.04	4,491
Norway	3,127	68.51	27.50	2015	0.05	2,844
Poland	5,224	41.14	30.80	2016	0.13	4,912
Portugal	6,126	74.98	35.50	2015	0.09	5,258
Romania	4,567	44.60	35.90	2015	0.31	3,930
Russia	4,281	N.A. ^c	37.70	2015	0.26	4,001
Serbia	3,933	N.A. ^c	28.50	2015	0.18	3,738
Slovenia	5,667	44.41	25.40	2015	0.05	5,313
Spain	4,320	59.73	36.20	2015	0.08	4,166
Sweden	4,185	77.84	29.20	2015	0.04	3,759
Switzerland	7,510	48.74	32.30	2015	0.04	7,049
Ukraine	6,660	N.A. ^c	25.00	2016	0.28	5,657
United Kingdom ^a	20,972	57.18	33.20	2015	0.12	16,439

Note. ^aIndividual data for the United Kingdom and Belgium are aggregate regional data (excluding Northern Ireland). ^bCountry-level indicators were categorized into tertiles. Colour coding indicates the ranking of the countries on the country-level indicators: darkgrey indicates high levels of equality/inclusivity, medium grey indicates medium levels, and light grey indicates low levels. ^cN.A. indicates not available.

<i>n</i> Psychosomatic complaints	% Girl	% Immigrant	<i>M</i> Age	<i>M</i> Life dissatisfaction	<i>M</i> Psychosomatic complaints
1,379	54.5	4.2	13.55	1.86	6.26
3,522	50.7	30.3	13.28	2.29	6.66
4,089	51.8	3.9	13.27	1.62	4.83
7,284	50.5	35.1	13.13	2.26	7.05
4,280	51.6	3.8	13.53	2.17	7.44
4,390	49.0	5.7	13.80	1.91	6.41
10,125	49.7	12.6	13.37	2.20	7.11
2,718	51.4	21.2	13.33	2.32	6.40
4,425	49.9	16.8	13.78	2.27	8.09
2,890	50.4	9.7	13.92	2.25	8.56
3,931	53.1	31.9	13.41	2.31	6.81
3,607	50.1	24.6	13.82	2.46	8.16
3,548	52.8	7.2	13.52	2.42	8.46
6,267	49.8	18.1	13.60	2.38	8.26
3,239	49.4	32.8	13.41	2.45	7.01
3,958	51.8	17.9	13.68	2.42	10.14
4,169	49.6	12.5	13.25	1.43	4.94
3,545	49.9	72.2	13.49	2.36	8.21
2,313	51.9	25.8	13.44	2.67	9.62
1,398	49.9	5.3	13.55	1.76	7.24
4,480	51.3	22.8	13.51	2.23	5.96
2,804	51.5	24.7	13.02	2.10	6.22
4,809	50.8	1.5	13.59	2.52	7.94
5,258	52.2	25.2	13.31	2.27	6.27
3,826	51.2	5.0	13.20	1.67	7.85
3,920	52.3	16.3	13.82	2.59	6.95
3,610	50.6	3.6	13.98	1.75	6.25
5,221	49.2	4.9	13.59	2.03	6.08
4,113	51.7	20.5	13.62	1.91	5.64
3,763	50.3	36.6	13.63	2.54	9.05
7,018	49.6	53.2	13.42	2.31	7.20
5,581	51.3	11.2	13.40	2.32	8.40
16,222	50.4	14.4	13.52	2.38	7.35

Intersectionality and adolescent mental well-being: **A cross-nationally comparative analysis of the interplay between immigration background, socioeconomic status and gender**

Table A6.2 Sample sizes per stratum for all four sets of strata that were tested

	Girl												
	Boy						Girl						
	Low SES	High SES	Low SES	Middle SES	High SES	Total	Low SES	High SES	Low SES	Middle SES	High SES	Total	
Life dissatisfaction													
MIPEX	6,684	6,548	862	777	767	6,749	6,703	7,394	876	720	902	46,061	
	5,665	5,886	2,416	2,024	1,944	5,641	6,451	6,115	2,404	2,141	2,067	48,539	
	3,681	4,421	1,654	1,353	1,347	4,151	4,565	4,385	1,994	1,466	1,448	34,739	
	16,030	17,138	16,855	4,932	4,058	16,541	17,719	17,894	5,274	4,327	4,417	129,339	
Income equality	7,529	7,554	2,549	2,124	2,168	7,618	8,337	7,979	2,565	2,314	2,351	60,708	
	4,289	4,881	1,051	996	895	4,615	5,502	4,840	1,183	1,074	877	35,011	
	7,957	8,213	1,614	1,372	1,424	8,333	7,852	8,804	1,853	1,297	1,733	58,510	
	19,775	20,714	20,420	4,492	4,487	20,566	21,691	21,623	5,601	4,685	4,961	154,229	
Gender equality	5,872	5,641	440	520	683	6,128	6,508	5,842	483	556	793	38,955	
	8,739	9,015	1,835	1,724	1,628	8,927	9,490	9,399	2,003	1,843	1,736	65,298	
	5,164	6,058	2,939	2,248	2,176	5,511	5,693	6,382	3,115	2,286	2,432	49,976	
	19,775	20,714	20,420	4,492	4,487	20,566	21,691	21,623	5,601	4,685	4,961	154,229	
Psychosomatic complaints													
MIPEX	6,395	6,868	831	744	749	6,583	6,596	7,292	852	703	882	44,838	
	5,591	5,713	2,386	2,010	1,931	5,611	6,411	6,099	2,402	2,138	2,075	48,195	
	3,650	4,241	1,631	1,336	1,329	4,138	4,549	4,377	1,988	1,457	1,435	34,523	
	15,636	16,822	4,848	4,090	4,009	16,332	17,556	17,768	5,242	4,298	4,392	127,556	
Income equality	7,410	7,520	2,524	2,108	2,154	7,568	8,265	7,949	2,555	2,307	2,339	60,172	
	4,150	4,771	1,045	982	886	4,534	5,471	4,797	1,194	1,075	886	34,504	
	7,699	8,001	1,552	1,319	1,381	8,158	7,675	8,652	1,818	1,266	1,692	57,026	
	19,259	20,292	5,121	4,409	4,421	20,260	21,411	21,398	5,567	4,648	4,917	151,702	
Gender equality	5,725	5,510	433	498	664	6,010	6,378	5,745	480	546	776	38,113	
	8,450	8,786	1,794	1,696	1,609	8,778	9,377	9,295	1,979	1,827	1,725	64,077	
	5,084	5,996	2,894	2,215	2,148	5,472	5,656	6,358	3,108	2,275	2,416	49,512	
	19,259	20,292	19,999	5,121	4,409	20,260	21,411	21,398	5,567	4,648	4,917	151,702	

Table A6.3 Main effect regression coefficients for all estimated MAIHDA main effects models

	Life dissatisfaction				Psychosomatic complaints			
	Only individual level	MIPEX	Income equality	Gender equality	Only individual level	MIPEX	Income equality	Gender equality
Intercept	1.95* (1.83,2.06)	2.36* (2.28,2.45)	1.95* (1.83,2.06)	1.99* (1.87,2.12)	5.16* (4.84,5.47)	5.60* (5.38,5.82)	5.12* (4.80,5.43)	5.26* (4.91,5.59)
Age	0.22* (0.21,0.22)	0.21* (0.21,0.22)	0.22* (0.21,0.22)	0.22* (0.21,0.22)	0.59* (0.57,0.61)	0.64* (0.62,0.66)	0.59* (0.57,0.60)	0.59* (0.57,0.60)
Girl	0.31* (0.25,0.37)	0.34* (0.30,0.39)	0.31* (0.26,0.36)	0.29* (0.23,0.36)	2.27* (2.18,2.36)	2.35* (2.25,2.45)	2.28* (2.18,2.39)	2.22* (2.08,2.36)
Immigrant	0.21* (0.14,0.27)	0.20* (0.15,0.25)	0.19* (0.14,0.24)	0.21* (0.15,0.28)	0.49* (0.39,0.59)	0.48* (0.37,0.59)	0.47* (0.35,0.58)	0.52* (0.37,0.66)
Middle SES	-0.30* (-0.37,-0.23)	-0.30* (-0.36,-0.24)	-0.30* (-0.36,-0.24)	-0.32* (-0.40,-0.23)	-0.28* (-0.39,-0.17)	-0.29* (-0.42,-0.16)	-0.28* (-0.41,-0.15)	-0.28* (-0.46,-0.10)
High SES	-0.51* (-0.59,-0.43)	-0.50* (-0.57,-0.45)	-0.52* (-0.58,-0.47)	-0.54* (-0.64,-0.47)	-0.29* (-0.40,-1.80)	-0.34* (-0.50,-0.18)	-0.30* (-0.40,-0.17)	-0.29* (-0.52,-0.11)
Stratum variance random effects: Null model								
Between	0.14	0.10	0.10	0.11	2.15	1.77	1.57	1.48
Within	3.22	3.12	3.21	3.20	31.02	30.06	30.97	30.99
Stratum variance random effects: Main effects model								
Between	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.01
Within	3.22	3.09	3.15	3.15	31.02	29.22	29.86	29.85

Note. Models were additionally adjusted for survey country. Bayesian 95% Credible Interval in parentheses. Reference groups are: natives, low family SES, and boys.
*, $p < 0.001$.

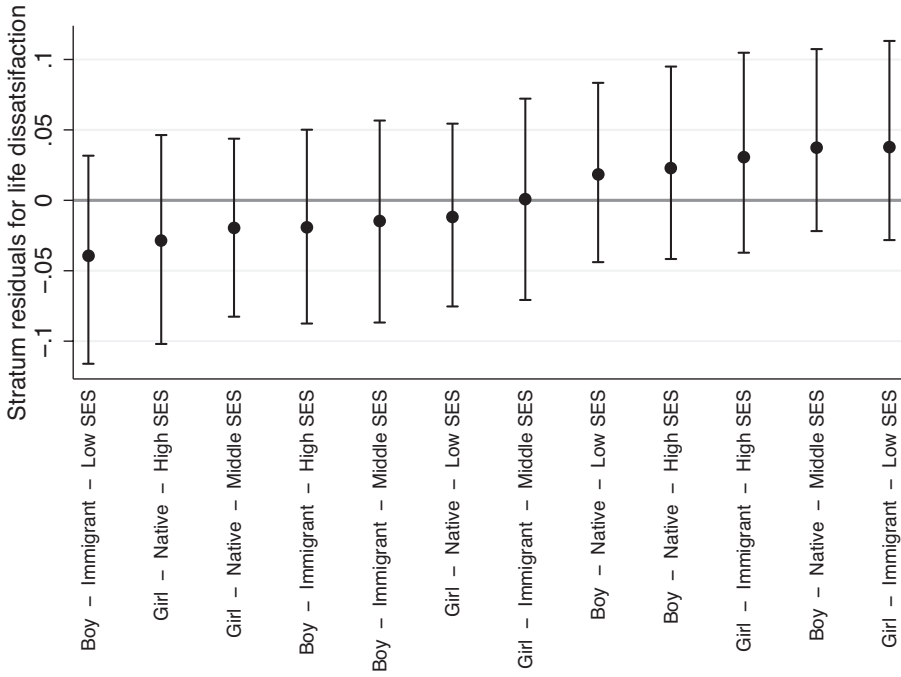


Figure A6.1 Stratum-level residuals with Bayesian 95% Credible Intervals for life dissatisfaction with individuals nested in strata according to only individual-level variables.

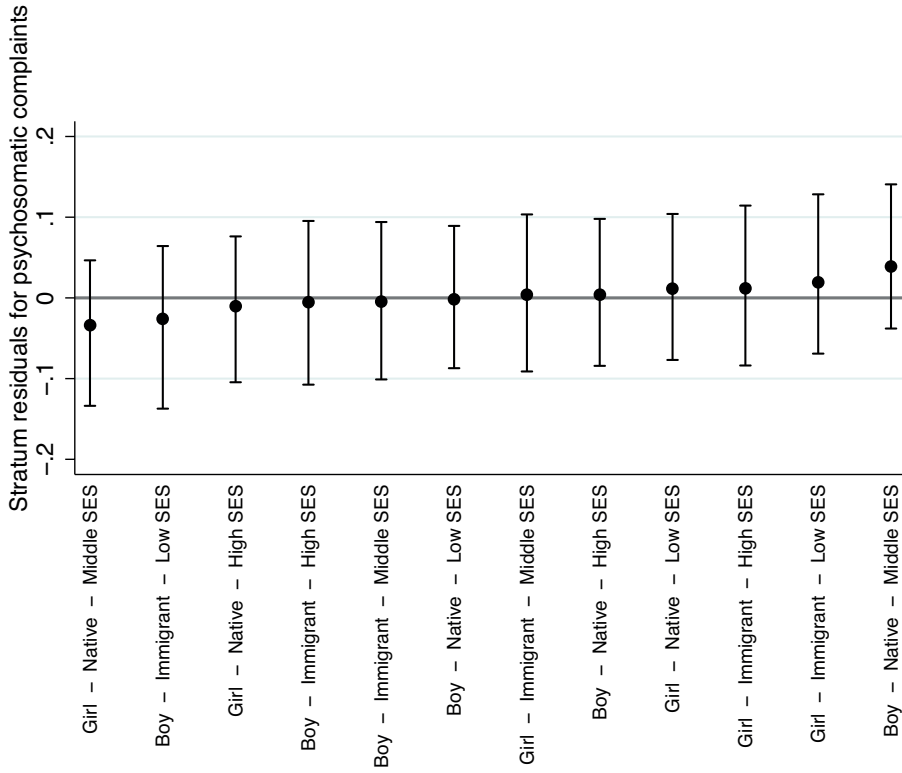


Figure A6.2 Stratum-level residuals with Bayesian 95% Credible Intervals for psychosomatic complaints with individuals nested in strata according to only individual-level variables.

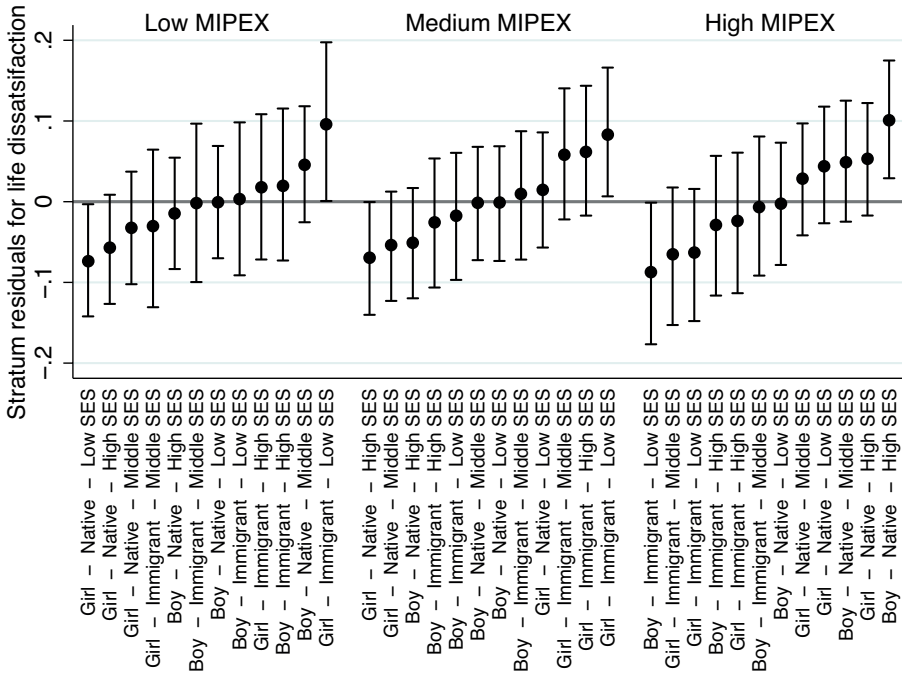


Figure A6.3 Stratum-level residuals with Bayesian 95% Credible Intervals for life dissatisfaction with individuals nested in strata according to individual-level variables and national-level migration and integration policies.

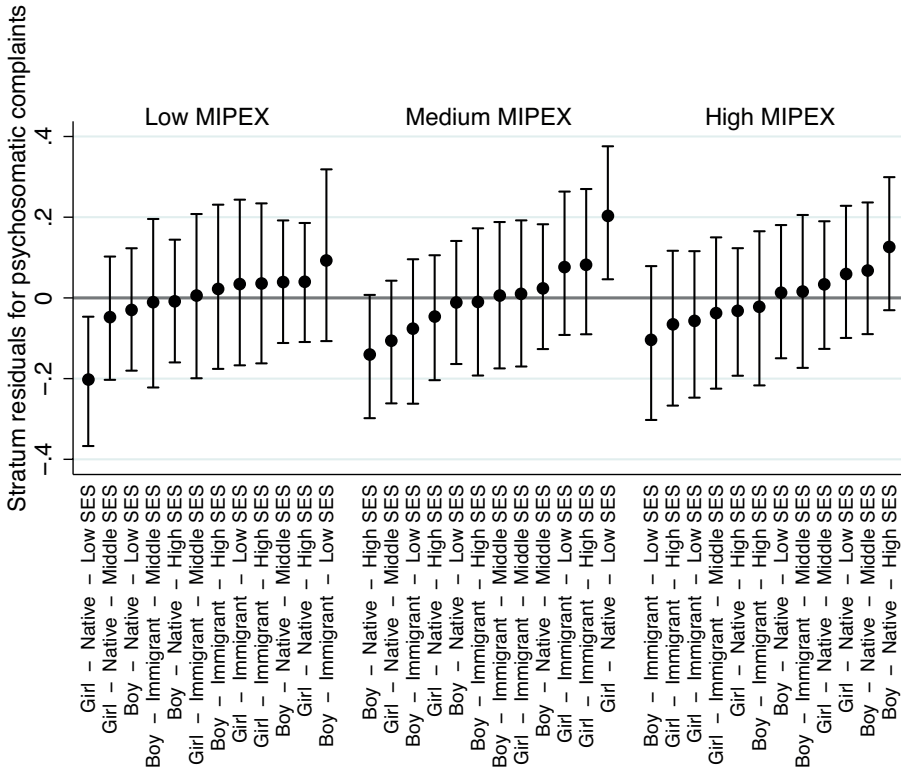


Figure A6.4 Stratum-level residuals with Bayesian 95% Credible Intervals for psychosomatic complaints with individuals nested in strata according to individual-level variables and national-level migration and integration policies.

Intersectionality and adolescent mental well-being: **A cross-nationally comparative analysis of the interplay between immigration background, socioeconomic status and gender**

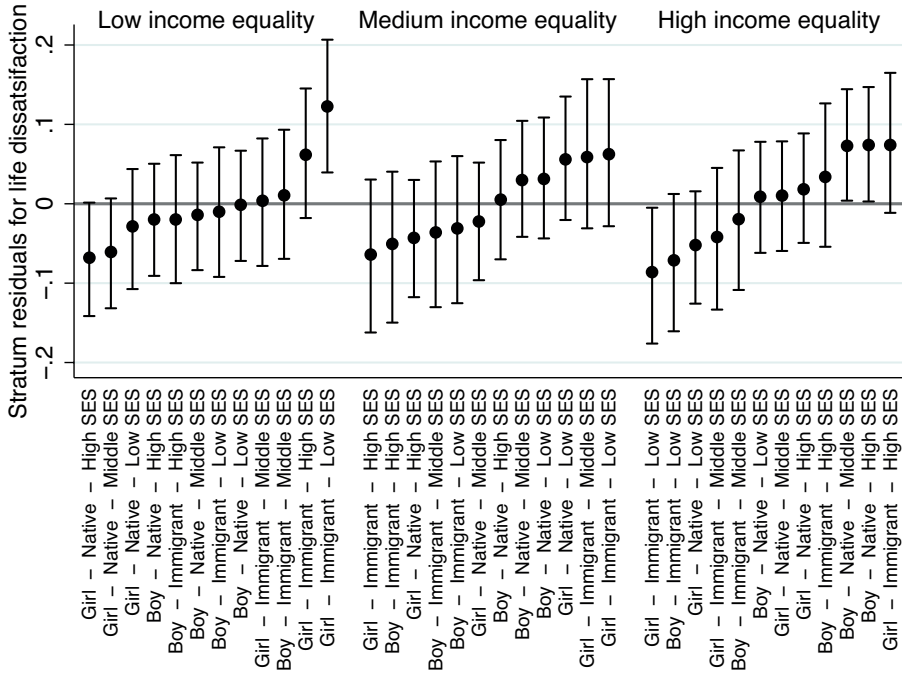


Figure A6.5 Stratum-level residuals with Bayesian 95% Credible Intervals for life dissatisfaction with individuals nested in strata according to individual-level variables and national-level income equality.

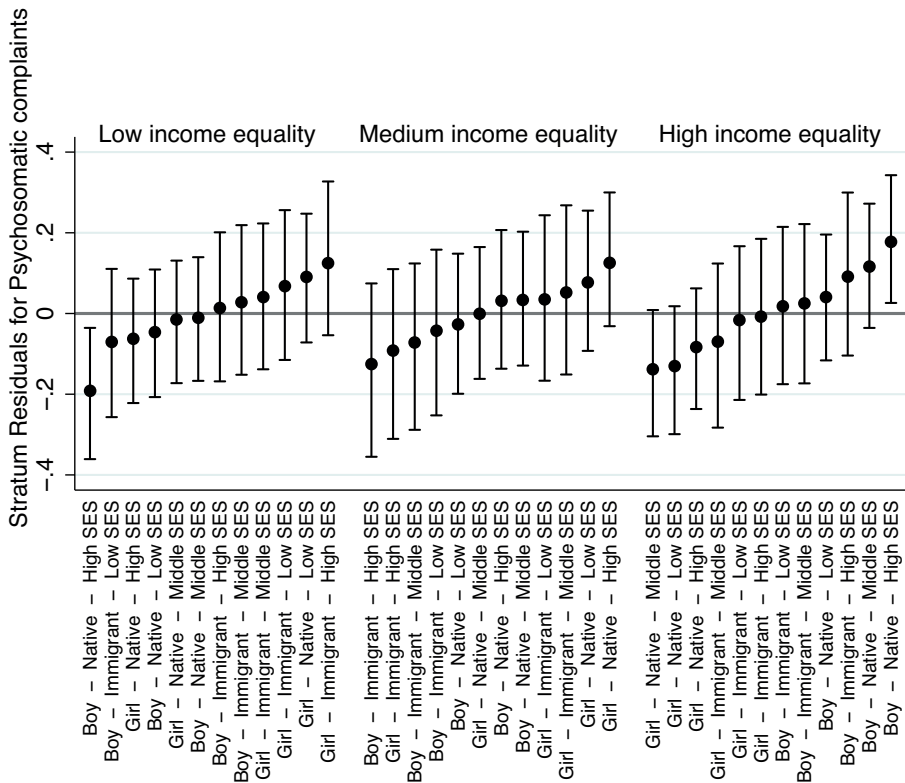


Figure A6.6 Stratum-level residuals with Bayesian 95% Credible Intervals for psychosomatic complaints with individuals nested in strata according to individual-level variables and national-level income equality.

Intersectionality and adolescent mental well-being: **A cross-nationally comparative analysis of the interplay between immigration background, socioeconomic status and gender**

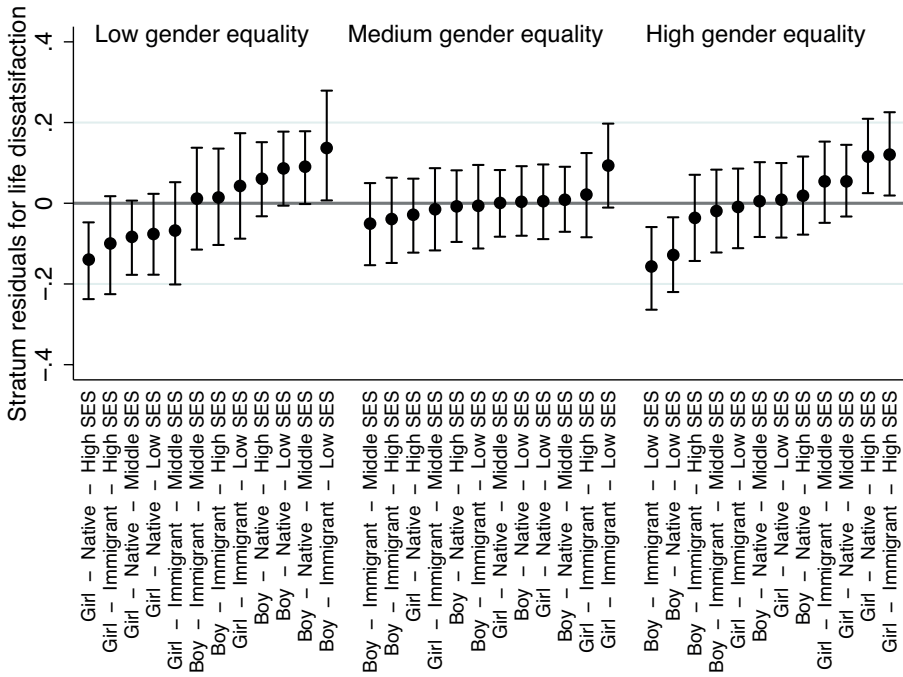


Figure A6.7 Stratum-level residuals with Bayesian 95% Credible Intervals for life dissatisfaction with individuals nested in strata according to individual-level variables and national-level gender equality.

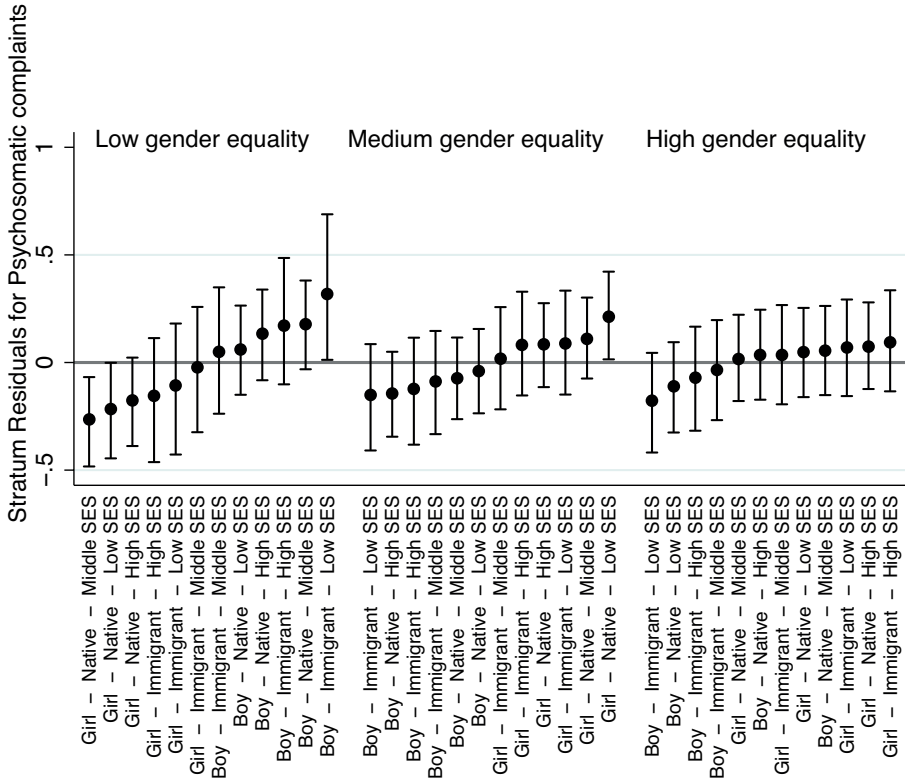


Figure A6.8 Stratum-level residuals with Bayesian 95% Credible Intervals for psychosomatic complaints with individuals nested in strata according to individual-level variables and national-level gender equality.



The background of the page is a repeating pattern of orange line-art human profiles. The profiles are arranged in a grid, with some facing left and some facing right, creating a sense of a diverse crowd. The lines are thin and consistent in color.

Summary and discussion

The present thesis aimed to increase our scientific knowledge on social inequalities in adolescent mental health in the Netherlands, and to examine the role of the national context in which these social inequalities in adolescent mental health should be understood. I focused on social inequalities in adolescent mental health related to: family affluence (a measure of family SES), immigration background, adolescent educational level, and/or gender. In the remainder of the discussion I refer to these as *social inequality indicators*.

Summary of main findings

Did (social inequalities in) adolescent mental health problems in the Netherlands increase over the last decade(s)? According to **Chapter 2**, this does not seem to be the case. Chapter 2 showed that Dutch adolescent mental health problems were relatively stable between 2003 and 2013. The same accounted for immigration background, adolescent educational level, and gender differences in these trends. Thus, trends in mental health problems were rather stable, and persistent social inequalities in Dutch adolescents' mental health problems were found. Adolescents with a non-western immigration background reported higher levels of conduct problems and native Dutch adolescents reported higher levels of hyperactivity-inattention problems. Adolescents in lower educational levels reported more conduct problems, peer relationship problems, and hyperactivity-inattention problems compared to adolescents in higher educational levels. Girls reported higher levels of emotional problems than boys, and boys reported higher levels of conduct problems than girls.

Chapter 3 focused on one of these persistent social inequalities: differences in mental health problems between non-western immigrant adolescents and native Dutch adolescents. Using data from the 2017 Dutch HBSC study, this chapter showed that non-western immigrant adolescents were at a higher risk for conduct problems and peer relationship problems than native Dutch adolescents. Family affluence and adolescent educational level explained only a very small proportion of these differences. In addition, the higher risk of non-western immigrants for conduct problems and peer relationship problems was highly similar across different family affluence levels, adolescent educational levels, and boys and girls. Hence, generally speaking, these social inequality indicators did not exacerbate or mitigate the relation between immigration background and adolescent mental health problems. Thus, the association between immigration background and adolescent mental health problems was found to be largely independent of family affluence, adolescent educational level, and gender.

Chapter 4 built upon the findings of Chapter 3 that other factors than family affluence and adolescent educational level may account for differences in mental health problems between non-western immigrant and native Dutch adolescents. In this chapter, the role of adolescents' subjective perceptions of personally experiencing unfair and negative treatments because of their social group memberships (i.e., perceived discrimination) as an explanation for social inequalities in adolescent mental health problems related to family affluence, immigration background, and gender was tested. Interestingly and unexpectedly, we found that the three different types of perceived discrimination that we intended to measure (i.e., family SES-, immigration background-, and gender-based perceived discrimination) were highly correlated, and better represented as one factor than as three factors. Using this one-factor model measuring more general perceptions of discrimination, the results indicated that non-western immigrant adolescents are far more likely to perceive discrimination than native Dutch adolescents and this in turn explained their higher risk for conduct problems and peer relationship problems. No differences in perceived discrimination according to family affluence were found and although boys perceived somewhat higher levels of discrimination than girls, this did not explain their higher risk for conduct problems. Thus, the results revealed that perceived discrimination is an important explanatory factor for the higher levels of conduct problems and peer relationship problems reported by non-western immigrants as compared to native Dutch adolescents.

In **Chapter 5**, we established a revised version of the problem scales of the self-report Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), the SDQ-R, by removing the five reverse worded items of the self-report SDQ. The SDQ-R allowed for valid cross-country comparisons of adolescent mental health problems across seven countries of different regions in Europe. As the SDQ-R also provided a much better fit to the Dutch data, we also used the SDQ-R in Chapter 3 and Chapter 4 of this thesis. By establishing the SDQ-R, we contributed to the methodological challenges that researchers face when conducting cross-country comparisons of adolescent mental health. Largely in line with previous international comparative findings on subjective well-being, Greek adolescents scored on the top of the countries' ranking, whereas Polish adolescents scored at the bottom. Adolescents in the Netherlands reported the most divergent pattern of mental health problems. They reported the lowest levels of conduct problems, low levels of emotional problems and peer relationship problems, but the highest levels of hyperactivity-inattention problems compared to their age-mates in six other European countries.

Chapter 6 built upon the findings from Chapter 3 by conducting a cross-nationally comparative analysis of the interplay of family socioeconomic status (SES) (i.e., family

affluence), immigration background, and gender on adolescent mental health. Extending the findings of Chapter 3, no evidence was found for an interplay of family affluence, immigration background, and gender on adolescent mental health across the 33 included countries. Thus, these three social inequality indicators did not exacerbate or mitigate each other's impact on adolescent mental health; adolescents belonging to particular combinations of social groups did not report better or worse mental health than expected based on just adding up effects from their separate social group memberships. However, once national-level characteristics of countries (income equality, migration and integration policies, gender equality) were considered, some evidence for an interplay between social inequality indicators and adolescent mental health was found. In countries with relatively high levels of income equality and immigrant inclusivity, adolescents belonging to multiple socially disadvantaged groups (i.e., low family SES, immigration background, girls) seemed better off than expected based on adding up the effects of the separate social group memberships. The opposite was found for adolescents belonging to multiple socially advantaged groups (i.e., middle or high family SES, natives, boys), they seemed worse off than expected based on additive effects. Results for national-level gender equality pointed in the same direction, but were somewhat counterintuitive for girls. In countries with relatively high levels of gender equality, low SES boys reported more life satisfaction than expected, whereas high SES girls reported less life satisfaction than expected. Thus, to understand social inequalities in adolescent mental health the role of the national context should be considered.

Table 7.1 provides an overview of the gaps of knowledge, research questions, data and mental health measures used, methods, main findings and conclusions for each chapter.

Integrated key findings

Combining the findings of this thesis, six key findings stand out. I discuss these key findings below.

Key finding 1: Small but persistent social inequalities in adolescent mental health problems in the Netherlands

Integrating the findings of the first three chapters of this thesis, it was found that inequalities in adolescent mental health problems according to family affluence, immigration background, adolescent educational level, and gender were small in size, except for gender differences in emotional problems. Both the level of mental health problems reported by the general population of Dutch adolescents as well as inequalities in mental health problems according to immigration background, educational level, and gender were rather stable across time. Recent studies have largely supported the stability of mental health problems among national representative samples of Dutch adolescents (11-16 years) (Weinberg, Stevens, Duinhof, & Finkenauer, 2019) and young adults (19-24 years) (Van der Velden, Das, & Muffels, 2019) as well as the stability of inequalities according to family affluence and adolescent educational level in adolescent mental health in the Netherlands (Weinberg et al., 2019) during the last decades. Thus, although there does not seem to be cause for growing concern about adolescent mental health in the Netherlands, there is cause for concern about the stability of social inequalities in adolescent mental health problems.

The stability of these social inequalities in adolescent mental health might be considered surprising, as societal changes occurred in the Netherlands during the last decades that might have increased social inequalities in adolescent mental health. To illustrate, there is evidence of a reduction of adolescents attending the lowest educational levels (Statistics Netherlands, 2020; Weinberg et al., 2019). This might stem from the negative reputation of these lower educational levels as potentially limiting future career options and including a relatively high number of students with motivational- and behavioral problems (The Education Council, 2015). This negative reputation might make these lower educational levels a less attractive option for parents and adolescents (The Education Council, 2015). With parents and adolescents being motivated to avoid the lower educational levels, it might be that these educational levels are increasingly occupied by adolescents with relatively more learning difficulties and mental health problems (Weinberg et al., 2019). There is also evidence of an increasingly less tolerant social and political climate towards immigrants in the Netherlands (Geddes & Scholten, 2016; Thijs et al., 2018)¹. This might imply that

¹ See also <http://www.mipex.eu/netherlands>

Table 7.1 Summary per chapter

	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
Gaps of knowledge	There is a lack of recent studies on trends in Dutch adolescent mental health problems including multiple measurement moments with small time intervals. Moreover, research on immigration background, adolescent educational level, and gender differences in these trends is scarce.	In Europe, studies generally find that immigrant adolescents are at a higher risk for mental health problems than native adolescents. It is theorized that SES and gender may play an important role in this social inequality, but this is hardly examined.	Studies found social inequalities in perceptions of discrimination. Moreover, the relation between perceptions of discrimination and poor adolescent mental health is well-established. This suggests that perceptions of discrimination might explain social inequalities in adolescent mental health, but studies testing this hypothesis are rare.	The self-report SDQ is a highly relevant questionnaire for cross-country comparisons of adolescent mental health problems, but studies show that it is not suited for this purpose in its current form.	Little is known about the interplay between family affluence, immigration background, and gender on adolescent mental health, and how this interplay varies with characteristics of the national context.
Research questions	Did Dutch adolescent mental health problems change between 2003 and 2013? Did these trends vary with the immigration background, educational level, and gender of the adolescent?	To what extent can the relation between immigration background and adolescent mental health problems be explained by adolescents' family affluence and educational level? and does this relation differ with adolescents' family affluence, educational level, or gender?	To what extent are social inequalities (according to family affluence, immigration background, and gender) in adolescent mental health problems explained by perceptions of discrimination based on family SES, immigration background, and gender?	Evaluate and establish a version of the self-report SDQ that allows for valid cross-country comparisons of adolescent mental health problems and examine cross-country variation in these mental health problems.	Is there an interplay between family affluence, immigration background, and gender on adolescent mental health? Does this interplay between family affluence, immigration background, and gender vary with characteristics of the national context (national-level income equality, migration and integration policies, and gender equality)?
Data	2005, 2009, and 2013 data from the Dutch HBSC study. 2003 and 2007 data from the Dutch National School Survey on Substance Use	2017 Dutch HBSC study	2017 Dutch HBSC study	International HBSC data from Poland (2005), Germany (2009), Greece (2009), Bulgaria (2013), the Netherlands (2013), Slovenia (2013), and Romania (2013)	The 2017 International HBSC data from 33 countries
Measures	Conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems using the original self-report SDQ.	Conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems using the SDQ-R.	Conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems using the SDQ-R.	Conduct problems, emotional symptoms, peer relationship problems, and hyperactivity-inattention problems using the original self-report SDQ.	Life dissatisfaction using the Cantril Ladder. Psychosomatic complaints using the HBSC multiple health complaints checklist.

Main findings				
<p>Small to negligible changes in mental health problems between 2003 and 2013.</p> <p>Rather stable differences in the mental health problems reported by native Dutch and non-western immigrant adolescents.</p> <p>Rather stable differences in the mental health problems reported by adolescents in vocational and academic educational levels.</p> <p>Some significant changes in gender differences over time, but the size of gender differences was highly comparable across time points.</p>	<p>Non-western immigrant adolescents reported lower levels of family affluence and higher levels of conduct problems and peer relationship problems than native Dutch adolescents.</p> <p>A significant, but very small explanatory role for family affluence was found.</p> <p>Educational level had only, very limited, explanatory power via family affluence.</p> <p>Differences in the mental health problems of non-western immigrant and native Dutch adolescents were largely comparable across different family affluence levels, educational levels, and between boys and girls.</p>	<p>The three different types of perceived discrimination (family SES-, immigration background-, and gender-based) were highly correlated, and better represented as one factor than as three factors.</p> <p>No family affluence differences in perceptions of discrimination were found.</p> <p>Non-western immigrant adolescents perceived far more discrimination than native Dutch adolescents and this explained their higher risk for conduct problems and peer relationship problems.</p> <p>Boys perceived somewhat more discrimination than girls, but this hardly explained their higher risk for conduct problems.</p>	<p>After removing the five reverse worded items of the self-report SDQ a good-fitting, common measurement model was found; the SDQ-R, and partial measurement invariance was established.</p> <p>Using the SDQ-R, Greek adolescents reported relatively low levels of mental health problems, Polish adolescents reported relatively high levels of mental health problems, and Dutch adolescents had the most divergent profile of mental health problems. They reported relatively low levels of conduct problems, emotional problems, and peer relationship problems, but the highest levels of hyperactivity-inattention problems.</p>	<p>No evidence for an interplay of family affluence, immigration background, and gender across all 33 countries was found.</p> <p>In countries with relatively low levels of income equality and immigrant inclusivity, adolescents belonging to multiple socially disadvantaged groups were doing worse than expected, whereas adolescents belonging to socially advantaged groups were doing better than expected.</p> <p>In countries with relatively high levels of income equality and immigrant inclusivity, adolescents belonging to multiple disadvantaged groups were doing better than expected, whereas adolescents belonging to multiple socially advantaged groups were doing worse than expected.</p> <p>In countries with relatively high levels of gender equality, high SES girls were doing worse than expected, whereas low SES boys were better off than expected. Reversed effects were found in countries with relatively low levels of gender equality.</p>
<p>Between 2003 and 2013, population levels of adolescent mental health problems were rather stable as well as immigration background, educational level, and gender differences in these trends, indicating persistent social inequalities in adolescent mental health problems in the Netherlands.</p>	<p>The relation between immigration background and adolescent mental health problems is largely independent of family affluence, adolescent educational level, and gender.</p>	<p>Perceptions of discrimination play an important role in the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems as compared to native Dutch adolescents. Questions asking adolescents about their personal experiences of discrimination based on specific social group memberships might tap into a deeper, underlying tendency to perceive discrimination.</p>	<p>By establishing the SDQ-R, this study contributed to the methodological challenges researchers face when conducting cross-country comparisons of adolescent mental health.</p>	<p>To fully understand social inequalities in adolescent mental health, the interplay of social inequality indicators and national-level characteristics should be considered.</p>

Conclusion

immigrant adolescents are increasingly more likely to report mental health problems because of the less tolerant societal climate. However, such broader societal changes are often small in size and the impact of such broader societal changes on the daily life experiences of adolescents – that are more directly related to their mental health – may be limited. Still, a continued monitoring of social inequalities in adolescent mental health as well as studies examining the extent to which societal changes might underlie these social inequalities is relevant. Such information helps policymakers decide to which groups of adolescents they should attend to and what investments they can make to reduce social inequalities in adolescent mental health in the Netherlands.

Key finding 2: Social inequalities in adolescent mental health problems in the Netherlands vary with the type of mental health problem

Looking in more detail at these persistent social inequalities, we see that they vary with the type of mental health problem. Boys reported more conduct problems and girls reported more emotional problems. Non-western immigrant adolescents reported higher levels of conduct problems and peer relationship problems than their native Dutch peers, while native Dutch adolescents reported higher levels of hyperactivity-inattention problems. No differences in emotional problems were found. Thus, the findings of this thesis do not unequivocally support a *risk perspective* of immigration (suggesting that immigrant adolescents are at a higher risk for mental health problems) in the Netherlands. Our findings are supported by another Dutch study showing that 9- to 15-year-old Moroccan-Dutch and Turkish-Dutch immigrant adolescents report more conduct problems and peer relationship problems but less hyperactivity-inattention problems than native Dutch adolescents (Adriaanse et al., 2014).

Adolescents in less affluent families reported higher levels of conduct problems, emotional problems, and peer relationship problems than adolescents in more affluent families. Higher educated adolescents reported less conduct problems, peer relationship problems, and hyperactivity-inattention problems than their lower educated peers, while no differences in emotional problems were found between adolescents in different educational levels. In line with previous findings (e.g., Havas, Bosma, Spreeuwenberg, & Feron, 2009), these educational inequalities were more pronounced than inequalities according to family affluence.

Social inequalities were mainly found for externalizing problems (conduct problems, hyperactivity-inattention problems) and social problems (peer relationship problems) and not so much for internalizing problems (emotional problems). This illustrates that in order to gain a comprehensive understanding of social inequalities in adolescent mental

health different aspects of mental health problems should be taken into account. Most importantly, it raises the question why these social inequalities were mainly revealed for externalizing problems and social problems. A potential answer might lie in the different mechanisms underlying social inequalities in different types of adolescent mental health problems. To illustrate, according to the *general strain theory*, stressors that are perceived as unfair – such as personal experiences with discrimination – are more strongly related to externalizing problems than to internalizing problems (Agnew, 2001). Empirical evidence supports this theoretical notion: perceived discrimination is more strongly related to externalizing problems than to internalizing problems (Cave, Cooper, Zubrick, & Shepherd, 2020). The findings in this thesis were also in line with this, as we found that non-western immigrant adolescents were far more likely to perceive discrimination than their native Dutch peers and these perceptions of discrimination were more strongly related to conduct problems and peer relationship problems than to emotional problems. Although educational differences in perceptions of discrimination were not examined in this thesis, analyses of our data in another study showed that adolescents in lower educational levels were also more likely to perceive discrimination than their peers in higher educational levels (Duijnhof, Kuyper, & De Looze, 2018), suggesting that a similar mechanism might be at play for educational inequalities in adolescent mental health.

Key finding 3: Not family affluence and adolescent educational level, but perceptions of discrimination explain the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems

It was found that it is not the lower levels of family affluence of non-western immigrant adolescents or their educational level that explains their higher risk for conduct problems and peer relationship problems, but their subjective perceptions of being discriminated (i.e., unfairly and negatively treated by others because of their social group memberships). Once the higher level of perceived discrimination among non-western immigrants was considered, non-western immigrants also reported significantly lower levels of emotional problems than native Dutch adolescents. A previous study among Moroccan-Dutch and Turkish-Dutch youth also found that once the social disadvantaged position of non-western immigrant adolescents (including amongst others low family SES and perceived personal discrimination) was controlled for, they no longer reported higher levels of conduct problems and/or peer relationship problems and were at a lower risk for emotional problems (Adriaanse et al., 2014). By examining the explanatory role of perceived discrimination on its own,

our findings suggest that perceived discrimination may be the “core” risk factor of the social disadvantage that underlies non-western immigrant adolescents higher risk for conduct problems and peer relationship problems.

Adolescents’ perceptions of discrimination are thus an important factor to consider in intervention and prevention efforts to improve the mental health of non-western immigrant adolescents. However, our finding that items about perceptions of discrimination on the basis of three different social group memberships (i.e., family SES-, immigration background, and gender-based discrimination) tapped into one factor also illustrates that we need to gain much more knowledge on what adolescents’ perceptions of discrimination represent. To what extent do these perceptions of discrimination represent: (a) adolescents’ objective occurrences of discrimination (e.g., Blommaert, Coenders, & van Tubergen, 2014), (b) a “spill-over” effect of perceptions of discrimination on the basis of one social group membership to perceptions of discrimination on the basis of other social group memberships as adolescents are still developing their social identities, or (c) personality characteristics that increase adolescents’ generally tendency to perceive discrimination? Future experimental studies might, for example, test if adolescents who are exposed to one type of discrimination (e.g., immigration background-based discrimination) are also more likely to perceive other types of discrimination (e.g., gender- or family SES-based discrimination) and if such a “spill-over” effect varies with adolescents’ personality characteristics (e.g., hostility or rejection sensitivity), or social identity development.

Key finding 4: Adolescents in the Netherlands report relatively high levels of hyperactivity-inattention problems

Looking at the general population, on average, adolescents in the Netherlands reported rather low levels of mental health problems. Also when we compare Dutch adolescents to their European agemates in Bulgaria, Germany, Greece, Poland, Romania, and Slovenia, we see that the average level of mental health problems reported by adolescents in the Netherlands is relatively low. There is, however, one notable exception to this general pattern: adolescents in the Netherlands reported, on average, moderately high levels of hyperactivity-inattention problems and these levels were higher than those of their European agemates. Other studies confirm these generally higher levels of self-reported hyperactivity-inattention problems among adolescents in the Netherlands (Van der A, Giesbers, & Wijga, 2015; Verhulst et al., 2003). Thus, whereas in line with previous cross-country comparisons on subjective well-being (Bradshaw & Richardson, 2009; Klocke et al., 2014; Ravens-Sieberer, Erhart, Gosh, et al., 2008), adolescents in the Netherlands report relatively low levels

of mental health problems, this does not seem to be the case for hyperactivity-inattention problems. We found that it is the native Dutch adolescents and the non-western immigrant adolescents in relatively highly affluent families who reported these moderately high levels of hyperactivity-inattention problems. How can we explain these findings?

These findings might be understood in light of parents' and adolescents' attitudes towards hyperactive and inattentive behavior. Recent national and international comparative studies show that schoolwork pressure has increased considerably among adolescents in the Netherlands during the last decades (Cosma et al., 2020; Stevens et al., 2018), which may be a reflection of an increased pressure to perform academically in our Dutch society (e.g., Health Council of the Netherlands, 2014). As adolescent hyperactive and inattentive behaviors are associated with poor school performance (Frazier, Youngstrom, Glutting, & Watkins, 2007; Loe & Feldman, 2007), parents and adolescents may have become more sensitive for symptoms of hyperactive and inattentive behavior. Evidence of an especially steep increase in attention-deficit/hyperactivity disorder (ADHD) medication use in the Netherlands (Bachmann et al., 2017; Hodgkins, Sasané, & Meijer, 2011) and results indicating that ADHD medication use peaks among early to middle Dutch adolescence (Bachmann et al., 2017), may be indicative of such an increased sensitivity of Dutch parents and adolescents for hyperactive and inattentive behavior. This sensitivity might make Dutch adolescents more alert to symptoms of hyperactive and inattentive behavior (e.g., "I am restless", "I am easily distracted") and/or lower their threshold to report about these symptoms in questionnaires. This might explain why adolescents in the Netherlands reported relatively high levels of hyperactivity-inattention problems as compared to the other mental health problems and their European age-mates.

Especially higher SES parents who tend to have higher academic aspirations for their children (e.g., Davis-Kean, 2005) may be more sensitive and alert to signs of hyperactive and inattentive behavior in their children, which may then impact their children's attitudes as well. These lower tolerance levels among higher SES parents might explain why we did not find an SES gradient in hyperactivity-inattention problems, with children from families with a lower SES having a higher risk of ADHD (e.g., Russell, Ford, Williams, & Russell, 2016) (see Key finding 2). Among non-western immigrants, SES effects were even in the opposite direction, as we found that non-western immigrant adolescents in relatively highly affluent families reported *higher* levels of hyperactivity-inattention problems than non-western immigrant adolescents in less affluent families. Previous research showed that higher SES immigrants tend to have more contacts with native Dutch persons than lower SES immigrants (Martinović,

2013). As such, *especially* high SES non-western immigrant parents may take over the sensitivity of native Dutch parents for their children's hyperactive and inattentive behavior, which may also impact the attitudes of their children.

Our findings illustrate the need to better understand what drives these relatively high levels of hyperactivity-inattention problems. An examination of the attitudes of native Dutch and non-western immigrant adolescents and their parents (from different SES backgrounds) on hyperactivity-inattention problems might help us better understand whether Dutch adolescents are genuinely at a higher risk for hyperactivity-inattention problems or whether they are more sensitive towards it, and are therefore more likely to report higher levels of, hyperactive and inattentive behavior than other mental health problems. Asking adolescents and parents about their attitudes towards hyperactivity-inattention problems and the role of the school in shaping these attitudes (e.g., schoolwork pressure) might move the field forward.

Key finding 5: The national context shapes social inequalities in adolescent mental health

Do social inequality indicators interact in shaping adolescent mental health and put specific groups of adolescents at an increased risk for poor mental health as compared to their peers? Our findings showed that this depends at least partly upon characteristics of the national context. We found no strong evidence for an interplay between social inequality indicators on the mental health of adolescents in the Netherlands. Generally speaking, immigrant adolescents, both boys and girls, reported a higher risk for conduct problems and peer relationship problems than their native Dutch peers, irrespective of the level of affluence in their families or their own educational level. In addition, no evidence at all was found for the interplay of social inequality indicators in shaping the mental health of adolescents across 33 countries. However, this changed once characteristics of the national context were taken into consideration. Some evidence was found that in countries with relatively high levels of income equality and more inclusive immigration policies, social inequalities in adolescent mental health were somewhat reduced. For national-level gender equality, girls scores were somewhat counterintuitive: low SES boys benefitted from a gender equal national context whereas high SES girls did not. Thus, our findings underline the importance of including the role of the national context in studies examining social inequalities in adolescent mental health. To further enhance our knowledge on the interplay of social inequality indicators on adolescent mental health across different social contexts, we need studies that examine if our findings are generalizable to other characteristics of the national context (e.g., child and adolescent mental health policies

(Hendriks et al., 2019)), or characteristics of social contexts that are more proximal to adolescents (e.g., schools and classrooms).

Key finding 6: The SDQ-R is a more valid alternative to measure adolescent mental health problems than the original self-report SDQ

In this thesis we established a revised version of the problem subscales of the self-report SDQ: the SDQ-R. A good-fitting factor structure that allowed for valid cross-country comparisons of adolescent mental health problems across seven European countries was found, for which we had to remove the five reverse worded items of the self-report SDQ. This is an important finding as the SDQ is a widely used research instrument due to its' assets: it is short, freely available, translated into many languages, and taps into multiple aspects of adolescent mental health problems. These assets make the self-report SDQ also a highly relevant instrument for cross-national comparisons of adolescent mental health problems.

A vast amount of studies have evaluated the psychometric properties of the SDQ and have identified problems with the factor structure (e.g., Achenbach et al., 2008) and the five reverse worded items of the SDQ (e.g., Essau et al., 2012). Although it is highly relevant to evaluate the psychometric properties of the SDQ, I think that ultimately such evaluative efforts only help to move the field forward if something is done with the "flaws" of the SDQ that are identified. By not only evaluating the SDQ, but also establishing the SDQ-R (by *removing* the five reverse worded items), we made a pragmatic contribution to the ongoing debate about the factor structure of the SDQ (Achenbach et al., 2008), and the limited availability of instruments that can be adequately used for cross-national comparisons of adolescent mental health (Stevanovic et al., 2017).

Future studies to further evaluate and develop the self-report SDQ-R are encouraged. To evaluate the factor structure of the SDQ, researchers typically use confirmatory factor analyses (CFA), as we did in this thesis. Recently it has been argued that for psychological scales, like the SDQ, the criteria of CFA that items only tap into one underlying factor might be too strict. CFA analyses should therefore be supplemented with a more flexible method that allows items to load on multiple factors: exploratory structural equation modelling (ESEM; Asparouhov & Muthén, 2009) (Garrido et al., 2018). The few studies that used ESEM also have indicated issues with the reverse worded items of the SDQ (i.e., a positive wording effect, items not adequately measuring their intended factors, or more strongly loading on unintended factors) (Garrido et al., 2018; Vugteveen, de Bildt, Theunissen, Reijneveld, & Timmerman, 2019), which supports our decision to remove these items. However, removing the reverse worded items did – of

course – not solve all problems of the self-report SDQ (see for instance the still rather low internal consistency of the peer relationship problems scale). Researchers may want to supplement their CFA analysis with the ESEM method to evaluate and further develop the SDQ-R.

Strengths and limitations

Many of the strengths of this thesis lie in its use of data from the HBSC study. Every four years, this international study collects self-report data on the health and well-being of large and national representative samples of adolescents using a standardized research protocol. Due to its design, the HBSC study provides a unique opportunity to examine (social inequalities in) adolescents mental health in the Netherlands over time and cross-national variation in (social inequalities in) adolescent mental health. Moreover, as the HBSC study provides national representative samples of adolescents, our findings were generalizable to the overall population of adolescents in their respective countries. This makes the HBSC study an important source for policymakers, who are concerned with improving the health and well-being of the overall population of adolescents in their countries. Finally, the HBSC data allows for an identification of those groups of adolescents who are most at risk for poor mental health and therefore provides useful information to guide selective intervention and prevention efforts.

The strengths of the HBSC study also come with some limitations. First, our data were cross-sectional, which means that we cannot make claims about causality. Although for some of the associations that were examined in this thesis this is less problematic (e.g., having a low family affluence does not make you an immigrant) for other associations it can be more problematic (e.g., it might be that adolescents with more mental health problems end up in lower educational levels) (Conger et al., 2010). Future studies are needed to see if our findings in Chapter 3 and Chapter 4 can be replicated in longitudinal studies that can give more insight in the temporal ordering of effects. Second, the HBSC study is based on self-reports that may have provided a one-sided perspective on adolescent mental health problems. However, this does not mean that adolescents' self-reports of mental health are not important. Self-reported subjective well-being and self-reported mental health problems provide important insights in how adolescents think about their own mental health. This is especially relevant for internalizing mental health problems (directed at the self) that are not easily observed or recognized by others. Third, following the definition of the World Health Organization (e.g., Patton et al., 2016), by including 10- to 16-year-old adolescents the HBSC study does not cover the whole adolescence period (e.g., 10-19 years), but only early tot middle adolescence. Although the HBSC study has compelling reasons

to do so (e.g., Roberts et al., 2009), it means that our findings are not generalizable to adolescents older than 16 years. Finally, the countries included in the HBSC study are mainly located in Europe and North America. Even more, the SDQ (the questionnaire that was used to measure adolescent mental health problems in this thesis) is not a mandatory but an optional questionnaire. Consequently, our cross-country analysis of the SDQ in Chapter 5 included seven countries. Both limitations hampered the international generalizability of our findings.

Implications

Looking at the integrated key findings, three major implications for research and policy stand out. First, as our data are cross-sectional, a longitudinal study focusing on social inequalities in adolescent mental health that includes: (a) multiple mental health indicators, (b) multiple types of perceived discrimination, (c) personality characteristics, and (d) social identity measures on multiple timepoints are highly relevant. Such a longitudinal study may help us: (a) further unravel the direction of the relation between perceived discrimination and adolescent mental health, and (b) the role of personality characteristics and adolescents' social identity development in the relation between perceived discrimination and adolescent mental health.

Second, our findings show that specific groups of Dutch adolescents are consistently at higher risk for poor mental health. This highlights the relevance of selective prevention and intervention efforts targeting these at-risk groups of adolescents (e.g., adolescents with a non-western immigration background and adolescents in lower educational levels). As we found no strong evidence for an interaction between social inequality indicators on adolescent mental health, our finding suggest that these at-risk groups may be treated as relatively homogenous in their risk for poor mental health. Efforts aimed at reducing the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems should take the important role of perceived discrimination into account.

Finally, Chapter 3 and Chapter 6 were (partly) based on the *intersectionality theory* (Crenshaw, 1989) that argues that social inequality indicators should not be examined in isolation but simultaneously as they may jointly shape adolescents' social experiences of privilege and disadvantage and, subsequently, their developmental outcomes (Ghavami et al., 2016). Social inequality indicators may thus interact with each other and exacerbate or mitigate each other's impact on adolescent mental health. Intersectionality theory is receiving increasing attention in research and seems to have become somewhat of a "buzzword". Hence, not only from a policy perspective

(as discussed above) but also from a theoretical perspective it is interesting that we only found some evidence for interaction effects between social inequality indicators in specific national contexts. Future studies are encouraged to test if our findings replicate with other combinations of social inequality indicators and other indicators of adolescent mental health. In addition, it might well be the case that stronger evidence for the intersectionality theory is found in models using outcome variables that tap more directly into adolescents' social experiences (e.g., personal experiences with discrimination) instead of the developmental consequences of such experiences (e.g., mental health). As we found that perceived discrimination plays an important role in the higher risk of non-western immigrant adolescents for conduct problems and peer relationship problems, future studies examining the interplay between social inequality indicators on adolescents' subjective perceptions of personally experiencing discrimination are relevant. Such studies may help us identify *which* immigrant adolescents are at a particular high risk to perceive discrimination.

Conclusion

The results of this thesis indicate that adolescents in the Netherlands report, on average, relatively low levels of mental health problems. Hyperactivity-inattention problems form an exception: adolescents in the Netherlands report moderately high levels of hyperactivity-inattention problems and these are higher than those of their age-mates in six other European countries. Problem levels were relatively stable between 2003 and 2013, indicating that there is no cause for growing concern about adolescent mental health in the Netherlands. However, *small* but *persistent* immigration background, educational level, and gender differences in Dutch adolescents' mental health problems were found. This indicates that there is cause for concern about the stability of social inequalities in adolescent mental health problems in the Netherlands. Social inequalities varied with the type of mental health problems assessed, illustrating the importance of distinguishing between different aspects of adolescent mental health problems. The SDQ-R might be a useful instrument to do this, although further evaluation and development of this instrument may also be warranted. The persistent social inequalities that were found call for action and highlight the need for selective intervention and prevention efforts targeting at-risk groups of adolescents. As we found no strong evidence for an interplay between social inequality indicators on adolescent mental health in the Netherlands, *all* adolescents within these at-risk groups might benefit from these efforts.

Samenvatting

Psychische problemen hebben een grote impact op de levenskwaliteit van adolescenten (Gore et al., 2011). Mentale gezondheid behelst echter meer dan de afwezigheid van psychische problemen, het is: "Een staat van welzijn, waarin een individu zijn of haar eigen vaardigheden kent, kan omgaan met stressvolle situaties in het leven, productief kan werken en een bijdrage kan leveren aan zijn of haar omgeving" (World Health Organization, 2001, p. 1). In dit proefschrift besteed ik aandacht aan beide aspecten van mentale gezondheid, zowel *mentaal welbevinden* (levenstevredenheid) als *psychische problemen* (gedragsproblemen, emotionele problemen, problemen met leeftijdsgenoten, hyperactiviteit, psychosomatische klachten).

Internationaal vergelijkend onderzoek laat zien dat adolescenten in Nederland hoog scoren op mentaal welbevinden, ze behoren tot de "gelukkigste jongeren van de wereld" (Bradshaw & Richardson, 2009; De Looze et al., 2018; Klocke et al., 2014). Dit betekent echter niet dat het met *alle* adolescenten in Nederland goed gaat. Wereldwijd – en dus ook in Nederland – zijn er duidelijke verschillen in de mentale gezondheid tussen groepen adolescenten (o.a., Inchley et al., 2016). Recente Nederlandse cijfers laten zien dat adolescenten uit gezinnen met een lagere gezinswelvaart, gezinnen met een niet-westerse migratieachtergrond en adolescenten met een lager schoolniveau over het algemeen een lager niveau van mentaal welbevinden en/of meer psychische problemen rapporteren dan hun leeftijdsgenoten uit gezinnen met een hogere gezinswelvaart, gezinnen zonder migratieachtergrond en adolescenten met een hoger schoolniveau. Ook rapporteren meisjes meer emotionele problemen dan jongens en jongens meer gedragsproblemen dan meisjes (Stevens et al., 2018). In dit proefschrift richt ik mij op de manier waarop deze sociale verschillen (op basis van gezinswelvaart, migratieachtergrond, schoolniveau van jongeren en/of sekse) doorwerken in de mentale gezondheid van jongeren. Ik refereer aan deze sociale verschillen als *indicatoren van sociale ongelijkheid* in mentale gezondheid.

Het eerste doel van dit proefschrift is om meer inzicht te krijgen in sociale ongelijkheid in de mentale gezondheid van adolescenten in Nederland. We onderzoeken: (a) in hoeverre (sociale ongelijkheid in) psychische problemen is veranderd in de laatste decennia (**Hoofdstuk 2**), (b) in hoeverre verschillende indicatoren van sociale ongelijkheid elkaars effecten op psychische problemen versterken of verzwakken (**Hoofdstuk 3**), en (c) mogelijke verklaringen voor sociale ongelijkheid in psychische problemen van adolescenten in Nederland (**Hoofdstuk 3, Hoofdstuk 4**). Het tweede doel van dit proefschrift is om de rol van de nationale context in sociale ongelijkheid in de mentale gezondheid van adolescenten te onderzoeken. Allereerst is de validiteit van de Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) voor vergelijkingen

van door jongeren uit verschillende landen gerapporteerde psychische problemen onderzocht (Hoofdstuk 5). Daarnaast is onderzocht in hoeverre gezinswelvaart, migratieachtergrond en sekse elkaars effecten op de mentale gezondheid van adolescenten beïnvloeden (versterken of verzwakken) en in welke mate dit varieert met kenmerken van de nationale context (nationale inkomensgelijkheid, nationale wet- en regelgeving ten aanzien van migranten, nationale seksegelijkheid) (Hoofdstuk 6).

Het Health Behaviour in School-aged Children (HBSC) onderzoek

Alle hoofdstukken in dit proefschrift zijn gebaseerd op de data van het Health Behaviour in School-aged Children (HBSC) onderzoek. HBSC is een internationaal, cross-sectioneel onderzoek naar de gezondheid en het welzijn van adolescenten in de leeftijd van 10 tot en met 16 jaar. Het onderzoek wordt elke vier jaar uitgevoerd onder een landelijk representatieve steekproef van scholieren in meer dan 40 landen in Europa, Noord-Amerika en Israël. Om de vergelijkbaarheid van resultaten tussen landen te bevorderen wordt gebruik gemaakt van een gestandaardiseerd onderzoeksprotocol. Voor meer informatie over het onderzoeksdesign, de dataverzameling en de steekproef zie Roberts en collega's (2009) en Stevens en collega's (2018). Hoofdstuk 2 tot en met Hoofdstuk 4 zijn gebaseerd op de Nederlandse data van het HBSC-onderzoek en Hoofdstuk 5 en Hoofdstuk 6 zijn gebaseerd op de internationale data van het HBSC-onderzoek.

Kernbevindingen

Op basis van de resultaten van dit proefschrift komen een aantal kernbevindingen naar voren. Ten eerste, **er zijn kleine maar hardnekkige verschillen op basis van gezinswelvaart, migratieachtergrond, schoolniveau en sekse in psychische problemen van adolescenten in Nederland, waarbij deze verschillen variëren met het type probleem.** Adolescenten uit gezinnen met een lage welvaart rapporteren meer gedragsproblemen, emotionele problemen en problemen met leeftijdsgenoten dan adolescenten uit gezinnen met een hogere welvaart. Adolescenten met een niet-westerse migratieachtergrond rapporteren meer gedragsproblemen, problemen met leeftijdsgenoten en minder hyperactiviteit dan adolescenten zonder een migratieachtergrond. Leerlingen in de basis- en kaderberoepsgerichte leerweg van het VMBO rapporteren meer gedragsproblemen, problemen met leeftijdsgenoten en hyperactiviteit dan leerlingen in de theoretische en gemengde leerweg van het VMBO, HAVO-leerlingen en VWO-leerlingen. Meisjes rapporteren meer emotionele problemen dan jongens en jongens rapporteren meer gedragsproblemen dan meisjes. Uit het

trendonderzoek in Hoofdstuk 2 blijkt dat Nederlandse adolescenten vrij vergelijkbare niveaus van psychische problemen rapporteren tussen 2003 en 2013. Verschillen in psychische problemen op basis van migratieachtergrond, schoolniveau en sekse zijn eveneens relatief stabiel tussen 2003 en 2013. Bovendien laat ander recent onderzoek in Nederland zien dat ook deze verschillen op basis van gezinswelvaart stabiel zijn in de laatste decennia (zie Weinberg et al., 2019).

Ten tweede, **niet gezinswelvaart en schoolniveau, maar ervaren discriminatie lijkt een belangrijke rol te spelen in het hogere risico van adolescenten met een niet-westerse migratieachtergrond op gedragsproblemen en problemen met leeftijdsgenoten.** In Hoofdstuk 3 is onderzocht of gezinswelvaart en schoolniveau verschillen in psychische problemen tussen jongeren met een niet-westerse migratieachtergrond en jongeren zonder een migratieachtergrond mogelijk verklaren. In tegenstelling tot de verwachting, is geen verschil in schoolniveau tussen deze twee groepen jongeren gevonden. Jongeren met een niet-westerse migratieachtergrond rapporteren wel een lagere gezinswelvaart, maar dit verklaart hun verhoogde risico op gedragsproblemen en problemen met leeftijdsgenoten nauwelijks. In Hoofdstuk 4 is onderzocht in hoeverre ervaren discriminatie (op basis van gezinsinkomen, migratieachtergrond en sekse) verschillen in psychische problemen van jongeren naar gezinswelvaart, migratieachtergrond en sekse kan verklaren. De resultaten laten zien dat de drie verschillende vormen van ervaren discriminatie (op basis van gezinsinkomen, migratieachtergrond en sekse) heel sterk met elkaar samenhangen en daarom beter gerepresenteerd kunnen worden als één onderliggend construct dan als drie verschillende constructen. Dit algemene construct van de mate waarin jongeren discriminatie ervaren op basis van verschillende groepslidmaatschappen lijkt een belangrijke verklarende rol te spelen in het verhoogde risico van niet-westerse migranten op gedragsproblemen en problemen met leeftijdsgenoten.

Ten derde, **in vergelijking met Europese leeftijdsgenoten rapporteren adolescenten in Nederland relatief vaak hyperactiviteit.** De resultaten van dit proefschrift laten zien dat, over het algemeen gesproken, adolescenten in Nederland relatief weinig psychische problemen rapporteren (gemiddeld rond de twee op een schaal van nul tot tien). Hoofdstuk 5 laat zien dat ook als we adolescenten in Nederland vergelijken met hun leeftijdsgenoten in zes andere Europese landen het niveau van zelfgerapporteerde psychische problemen door adolescenten in Nederland relatief laag is. Er is echter één uitzondering op dit algemene patroon: adolescenten in Nederland rapporteren gemiddeld genomen hogere niveaus van hyperactiviteit (gemiddeld rond de vier op een schaal van nul tot tien) en dit niveau van hyperactiviteit

is ook het hoogst vergeleken met adolescenten uit Bulgarije, Duitsland, Griekenland, Polen, Roemenië en Slovenië.

Ten vierde, **om een beter beeld te krijgen van de mate waarin er sprake is van sociale ongelijkheid in de mentale gezondheid van adolescenten, is het relevant om rekening te houden met kenmerken van de nationale context waarin adolescenten opgroeien.** In Hoofdstuk 3 is ook gekeken of de relatie tussen migratieachtergrond en psychische problemen van adolescenten varieerde met hun niveau van gezinswelvaart, schoolniveau en sekse. We vonden hier geen sterk bewijs voor. Over het algemeen versterkten of verzwakten gezinswelvaart, schoolniveau en sekse de relatie tussen migratieachtergrond en psychische problemen van adolescenten niet. In Hoofdstuk 6 staat de vraag centraal: hebben jongeren die tot meerdere risicogroepen behoren (adolescenten uit gezinnen met een lage welvaart, adolescenten met een migratieachtergrond, meisjes) meer risico op een lager mentaal welbevinden of meer psychische problemen omdat de verschillende risico's elkaar versterken? In overeenstemming met de resultaten van Hoofdstuk 3, is hiervoor geen bewijs gevonden. Echter, dit beeld veranderde enigszins toen kenmerken van de nationale context (nationale inkomensgelijkheid, nationale wet- en regelgeving ten aanzien van migranten, nationale seksegelijkheid) werden meegenomen in de analyses. In landen met een meer inclusieve wet- en regelgeving ten aanzien van migranten en meer inkomensgelijkheid rapporteren adolescenten die tot meerdere risicogroepen behoren een hoger mentaal welbevinden dan verwacht. Het omgekeerde is het geval voor adolescenten die tot meerdere geprivilegieerde groepen behoren (adolescenten zonder een migratieachtergrond, adolescenten uit gezinnen met een hogere welvaart, jongens), zij rapporteren een lager mentaal welbevinden en meer psychische problemen dan verwacht. Voor seksegelijkheid zijn de resultaten grotendeels vergelijkbaar, alleen de resultaten voor meisjes zijn enigszins contra-intuïtief: in meer seksegelijke landen rapporteren jongens uit gezinnen met een lage gezinswelvaart een hogere mate van mentaal welbevinden, terwijl meisjes uit gezinnen met een hoge gezinswelvaart juist een lagere mate van mentaal welbevinden rapporteren dan verwacht.

Ten slotte, **de SDQ-R is een meer valide instrument om psychische problemen te meten dan de originele zelfrapportage versie van de SDQ.** In Hoofdstuk 5 is onderzoek gedaan naar de validiteit van de door jongeren gerapporteerde en veelvuldig gebruikte versie van de SDQ om psychische problemen van adolescenten in zeven Europese landen met elkaar te vergelijken (Nederland, Bulgarije, Duitsland, Griekenland, Polen, Roemenië en Slovenië). De SDQ heeft vijf positief in plaats van negatief geformuleerde items (dat wil zeggen vragen waarop een hogere score minder in plaats van meer psychische problemen veronderstelt) en verschillende onderzoekers

hebben gesuggereerd dat deze items (mede)verantwoordelijk zijn voor de beperkte validiteit van de SDQ (o.a., Essau et al., 2012). Onze resultaten laten overtuigend zien dat deze vijf items geen goede indicatoren zijn van de onderliggende constructen die zij beogen te meten. Door deze vragen te verwijderen ontstaat er een versie van de SDQ die voldoende valide is voor cross-nationale vergelijkingen: de SDQ-R. De SDQ-R past ook beter op de Nederlandse data dan de originele SDQ en is daarom ook gebruikt in Hoofdstuk 3 en Hoofdstuk 4 van dit proefschrift.

Implicaties

Uit de kernbevindingen kunnen drie implicaties voor onderzoek en beleid worden gedistilleerd. Allereerst, aangezien het HBSC-onderzoek cross-sectioneel van aard is, is longitudinaal onderzoek gewenst. De bevindingen van dit proefschrift laten zien dat het aan te raden is om in longitudinale studies naar sociale ongelijkheid in de mentale gezondheid van adolescenten: (a) verschillende vormen van psychische problemen, (b) verschillende vormen van ervaren discriminatie, (c) persoonlijkheidskenmerken en (d) maten van sociale identiteit te includeren. Hiermee kan, onder andere, (a) de causaliteit van de relatie tussen ervaren discriminatie en de mentale gezondheid van jongeren en (b) de rol van persoonlijkheidskenmerken en de sociale identiteitsontwikkeling van jongeren in de relatie tussen ervaren discriminatie en mentale gezondheid worden onderzocht.

Ten tweede, één van de sterke kanten van het HBSC-onderzoek is dat het elke vier jaar wordt uitgevoerd onder een landelijk representatieve steekproef van scholieren. Daarmee biedt het HBSC-onderzoek de mogelijkheid om te onderzoeken of er veranderingen hebben plaatsgevonden in de mentale gezondheid van adolescenten in Nederland. De resultaten van dit proefschrift laten duidelijk zien dat verschillen in psychische problemen van adolescenten in Nederland op basis van migratieachtergrond, schoolniveau en sekse de laatste decennia tamelijk robuust zijn. Specifieke groepen adolescenten rapporteren consistent een verhoogd niveau van psychische problemen. Dit onderstreept het belang van selectieve preventie maatregelen en interventies. Aangezien er geen sterk bewijs is dat indicatoren van sociale ongelijkheid elkaars effecten op de mentale gezondheid van jongeren beïnvloeden (met andere woorden, het is dus niet zo dat specifieke groepen jongeren *binnen* deze risicogroepen een extra verhoogd risico op een lager mentaal welbevinden of meer psychische problemen hebben), lijken deze maatregelen en interventies even relevant voor *alle* jongeren binnen deze risicogroepen. Voor maatregelen gericht op het reduceren van het verhoogde risico op gedragsproblemen en problemen met

leeftijdsgenoten van jongeren met een migratieachtergrond is het raadzaam om hierbij de belangrijke rol van ervaren discriminatie te betrekken.

Ten slotte, de *intersectionaliteit theorie* – waarop Hoofdstuk 3 en Hoofdstuk 6 (deels) zijn gebaseerd – krijgt in toenemende mate aandacht in onderzoek. In het kort beargumenteert de intersectionaliteit theorie dat verschillende indicatoren van sociale ongelijkheid (zoals gezinswelvaart, migratieachtergrond en sekse) *gezamenlijk* vorm geven aan de ervaringen, kansen en mogelijkheden die jongeren hebben in hun dagelijks leven en daarmee mogelijk ook *gezamenlijk* doorwerken in hun mentale gezondheid (o.a., Else-Quest & Hyde, 2016; Ghavami, Katsiaficas, & Rogers, 2016; Kapilashrami, 2018). Het is dus niet alleen vanuit een beleidsperspectief (zoals hierboven besproken bij punt twee), maar ook vanuit een onderzoeksperspectief interessant dat we slechts heel beperkt bewijs vonden voor een interactie tussen gezinswelvaart, migratieachtergrond (en sekse). Toekomstig onderzoek is nodig om te bestuderen of onze bevindingen gerepliceerd worden met andere combinaties van indicatoren van sociale ongelijkheid en andere indicatoren van mentale gezondheid. Het is daarnaast ook mogelijk dat er meer bewijs wordt gevonden voor de intersectionaliteit theorie in studies die meer direct de dagelijkse ervaringen van jongeren meten (zoals ervaren discriminatie) dan de ontwikkelingsuitkomsten van deze dagelijkse ervaringen (zoals mentale gezondheid). Aangezien onze resultaten lieten zien dat ervaren discriminatie een belangrijke rol speelt in het verhoogde risico van jongeren met een niet-westerse migratieachtergrond op gedragsproblemen en problemen met leeftijdsgenoten, lijkt het bijzonder relevant om te onderzoeken hoe specifieke combinaties van indicatoren van sociale ongelijkheid de persoonlijke ervaringen van jongeren met discriminatie vormgeven. Dit type onderzoek helpt ons, onder andere, om beter in kaart te brengen welke migrantenjongeren het grootste risico lopen om discriminatie te ervaren.

Conclusie

Adolescenten in Nederland rapporteren, gemiddeld genomen, lage niveaus van psychische problemen. Hyperactiviteit vormt een uitzondering op dit algemene patroon: de Nederlandse jeugd rapporteert gemiddeld genomen een hoger niveau van hyperactiviteit, en dit niveau is ook het hoogst vergeleken met hun leeftijdsgenoten in zes andere Europese landen. De niveaus van zelfgerapporteerde psychische problemen zijn relatief stabiel gebleven in de laatste decennia, wat aangeeft dat er geen reden is tot zorg over een toename in psychische problemen van adolescenten in Nederland. Echter zijn er in dezelfde periode ook *kleine* maar relatief *stabiele* verschillen gevonden in psychische problemen van jongeren in Nederland

op basis van migratieachtergrond, schoolniveau en sekse. Er lijkt dus wel reden tot zorg over de stabiliteit van deze sociale ongelijkheid in psychische problemen van Nederlandse adolescenten. Specifieke groepen adolescenten (onder andere jongeren met een lager schoolniveau en jongeren met een niet-westerse migratieachtergrond) rapporteren consistent een hoger niveau van psychische problemen. Deze sociale ongelijkheid varieert met het type probleem. Om een adequaat beeld te krijgen van sociale ongelijkheid in de mentale gezondheid van adolescenten in Nederland is het dus belangrijk om verschillende vormen van psychische problemen te bestuderen. De resultaten van dit proefschrift suggereren dat de SDQ-R een valide instrument is om psychische problemen te meten, alhoewel verdere evaluatie en ontwikkeling van dit instrument ook belangrijk is. De hardnekkige sociale ongelijkheid in psychische problemen van jongeren in Nederland onderstreept het belang van selectieve preventieve maatregelen en interventies gericht op risicogroepen. Aangezien er geen bewijs is gevonden voor een interactie tussen de indicatoren van sociale ongelijkheid, lijken deze maatregelen en interventies even relevant voor *alle* jongeren binnen deze risicogroepen.

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Dankwoord

Dit proefschrift is niet compleet zonder een dankwoord. Mede dankzij het advies, de praktische ondersteuning en de bemoediging van mijn (co-)promotor, collega's, vrienden en familie is dit proefschrift tot stand gekomen.

Gonneke en **Wilma**, jullie waren al goed op elkaar ingespeeld en dat was duidelijk te merken in onze gezamenlijke afspraken. De onderlinge sfeer was altijd erg goed. **Gonneke**, ik was destijds al superblij met jou als masterscriptie begeleider en dat geldt ook zeker voor dit proefschrift. Ik heb ontzettend veel van je geleerd en vond het erg fijn om met je samen te werken. Bedankt voor het uitbreiden van mijn woordenschat met woorden zoals: "huis-tuin-en-keuken-hypothese", je betrokkenheid, je vertrouwen in mijn kunnen, de kansen die je me hebt geboden en dat ik op je kon rekenen. Dat heb ik echt heel erg gewaardeerd! **Wilma**, je hebt dit vast vaker gehoord, maar je hebt echt het talent om de grote lijn van een artikel te zien en deze te verduidelijken. Je had altijd een uitgesproken en duidelijke visie op mijn teksten, maar bood tegelijkertijd ruimte en gaf vertrouwen. Ik heb daarnaast je pragmatische houding, vooral tegen het einde van het traject, bijzonder gewaardeerd!

PhD collega's van de afdeling (Maartje, Dom, Heiko, Ties, Suzanne, Steffie, Shanshan, Peggy, Jenneke, Rob), maar ook daarbuiten (Sandra, Sanne, Kimberley, Yayouk, Anne, Zhipeng, Spark, Jana), veel dank voor de gezelligheid, betrokkenheid en hulp. Een aantal van jullie wil ik in het bijzonder bedanken. **Dom**, thank you for sending me so many useful articles, our collaboration on your article, and our talks about science. **Maartje**, bedankt dat ik met veel vragen, bijvoorbeeld over de HBSC dataset, bij jou terecht kon en dat je altijd mega snel reageerde. **Kimberley**, bedankt voor je hulp en heldere uitleg op mijn statistische vragen. Ik heb veel van je geleerd en vond het heel leuk om samen in The Village Coffee te werken aan ons artikel. **Sanne**, zonder jou had ik nooit die probit regression probabilities kunnen berekenen. Dank ook voor de gezelligheid, je eindeloze aanstekelijke enthousiasme voor ingewikkelde SEM modellen en al je hulp bij het runnen van de modellen!

En dan natuurlijk ook mijn kamergenoot **Lydia**. Wat heb ik gelachen om de chaos op je bureau, de enorme voorraad Tony Chocolonely die volgens jou heel goed combineert met koffiemachine cappuccino (ik moet er nog steeds niet aan denken) en dat je vrijwel altijd iets vergat (van bril tot fietssleutel). Van een handstand oefenen in het kantoor tot Samuel die op vrijdag gezellig mee kwam: super bedankt voor je vrolijkheid, vriendelijkheid en hulp!

Ook de andere **collega's van de afdeling jeugdstudies** (Catrin, Margot, Margreet, Ina, Regina, Tom, Winneke, Vincent van der Rijst, Vincent Duindam, Rianne, Zeena, Ying, Ricarda, Lisa, Wouter, Alina, Jette, Carol, Ildeniz, Fadoua, Esmée) wil ik bedanken voor de "praatjes bij de koffiemachine", lunches, teamuitjes en LSG-meetings. En natuurlijk niet te vergeten de **collega's van het secretariaat en management**, bedankt voor alle praktische ondersteuning!

Met enkelen van jullie heb ik wat intensiever mogen samenwerken. **Alina**, I really enjoyed our talks (both scientific and personal), sharing an Airbnb in Reykjavik, and working together on articles. **Margreet**, super leuk om je beter te leren kennen, samen naar IJsland op congres te gaan (en elkaar vervolgens onverwachts tegen te komen in the middle of nowhere) en samen te werken aan artikelen en daarmee heel veel van jou te leren!

Also a big thank you to the international colleagues of the HBSC network. Thank you for making me feel so welcome. I want to especially thank **Matthias** and **Sophie**, I really enjoyed our collaborations. Keep up the good work!

Leuke **Trimbos collega's** (Laura, Judith, Marja, Lily, Els, Tessa, Filip, Linda, Marjan, Marjolein, Mandy, Stephanie, Anouk en Marieke), dank voor jullie betrokkenheid én begrip toen ik de laatste hand aan dit proefschrift legde maar ook al jullie nieuwe collega werd. Ik kijk er naar uit verder met jullie samen te werken!

Bij die Trimbos collega's hoor jij ook **Saskia**. Als masterstudent mocht ik meehelpen met de data cleaning van de HBSC data en een aantal jaar later met het werven van scholen voor het HBSC onderzoek. Beide ervaringen waren super waardevol. Bedankt ook dat je altijd zo tijdig en volledig reageerde op mijn vragen over de dataset!

Ik wil ook de beoordelingscommissie **prof. dr. Kleinjan, prof. dr. Thomaes, prof. dr. Kunst, prof. dr. Veling** en **dr. Knipscheer** hartelijk danken voor het lezen en goedkeuren van dit proefschrift.

Lieve **vriendinnen!** Bedankt voor het begrip, het aanhoren van mijn verhalen, jullie steun maar ook vooral de goede gesprekken en het eindeloos lachen. Ik ben heel dankbaar voor jullie vriendschap!

Dan mijn familie. Lieve **Pap** en **Mam**, ik weet het: “het komt allemaal écht goed”. Bedankt dat jullie dit zo vaak hebben gezegd de afgelopen jaren, jullie flinke dosis Twentse nuchterheid, maar vooral ook dat jullie er voor mij waren toen de laatste loodjes wel heel zwaar wogen. Dit proefschrift is opgedragen aan jullie!

Lieve **Jacomine & Michiel, Maarten & Claartje** en **Jochem & Suzanne**, ook jullie wil ik heel erg bedanken voor het luisteren naar mijn verhalen over onderzoek, jullie enthousiasme bij de mijlpalen en de bemoedigende woorden. **Jacomine**, ik vind het heel fijn dat ik bij jou terecht kan als ik even zéér ongenueanceerd mijn verhaal wil doen. Ook heel erg bedankt voor alles wat je hebt gedaan (de kaartjes, taxichauffeur spelen), wellicht wordt ik ooit nog zo attent als jij. **Maarten**, hoe vaak jij wel niet hebt gezegd dat ik me gewoon niet zo druk moest maken. Ik kan veel leren van je nuchtere houding in je werk en daarbuiten. **Jochem**, dank voor je interesse en enthousiasme de afgelopen jaren. Ik vind het heel leuk om met jou te praten over sociaalwetenschappelijk onderzoek!

Ook mijn **overige familie** (oma, tantes, neefjes en nichtjes) wil ik bedanken voor de belangstelling de afgelopen jaren. In het bijzonder **Oma** en **Opa (†) van de Riet**, jullie hebben altijd veel interesse getoond in de studies en loopbanen van al jullie kleinkinderen. Bedankt voor alles!

Mijn **schoonfamilie**, in het bijzonder **Henk & Jenny, Niël & Anne** en **Timo & Merlin**, wil ik ook bedanken. Ik loop al heel wat jaartjes mee in de familie. Bedankt dat jullie mij destijds zo vriendelijk hebben ontvangen en dat de deur altijd openstaat. Bedankt voor de interesse de afgelopen jaren!

Als laatste, lieve **Lenn**, je aanwezigheid in mijn leven is zo vanzelfsprekend. Ik vind het gewoon heel fijn om bij jou te zijn. Je steunt mij met woorden én daden. Daar is niets vanzelfsprekends aan, dat is heel bijzonder. Tijd voor nieuwe avonturen! Ik hou van jou!



Curriculum Vitae

Elisa Duinhof (1991) obtained her bachelor in Pedagogical Sciences at Utrecht University in 2012. In 2014, she graduated from the research master Development and Socialization in Childhood and Adolescence, also at Utrecht University. After graduating she worked as a junior researcher at the Erasmus University Rotterdam (department Criminology) and Utrecht University (department Interdisciplinary Social Science). In 2017, Elisa started her PhD project at Utrecht University (department Interdisciplinary Social Science) focusing on social inequalities in adolescent mental health. She attended a summer school on global mental health in Barcelona and presented her research at several national and international conferences and meetings. Elisa now works as a researcher at the Trimbos Institute (department Mental Health & Prevention).

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