Cross-country differences in the association between socio-economic status and adolescent mental health: The role of mental health policies and services

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Abstract:

The “social gradient in adolescent mental health” describes the association between higher socioeconomic status (SES) and better mental health in adolescents. This association varies across countries, and little is known about the role of national child and adolescent mental (CAMH) policies in this relationship. This study examined the association between adolescent SES, national-level CAMH policy indicators and three adolescent mental health outcomes using data from eleven- to fifteen-year-olds from 30 European countries (n = 155,375). Multilevel regression models with cross-level interactions examined whether national-level CAMH policy indicators moderated the association between SES and adolescent mental health outcomes. Results showed a social gradient in adolescent in adolescent life satisfaction and psychosomatic complaints. No association was found between CAMH policy indicators and adolescent mental health, only national-level monitoring of CAMH was associated with lower aggressive behaviours. CAMH policies were not associated with mental health inequalities in adolescents. Results of the current study may inform policy processes and guide interventions. Future research should focus on specific national-level CAMH policy indicators to investigate determinants of mental health and mental health inequalities in adolescence.

Introduction

Socioeconomic inequalities in child and adolescent mental health (CAMH) have been identified in almost all European countries, showing that young people with a lower socioeconomic status (SES) consistently have worse mental well-being than counterparts with a higher SES (Evans & Kim, 2007; Reiss, 2013; Elgar et al., 2015). Even though those inequalities appear to be widely prevalent, the size of this association (the "social gradient in adolescent mental health") seems to vary considerably across countries (Holstein et al., 2009; Zaborskis et al., 2019). Addressing socioeconomic inequalities in health is difficult and even though evidence on the effect of policies on adolescents' mental health outcomes is scarce, it is urgently needed (Mackenbach, 2015; Hendricks et al., 2020). It is particularly important to explore the interplay between individual and national-level factors on adolescents' mental health outcomes from a cross-national perspective (Zaborskis et al., 2019).

Socioeconomic status and adolescent mental health

There as several theoretical approaches towards the differences in rates of mental health problems, such as the social selection hypothesis (Eaton, 1980) or the social causation hypothesis (Dohrenwend & Dohrenwend, 1969). While the former one assumes that people with mental health problems may drift down in socioeconomic position because of their psychopathology and inability to fulfill expected role obligations, the latter one posits that mental health problems may be a result of socioeconomic deprivation. Both theories may not be mutually exclusive and linked to a cycle of deprivation and mental health problems across families and generations (Reiss, 2013). Low SES may strongly contribute to the initial appearance of mental health problems, and the failure to recover from these problems which may lead to a socioeconomic downward drift in later adulthood (Wadsworth & Achenbach, 2005). Even though adolescence is an important developmental life stage for adult health, it is often neglected in health policy (Viner, 2012).

Policies and inequalities in mental health outcomes

Welfare states can mediate the link between adverse socio-economic conditions and population health by providing cash transfers to vulnerable population groups and funding key public services, such as education and public health policy (Eikemo & Bambra, 2008). Efforts to bolster income and improve access to financial, social, and natural resources for at risk low-income families may help to reduce mental health ill-health among disadvantaged children and adolescents (Alegría et al., 2018).

Previous research shows that countries with more comprehensive welfare regimes (e.g., such as those in Scandinavia) have better mental health outcomes on a population level than less generous welfare states (Chung et al., 2013). Nevertheless, mental health inequalities remain widespread across most welfare states, making it increasingly important to examine the influence of specific ‘packages’ of policies. The evidence base on the association of policies and health inequalities is very limited and more so on inequalities in (adolescent) mental health. There are multiple complicating factors in the measurement and evaluation of policies on health inequalities and it remains questionable whether it will actually be possible to reduce socioeconomic inequalities in health (Mackenbach, 2015).

In a recent review, Simpson et al. (2021) investigated how changes in redistributive policies (i.e., social security policies) affect adult mental health and mental health inequalities. A clear pattern showed that expansionary policies (i.e., policies which increase benefits) were associated with positive mental health outcomes and contradictory policies (i.e., policies which decrease benefits) were associated with adverse mental health outcomes. Results of studies that focused on disadvantaged populations showed that contradictory policies tended to increase mental health inequalities, whereas expansionary policies had the opposite effect. A plausible mechanism through which national level policies may affect mental health is materially through income or financial resources (Lundberg et al., 2010). Results suggest that certain sets of policies (e.g., social security policies) may decrease mental health inequalities in adults, yet whether this also applies to adolescents remains unclear. The importance of adolescent mental health and the lack of policies to support it has been recognized by the WHO long ago (Shatkin & Belfer, 2004; WHO, 2005), yet there is little evidence on the association between those policies and adolescent mental health inequalities. Income has been found to be an important factor mediating the policy effect on mental health, yet to the best of knowledge no study to date has investigated this relationship in adolescents.

Indicators of adolescent mental health policies

Very little research has examined the effect of specific welfare state policies on mental health inequalities and even less on adolescent mental health (Thompson et al., 2018). In a recent study, Hendricks et al. (2020) examined the association between CAMH policy indicators and several indicators of adolescent mental health (i.e., aggressive behavior, life satisfaction, psychosomatic complaints). Results showed a relation between combined policies for CAMH and adolescent aggressive behavior, whereby more policies were associated with fewer reported aggressive behaviors. Hendricks et al. (2020) identified four types of national-level policy indicators that are relevant to CAMH and mental health inequalities:

Investment in family benefits

Support for vulnerable families through investments in family benefits (i.e., child payments and allowances, parental leave benefits, child-care support) can be important to decrease the risk of mental health problems due to poverty and low SES and implications of those policies may improve adolescent mental (Currie et al., 2012; Viner et al., 2012). Expansions of benefits aimed at supporting families with dependent children have been found to have a positive relationship with mental health and have a decreasing effect on mental health inequalities (Simpson et al., 2021).

Investments in Education

Policies that aim to ensure access to education may improve adolescent mental health through an increase of quality of and access to education. Higher educational attainment has been linked with well-being and mental health of adolescents (Ottova et al., 2012; Viner et al., 2012). Education may also be a resource compensating for lower parental socioeconomic status and moderate the association with adolescent mental health problems (Ross & Mirowsky, 2011).

Mental health monitoring

Evidence on the incidence and prevalence of mental health problems of adolescents may inform governments about the needs of adolescents and helps to discover possible gaps of prevention and intervention strategies (Wittchen et al., 2011).

Number of child and adolescent mental health services

Despite their high need for mental health services, young people and families from lower SES backgrounds are less likely to have access to structural resources such as mental health care and services than those from higher SES backgrounds (Howell et al., 2008; Santiago et al., 2013; Reiss, 2013).The number of structural facilities and resources to deliver medical and psychosocial interventions (i.e., psychiatrists, psychologists, community-based mental health services) may reflects a country's capacity to respond to the needs of adolescents with mental health problems (Tylee et al., 2007).

Using nationally representative samples of adolescents from 30 countries, this study aims to investigate (1) the social gradient in adolescent mental health across countries, (2) the association between CAMH policy indicators and adolescent mental health and (3) the interaction effect of national-level CAMH policy indicators and SES on various mental health outcomes. It is hypothesized that results will replicate evidence on the social gradient in adolescent mental health across countries. National CAMH policies are expected to be positively associated with adolescent aggressive behavior as previously found by Hendricks et al. (2020).

Three indicators of mental health are included – life satisfaction, psychosomatic complaints, and aggressive behavior – incorporating positive mental health as well as emotional and behavioral problems (Antaramian et al., 2010). The previously identified policy indicators *Investment in family benefits, Investments in Education, Mental health monitoring, Number of child and adolescent mental health services* are used in the current study.

Method

Data

Individual-level data were available from the international Health Behavior in School-Aged Children (HBSC) study conducted in 2017/2018. Adolescents in 47 countries/regions completed surveys that were conducted in classrooms where a standard international protocol was adhered to ensure consistency of measures, sampling, and implementation procedures (Inchley et al., 2016). Cluster sampling was used in each country for selecting schools and classes to generate representative samples of boys and girls of ages 11,13 and 15. Ethical approval was granted in each country, participation was voluntary, and passive or active consent was sought from school administrators, parents, and adolescents (Currie et al., 2014).

Two inclusion criteria were applied. First, only adolescents from countries/regions with available country-level data on policy indicators were included, comprising 171,948 individuals from 30 European countries. Data from the following countries was used: Austria, Belgium (i.e., Flanders and Wallonia), Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom (i.e., England, Scotland, and Wales). Individual-level data from three constituent countries of the United Kingdom (England, Wales, and Scotland) were collected in independent HBSC surveys, yet combined and analyzed jointly using available country-level measures applying to the United Kingdom. For the same reason, individual-level data from the French and Flemish regions of Belgium were analyzed jointly, using country-level data from Belgium.

Secondly, only individuals with complete data on all analysis measures were included (n = 155,357). Missingness was spread across variables: age (.7%); family affluence (4.2%); life satisfaction (1.3%); psychosomatic complaints (2.5%); aggressive behavior (5.1%). There was no missingness across the national-level policy indicators except for Number of child and adolescent mental health services (10%).

Measures

<u>Individual Level Measurements</u>

Life satisfaction

Life satisfaction was measured using the Cantril ladder of life satisfaction on an 11-point scale where participants reported how they feel about their life (0 = *worst possible life* to 10 =

best possible life). The Cantril Ladder has repeatedly been used to assess adolescent mental health and showed high reliability among adolescents (Levin & Currie, 2014).

Psychosomatic complaints

Psychosomatic complaints were measured with the HBSC symptom checklist (Gariépy & Elgar, 2016) which assessed headache, abdominal pain, backache, dizziness, feeling low, irritability/bad temper, feeling nervous, and sleeping difficulties. Items are measured on a 5-point response scale and participants report how often during the past 6 months they experienced the complaint (0 = *rarely or never* to 4 = *about every day*). For participants who completed at least six of the eight subscale items a sum score was computed where higher scores indicated more complaints (range: 0 – 32). The checklist had good internal consistency in the given dataset (Cronbach's a = .81) and has convergent validity with indicators of emotional symptoms and emotional well-being (Gariépy & Elgar, 2016).

Aggressive behavior

Aggressive behavior was assessed based on two items. One measured the frequency of physical fights and the frequency of bullying others (Hendricks et al., 2020). The first item, "During the past 12 months, how many times were you in a physical fight" is measured on a 5-point scale (0 = *I have not been in a physical fight* to 4 = *4 times or more*) and has been validated in adolescents as a continuous variable. The second item, "How many times have you bullied others at school in the previous months?" was assessed using a 4-point scale (0 = *I have not* to 4 = *several times per week*). In line with previous research, the two items (r = .23) were combined into a mean score with higher scores indicating more aggressive behavior (Hendricks et al., 2020).

Socioeconomic status

Socioeconomic status was measured using the HBSC Family Affluence Scale (FAS), which consists of six items that indicate family material assets. Those include car/van ownership, having own bedroom, holidays abroad, computer ownership, dishwasher ownership, bathrooms. The FAS has been shown to be a reliable instrument that shows greater responsive rates than other SES indicators for adolescents (Torsheim et al., 2016). All scale items were summed up to compute a total FAS score (range 0-13) where higher scores indicate more material assets. Each adolescent's absolute FAS score was transformed to a country-specific relative score (range 0-1, with a mean of .5 in each country), measuring adolescents' relative family affluence in their country of residence (Elgar et al., 2017).

Demographic variables

The current study included age and gender as demographic variables because of their associations with adolescent mental health (e.g., Campbell, Bann & Patalay, 2021). Age was included as a continuous variable.

National-Level Indicators for Policies

Data on national-level indicators for adolescent mental health policies were collected as previously conducted by Hendriks et al. (2020), using more recent data on investments in family benefits (2017 and latest instead of 2011-2013) and investments in education (2020 instead of 2011/2010). The original values of the policy indicators are presented in Supplement Table 1. For analyses on the separate policies, unstandardized values were used. To compute a total policy score, standardized values were used.

Number of child and adolescent mental health services

As an indicator of mental health facilities per country, data on the number of child and adolescent mental health services (CAMHS), the number of psychiatrists, and the number of psychologists per 100,000 young people (i.e., younger than 18 or the age of majority in a country) were used. CAMHS were defined as specialist, community-based, multidisciplinary mental health services that deliver medical and psychosocial interventions. The information was derived from an article by Signorini and colleagues (2017), which describes the current status of CAMHS in the European Union. The paper used questionnaire data that was completed by psychiatrists and representatives of national child psychiatry associations. The variables were standardized to have a mean of 0 and a standard deviation of 1 and were combined to a mean single factor score (Cronbach's a = .65). For Iceland, Norway, and Switzerland, no complementary source for this variable was found and therefore these countries were coded as missing. The three variables had the following ranges per 100,000 young people: number of public CAMHS, 0.5 (Bulgaria) to 12.9 (Finland); number of psychiatrists, 1.9 (Bulgaria) to 36 (Finland); number of psychologists, 1.7 (Bulgaria) to 104.2 (Sweden).

Mental health monitoring

The extent to which countries monitor adolescent mental health through collection of epidemiological data was derived using information from the Global Burden of Disease Study (GBD; Institute for Health Metrics and Evaluation, 2018). Countries reported on six types of children's psychopathologies, including conduct disorder, attention-deficit/hyperactivity disorder, autism spectrum disorders, eating disorders, depression, and anxiety. Countries received a score (i.e., 0-6) based on the number of children's psychopathology types that countries reported to have epidemiological data on, in either the 2010 or 2013 GBD study (Erskine et al., 2017). The variable was standardized to have a mean of 0 and a standard deviation of 1. Monitoring scores before standardization ranged between 0 (Bulgaria, Croatia, Czech Republic, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, Slovenia) and 6 (Finland and the United Kingdom).

Investment in family benefits

Investment in family benefits to support families was measured by the percentage of a country's GDP spent on family benefits. Family benefits referred to payments solely for families and children such as child payments and allowances, parental leave benefits, and childcare support. This information was retrieved from the Organization for Economic Co-operation and Development (OECD) family database describing country percentages from 2017 and latest available (OECD, 2022). For countries for which the OECD did not report this information (indicated in Supplemental table 1), the information was retrieved from the statistical office of the European Union (Eurostat, 2020). The correlation between estimates from the OECD and Eurostat for countries with available data was $r = .83$. The variable was standardized to have a mean of 0 and a standard deviation of 1. Before transformation, scores ranged between 0.9% (Malta) and 3.6% (France).

Investment in education

Investment in education was measured by national-level percentages of GDP spent on education as derived from the statistical office of the European Union (Eurostat, 2020). For the UK, no data was available from Eurostat and therefore obtained from the latest report of the Parliament (Parliament. House of Commons, 2021). The variable was standardized to have a mean of 0 and a standard deviation of 1. Before transformation, the values ranged between 3.1% (Ireland) and 7.7% (Iceland).

Total policy score

The separate policy variables had a similar scale due to transformation, which allowed for them to be combined into a single total policy score which was calculated as the mean for each country (Cronbach's $a = .66$). All policy indictors showed positive correlations with each other, ranging from .28 to .51, yet only the correlation between *Mental Health monitoring* and *Number of child and adolescent mental health services* showed statistical significance at the $p < .01$ level.

Analysis strategy

For the descriptive results, data were analyzed and means and standard deviations for all study variables were computed. Bivariate correlations between the individual variables (i.e., gender, age, and family affluence) were computed for adolescent life satisfaction, aggressive behavior, and psychosomatic complaints. Multilevel regression analyses were carried out using the "lme4" package for multilevel regression models and the "lmerTest" package to obtain alpha levels in R.4.1.0 (Kuznetsova et al., 2017; Bates et al., 2015; R Core Team., 2022)

Two-level linear regression models investigated (1) overall associations between family affluence and adolescent mental health outcomes (2) overall associations between national-level policy indicators and adolescent mental health outcomes (3) cross country variations in the association between family affluence and adolescent mental health outcomes (4) the moderating role of national-level policy indicators on the association between family affluence and adolescent mental health outcomes. It was aimed to test if adding the random slope for family affluence would show improved model fit for outcome measures (χ^2 test with $p < 0.01$), implying that the association between family affluence and the outcome measure varied across countries/regions (Smeets & van de Schoot, 2019). Random slopes were interpreted using the 95% prediction interval (PI), indicating the range of the estimated slope across countries. Individual level and country-level variables were added to the models using a stepwise approach. Individuals were clustered within countries/regions ($n = 30$). Individual-level variables were group mean centered and country-level variables were grand mean centered (Aguinis et al., 2013). To adjust for oversampling of sub-populations, survey weights were applied in the multilevel analyses. Models were separately computed and analyzed for life satisfaction, psychosomatic complaints, and aggressive behavior.

Model 0 included only the dependent variable to test for country variation. Model 1a included all individual-level variables (i.e., sex, age, family affluence), adding the total policy score (Model 1b) and the separate policy indicators (Model 1c). Model 2 included random slopes for family affluence for models with only the total policy score (Model 2a) and the separate policy indicators (Model 2b). Model 3 added cross-level interaction terms between family affluence and the total policy score (Model 3a) and the separate policy indicators (Model 3b).

To correct for the large number of tested variables, and control for familywise error rate, the significance threshold $p < .01$ was used.

Results

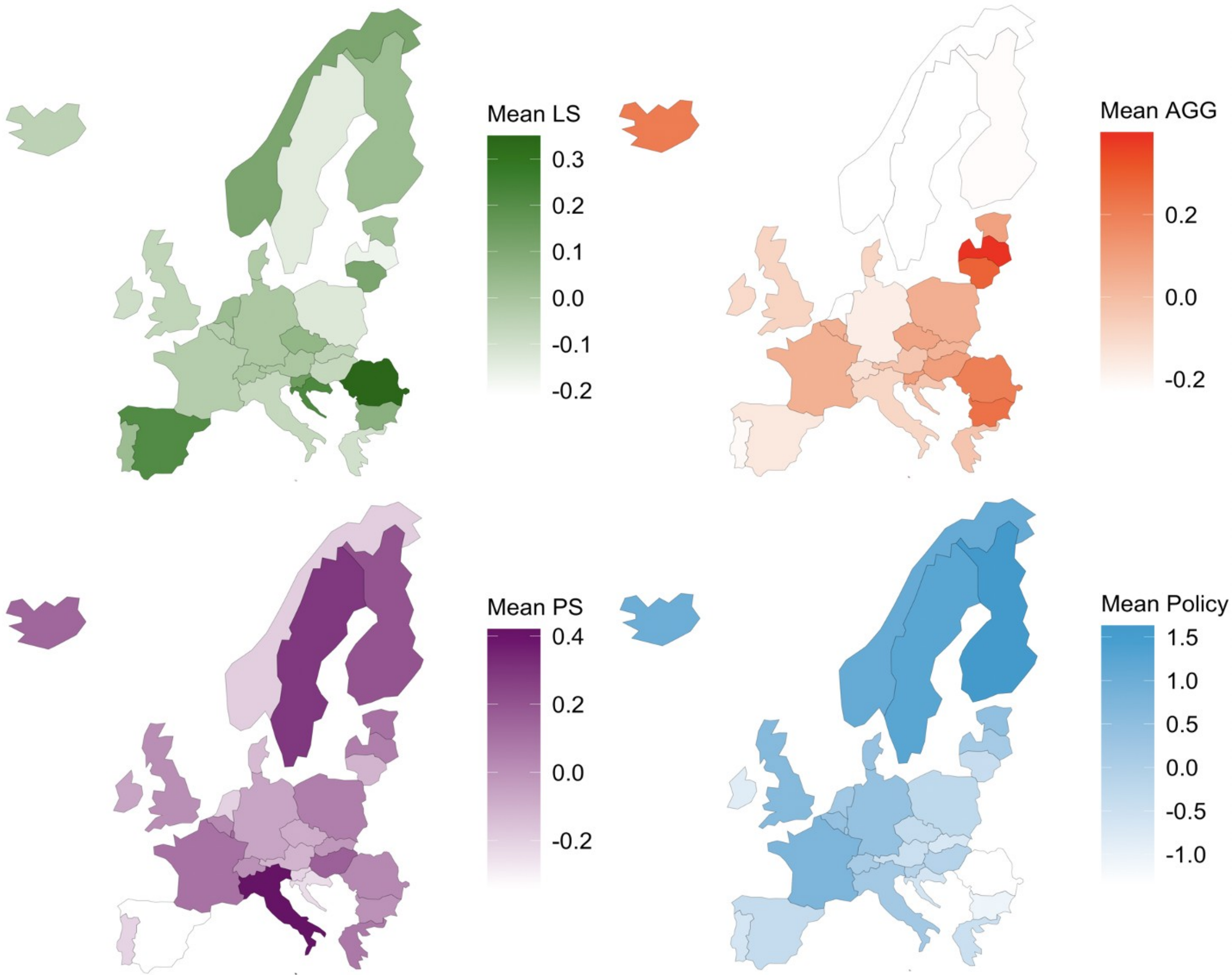

Figure 1

Country means for adolescent life satisfaction (LS), aggressive behaviour (AGG), psychosomatic complaints (PS), and total policy. Values of LS, AGG, and PS were standardized for comparability

Descriptive results

Table 1 shows correlations between individual-level variables: life satisfaction was negatively associated with aggressive behavior and psychosomatic complaints. Aggressive behavior was positively associated with psychosomatic complaints. Family affluence was positively associated with life satisfaction and showed small negative associations with aggressive behavior and psychosomatic complaints. The correlations between the indicators of adolescent mental health and the national-level policy indicators (i.e., total policy, monitoring, facilities, investment in family benefits, investment in education) all showed positive associations except for monitoring and investment in education which showed a small negative association.

Table 2 shows variance across countries for all outcome and country-level variables (except for family affluence, which was constructed to have a country-specific mean of .5). Adolescent life satisfaction was lowest for Malta (7.3) and highest for Romania (8.4). Adolescent psychosomatic complaints were lowest for Spain (6.4) and highest for Italy (11.3). Adolescent aggressive behavior was lowest for Sweden (0.3) and highest for Latvia (0.8). The country scoring the lowest on the total policy score was Romania (-1.3) and the country scoring highest was Finland (1.6). Figure 1 shows the country means of CAMH policies, life satisfaction, psychosomatic complaints, and adolescent aggressive behaviors.

Table 1
Correlations Between the Individual-Level Variables (N = 155.375)

Variable	2	3	4	5	6
1. Gender	.00	-.09**	-.24**	.20**	.00
2. Age		-.19**	-.05**	.17**	.00
3. Life satisfaction			-.10**	-.43**	.13**
4. Aggressive behaviour				.15**	-.02
5. Psych. complaints					-.02**
6. Family affluence					

$^{*}p < .05$. $^{**}p < .01$. Psych. = Psychosomatic.

Individual-level associations

Tables 3-5 display the results of the linear multilevel regression analyses for adolescent life satisfaction, psychosomatic complaints, and aggressive behavior, respectively.

Models showed lower life satisfaction and aggressive behavior among girls and younger adolescents and higher psychosomatic complaints among girls and older adolescents. Life satisfaction showed a small positive association with family affluence. Psychosomatic complaints showed a small negative association with family affluence. Aggressive behavior showed no significant association with family affluence.

Adding the random slope for family affluence showed significant improved model fit for all outcome measures (χ^2 test with $p < 0.01$), implying that the association between family affluence and adolescent life satisfaction, psychosomatic complaints, and aggressive behavior varied across countries/regions. The association existed in almost all countries and range of the strength of the association is shown in the predictive interval of the respective Models.

There was no association between either the total policy score or the separate policy indicators and life satisfaction or psychosomatic complaints. There was a small but negligible association between the total policy score and aggressive behavior in Model 1b and an association between monitoring of adolescent mental health and aggressive behavior in Model 1c.

Table 2

Descriptive Characteristics of the Individual- and Country-Level Sample (N = 155,375).

Sample	Individual-Level Characteristics						Country-Level Characteristics				
Country	*N*	Girls (%)	Age (*M*)	Life satisfaction (*M*)	Aggressive behaviour (*M*)	Psych. complaints (*M*)	Monitoring	Facilities	Investment in family benefits	Investment in education	Total policy
Austria	3,662	51.7	13.3	7.7	0.5	7.9	-0.9	-0.9	0.2	-0.2	-0.5
Belgium	8,809	51.3	13.3	7.6	0.5	8.9	-0.4	-0.1	0.8	1.3	0.4
Bulgaria	4,327	51.7	13.5	7.8	0.7	8.6	-0.9	-1.3	-0.9	-1.3	-1.1
Croatia	4,126	50.3	13.9	8.1	0.5	7.3	-0.9	-0.8	-0.9	0.1	-0.6
Czech Republic	10,098	50.5	13.5	7.8	0.5	8.3	-0.9	-0.9	0.6	-0.2	-0.3
Denmark	2,755	53.0	13.4	7.7	0.4	7.8	-0.4	-0.3	1.2	1.1	0.4
Estonia	4,511	50.2	13.8	7.7	0.6	9.3	-0.4	0.3	0.7	1.3	0.5
Finland	2,924	51.1	13.9	7.8	0.3	10.0	2.1	3.4	0.5	0.6	1.6
France	8,006	51.8	13.4	7.6	0.5	9.5	1.6	-0.1	1.4	0.2	0.8
Germany	3,983	53.8	13.5	7.7	0.4	8.2	1.1	0.2	0.9	-0.6	0.4
Greece	3,634	50.6	13.9	7.5	0.5	9.2	-0.4	0.4	-1.1	-0.8	-0.5
Hungary	3,498	53.6	13.6	7.6	0.6	9.7	-0.4	-0.6	1.2	-0.6	-0.1
Iceland	6,484	50.8	13.6	7.6	0.7	9.6	-0.4		1.0	2.4	1.0
Ireland	3,226	50.2	13.4	7.5	0.4	8.4	0.1	-0.2	-1.1	-2.2	-0.8
Italy	3,908	52.5	13.7	7.6	0.4	11.4	1.1	0.6	-0.0	-1.0	0.2
Latvia	4,159	51.0	13.5	7.4	0.8	9.1	-0.4	0.6	-0.3	0.6	0.1
Lithuania	3,520	50.9	13.7	7.9	0.7	8.0	-0.9	-0.2	-0.5	-0.1	-0.4
Luxembourg	3,530	51.0	13.6	7.7	0.5	9.6	-0.9	1.2	1.0	-0.3	0.3
Malta	2,332	53.3	13.4	7.3	0.5	10.9	-0.9	-0.6	-2.0	0.6	-0.7
Netherlands	4,505	51.9	13.5	7.8	0.3	7.3	1.6	0.1	-0.8	0.0	0.2
Norway	2,557	51.9	13.1	7.9	0.3	7.5	1.6		1.1	0.6	1.1
Poland	4,846	51.9	13.6	7.5	0.5	9.2	-0.9	-0.7	0.6	-0.1	-0.3
Portugal	5,493	52.5	13.3	7.8	0.3	7.2	-0.4	-0.8	-1.0	-0.3	-0.6
Romania	4,055	51.0	13.2	8.3	0.6	9.0	-0.9	-1.2	-1.7	-1.6	-1.3
Slovakia	3,181	52.1	13.4	7.6	0.5	8.8	-0.9	-0.6	-0.6	-0.7	-0.7
Slovenia	5,375	50.0	13.6	8.0	0.6	7.3	-0.9	0.7	-0.8	0.5	-0.1
Spain	4,141	51.9	13.6	8.1	0.4	6.4	1.1	-0.4	-1.5	-0.7	-0.4
Sweden	3,606	51.7	13.7	7.4	0.3	10.7	0.1	1.8	1.2	1.9	1.2
Switzerland	7,055	50.1	13.4	7.7	0.4	8.6	0.1		-0.2	0.4	0.1
UK	19,505	50.9	13.6	7.6	0.4	8.8	2.1	0.5	0.9	-0.9	0.6
Mean		51.0	13.5	7.71	0.49	8.58	1.77	-0.04	2.48	5.3	0.02
SD			1.62	1.83	0.75	6.57	2.05	0.71	0.8	1.01	0.71

Note. *N* = sample size. *M* = mean. SD = Standard Deviation Psych. = Psychosomatic. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilities. Mean policy = total policy score

Table 3

Multilevel models for Life satisfaction with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 0			Model 1a			Model 1b			Model 1c		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	7.707 (0.039)	<0.001	0.000	7.872 (0.039)	<0.001	0.000	7.872 (0.037)	<0.001	0.000	7.858 (0.044)	<0.001	0.000
	Gender [a]				**-0.319 (0.009)**	<0.001	-0.087	**-0.318 (0.009)**	<0.001	-0.087	**-0.306 (0.009)**	<0.001	-0.084
	Age				**-0.212 (0.002)**	<0.001	-0.187	**-0.212 (0.002)**	<0.001	-0.187	**-0.215 (0.002)**	<0.001	-0.191
	Family affluence				**0.834 (0.015)**	<0.001	0.130	**0.818 (0.015)**	<0.001	0.130	**0.836 (0.016)**	<0.001	0.134
Fixed effects (country -level)	Monitoring										0.008 (0.024)	0.735	0.010
	Facilities										-0.034 (0.076)	0.656	-0.011
	Family benefits										-0.081 (0.057)	0.165	-0.034
	Education										-0.015 (0.053)	0.774	-0.007
	Total policy							-0.074 (0.053)	0.179	-0.026			
Cross-level interactions	FA × Monitoring												
	FA × Facilities												
	FA × Family benefits												
	FA × Education												
	FA × Total policy												
Residual variance	Family affluence												
Variance components	Individual-level	3.307 (1.818)			3.105 (1.762)			3.105 (1.762)			3.072 (1.753)		
	Country-level	0.044 (0.211)			0.043 (0.011)			0.041 (0.203)			0.041 (0.202)		
95% PIs	Family affluence												
Model statistics	Free parameters	2			5			6			9		
	AIC	616723.0			607155.5			607155.6			**541796.5**		
	BIC	616752.8			607215.0			607225.1			**541894.7**		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilities. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score. p<.01 and lowest AIC and BIC in bold type. The null model (Model 0) showed country-level variance in life satisfaction. Of the total variance in life satisfaction, 1.3% (0.044/ (0.044 + 3.307) = 0.013) was on the country level.

Table 3 (continued)

Multilevel models for Life satisfaction with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 2a			Model 2b			Model 3a			Model 3b		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	7.872 (0.039)	<0.001	0.000	7.864 (0.045)	<0.001	0.000	7.878 (0.039)	<0.001	0.000	7.864 (0.045)	<0.001	0.000
	Gender [a]	**-0.319 (0.009)**	<0.001	-0.085	**-0.302 (0.009)**	<0.001	-0.083	**-0.314 (0.008)**	<0.001	-0.085	**-0.302 (0.009)**	<0.001	-0.082
	Age	**-0.212 (0.003)**	<0.001	-0.188	**-0.216 (0.002)**	<0.001	-0.191	**-0.213 (0.002)**	<0.001	-0.188	**-0.216 (0.003)**	<0.001	-0.191
	Family affluence	**0.818 (0.043)**	<0.001	0.125	**0.826 (0.045)**	<0.001	0.129	**0.806 (0.044)**	<0.001	0.125	**0.825 (0.047)**	<0.001	0.129
Fixed effects (country -level)	Monitoring				0.002 (0.027)	0.939	0.002				0.007 (0.027)	0.785	0.009
	Facilities				-0.032 (0.084)	0.701	-0.010				-0.036 (0.085)	0.670	-0.012
	Family benefits				-0.069 (0.063)	0.286	-0.029				-0.081 (0.064)	0.217	-0.033
	Education				-0.018 (0.058)	0.756	-0.008				-0.015 (0.058)	0.792	-0.007
	Total policy	-0.078 (0.054)	0.164	-0.027				-0.076 (0.056)	0.186	-0.026			
Cross-level interactions	FA × Monitoring										-0.033 (0.028)	0.252	-0.012
	FA × Facilities										0.025 (0.090)	0.779	0.002
	FA × Family benefits										0.079 (0.068)	0.258	0.009
	FA × Education										-0.016 (0.063)	0.795	-0.002
	FA × Total policy							-0.009 (0.064)	0.885	-0.001			
Residual variance	Family affluence	**0.048 (0.220)**	<0.001		**0.046 (0.214)**	<0.001		**0.050 (0.224)**	<0.001		**0.049 (0.222)**	<0.001	
Variance components	Individual-level	3.108 (1.763)			3.077 (1.774)			3.108 (1.763)			3.077 (1.754)		
	Country-level	0.045 (0.213)			0.051 (0.227)			0.045 (0.213)			0.051 (0.227)		
95% PIs	Family affluence		[0.724 / 0.912]			[0.735 / 0.916]			[0.708 / 0.904]			[0.729 / 0.921]	
Model statistics	Free parameters	7			10			8			14		
	AIC	621747.55			555402.84			621753.20			555424.75		
	BIC	621837.14			555520.95			621852.74			555582.23		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilities. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score. p<.01 and lowest AIC and BIC in bold type.

Table 4

Multilevel models for Psychosomatic complaints with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 0			Model 1a			Model 1b			Model 1c		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	8.756 (0.208)	<0.001	0.000	7.397 (0.208)	<0.001	0.000	7.397 (0.200)	<0.001	0.000	7.405 (0.203)	<0.001	0.000
	Gender [a]				**2.641 (0.032)**	<0.001	0.201	**2.641 (0.032)**	<0.001	0.201	**2.634 (0.034)**	<0.001	-0.084
	Age				**0.663 (0.009)**	<0.001	0.163	**0.663 (0.009)**	<0.001	0.163	**0.687 (0.010)**	<0.001	-0.191
	Family affluence				**-0.651 (0.015)**	<0.001	-0.028	**-0.651 (0.053)**	<0.001	-0.028	**-0.669 (0.059)**	<0.001	-0.025
Fixed effects (country -level)	Monitoring										-0.128 (0.124)	0.312	0.010
	Facilities										0.770 (0.386)	0.056	-0.011
	Family benefits										0.352 (0.290)	0.235	-0.034
	Education										-0.166 (0.268)	0.541	-0.007
	Total policy							0.434 (0.286)	0.14	0.042			
Cross-level interactions	FA × Monitoring												
	FA × Facilities												
	FA × Family benefits												
	FA × Education												
	FA × Total policy												
Residual variance	Family affluence												
Variance components	Individual-level	42.18 (6.495)	<0.001	0.927	39.22 (6.263)	<0.001	0.875	39.22 (6.263)	<0.001	0.872	39.02 (6.247)	<0.001	0.872
	Country-level	1.297 (1.139)	<0.001	0.015	1.282 (1.132)	<0.001	0.015	1.19 (1.091)	<0.001	0.015	1.063 (1.031)	<0.001	0.013
95% PIs	Family affluence												
Model statistics	Free parameters	2			5			6			9		
	AIC	1003222.9			992184.6			992184.4			**886750.2**		
	BIC	1003252.7			992244.2			992253.9			**886848.3**		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilities. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score.. p<.01 and lowest AIC and BIC in bold type. The null model (Model 0) showed country-level variance in psychosomatic complaints. Of the total variance in psychosomatic complaints, 2.9% (1.297/ (1.297 + 42.18) = 0.029) was on the country level.

Table 4 (continued)

Multilevel models for Psychosomatic Complaints with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 2a			Model 2b			Model 3a			Model 3b		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	7.260 (0.206)	<0.001	0.000	7.403 (0.225)	<0.001	0.000	7.397 (0.207)	<0.001	0.000	7.266 (0.223)	<0.001	0.000
	Gender [a]	**2.662 (0.031)**	<0.001	0.202	**2.634 (0.033)**	<0.001	0.202	**2.640 (0.032)**	<0.001	0.202	**2.656 (0.033)**	<0.001	0.202
	Age	**0.683 (0.009)**	<0.001	0.168	**0.688 (0.010)**	<0.001	0.174	**0.664 (0.009)**	<0.001	0.168	**0.708 (0.010)**	<0.001	0.174
	Family affluence	**-0.496 (0.139)**	0.001	-0.021	**-0.589 (0.135)**	0.001	-0.021	**-0.573 (0.133)**	0.001	-0.021	**-0.509 (0.140)**	0.001	-0.022
Fixed effects (country -level)	Monitoring				-0.169 (0.135)	0.227	-0.059				-0.116 (0.137)	0.405	-0.041
	Facilities				0.768 (0.420)	0.072	0.071				0.788 (0.425)	0.077	0.072
	Family benefits				0.332 (0.316)	0.333	0.035				0.322 (0.319)	0.323	0.037
	Education				-0.139 (0.295)	0.627	-0.018				-0.156 (0.295)	0.601	-0.020
	Total policy	0.363 (0.288)	0.217	0.035				0.433 (0.296)	0.135	0.044			
Cross-level interactions	FA × Monitoring										-0.136 (0.085)	0.125	-0.014
	FA × Facilities										-0.036 (0.271)	0.894	-0.000
	FA × Family benefits										-0.038 (0.203)	0.851	-0.001
	FA × Education										0.044 (0.188)	0.814	0.001
	FA × Total policy							-0.239 (0.193)	0.151	-0.008			
Residual variance	Family affluence	**0.477 (0.690)**	<0.001		**0.431 (0.657)**	<0.001		**0.449 (0.670)**	<0.001		**0.359 (0.599)**	<0.001	
Variance components	Individual-level	39.14 (6.256)			38.94 (6.240)			39.14 (6.256)			38.98 (6.244)		
	Country-level	1.259 (1.122)			1.291 (1.139)			1.256 (1.121)			1.307 (1.143)		
95% PIs	Family affluence		[-1.430 / 0.439]			[-1.433 / 0.255]			[-1.453 / 0.307]			[-1.121 / 0.194]	
Model statistics	Free parameters	7			10			8			14		
	AIC	1015324.31			908261.73			1015325.58			908272.52		
	BIC	1015413.90			908379.84			1015425.12			908430.00		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilities. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score. p<.01 and lowest AIC and BIC in bold type.

Table 5

Multilevel models for Aggressive behaviour with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 0			Model 1a			Model 1b			Model 1c		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	0.490 (0.022)	<0.001	0.000	0.672 (0.022)	<0.001	0.000	0.672 (0.037)	<0.001	0.000	0.677 (0.018)	<0.001	0.000
	Gender [a]				**-0.353 (0.004)**	<0.001	-0.234	**-0.353 (0.009)**	<0.001	-0.234	**-0.365 (0.003)**	<0.001	-0.239
	Age				**-0.024 (0.001)**	<0.001	-0.054	**-0.025 (0.002)**	<0.001	-0.053	**-0.023 (0.001)**	<0.001	-0.045
	Family affluence				-0.016 (0.006)	0.024	-0.006	-0.016 (0.015)	0.024	-0.006	-0.025 (0.006)	<0.001	-0.009
Fixed effects (country -level)	Monitoring										**-0.033 (0.011)**	**0.007**	-0.102
	Facilities										-0.007 (0.035)	0.839	-0.005
	Family benefits										0.012 (0.026)	0.652	0.012
	Education										-0.015 (0.025)	0.558	-0.017
	Total policy							-0.062 (0.053)	0.045	-0.005			
Cross-level interactions	FA × Monitoring												
	FA × Facilities												
	FA × Family benefits												
	FA × Education												
	FA × Total policy												
Residual variance	Family affluence												
Variance components	Individual-level	0.556 (0.746)			0.523 (0.723)			0.523 (0.723)			0.533 (0.730)		
	Country-level	0.014 (0.120)			0.014 (0.120)			0.012 (0.111)			0.009 (0.095)		
95% PIs	Family affluence												
Model statistics	Free parameters	2			5			6			9		
	AIC	346175.3			336902.9			336900.8			**304105.7**		
	BIC	346205.1			336962.5			336970.3			**304203.9**		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilitites. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score. p<.01 and lowest AIC and BIC in bold type. The null model (Model 0) showed country-level variance in aggressive behaviour. Of the total variance in aggressive behaviour, 2.5% (0.014/ (0.014 + 0.556) = 0.024) was on the country level.

Table 5 (continued)

Multilevel models for Aggressive Behaviour with unstandardised and standardised fixed effects at individual- and country-level (N = 155,375).

		Model 2a			Model 2b			Model 3a			Model 3b		
		b (SE)	p	β	b (SE)	p	β	b (SE)	p	β	b (SE)	p	β
Fixed effects (individual -level)	Intercept	0.674 (0.021)	<0.001	0.000	0.680 (0.020)	<0.001	0.000	0.674 (0.021)	<0.001	0.000	0.679 (0.020)	<0.001	0.000
	Gender [a]	**-0.356 (0.004)**	<0.001	-0.235	**-0.367 (0.004)**	<0.001	-0.241	**-0.356 (0.003)**	<0.001	-0.235	**-0.367 (0.003)**	<0.001	-0.241
	Age	**-0.024 (0.024)**	<0.001	-0.052	**-0.023 (0.001)**	<0.001	-0.049	**-0.024 (0.001)**	<0.001	-0.052	**-0.023 (0.001)**	<0.001	-0.049
	Family affluence	-0.011 (0.011)	0.331	-0.004	-0.019 (0.011)	0.101	-0.007	-0.011 (0.011)	0.335	-0.004	-0.021 (0.010)	0.057	-0.007
Fixed effects (country -level)	Monitoring				-0.032 (0.012)	0.019	-0.098				-0.033 (0.012)	0.016	-0.102
	Facilities				-0.005 (0.039)	0.898	-0.004				-0.008 (0.039)	0.833	-0.006
	Family benefits				0.017 (0.029)	0.551	0.017				0.012 (0.029)	0.677	-0.012
	Education				-0.010 (0.027)	0.708	-0.012				-0.013 (0.027)	0.627	-0.015
	Total policy	-0.052 (0.029)	0.089	-0.044				-0.061 (0.030)	0.053	-0.053			
Cross-level interactions	FA × Monitoring										-0.003 (0.006)	0.642	-0.002
	FA × Facilities										-0.016 (0.021)	0.453	-0.003
	FA × Family benefits										-0.019 (0.015)	0.227	-0.005
	FA × Education										-0.011 (0.014)	0.446	-0.003
	FA × Total policy							-0.022 (0.017)	0.208	-0.005			
Residual variance	Family affluence	**0.002 (0.052)**	<0.001		**0.002 (0.044)**	<0.001		**0.002 (0.051)**	<0.001		**0.001 (0.039)**	0.003	
Variance components	Individual-level	0.525 (0.725)			0.535 (0.731)			0.525 (0.724)			0.535 (0.731)		
	Country-level	0.013 (0.116)			0.011 (0.105)			0.013 (0.116)			0.011 (0.105)		
95% PIs	Family affluence		[-0.015 / -0.007]			[-0.022 / -0.015]			[-0.015 /- 0.007]			[-0.022 /-0.019]	
Model statistics	Free parameters	7			10			8			14		
	AIC	345546.91			312184.40			345553.57			312212.74		
	BIC	345636.50			312302.51			345653.11			312370.22		

Note. [a] Male is the reference group. FA = Family affluence. Monitoring = monitoring of adolescent mental health. Facilities = adolescent mental health facilitites. Family benefits = investment in family benefits. Education = investment in education. Total policy = the total policy score. p<.01 and lowest AIC and BIC in bold type.

Discussion

The present study aimed to examine the association between family affluence, national CAMH policy indicators and adolescent mental health outcomes (i.e., life satisfaction, psychosomatic complaints, and aggressive behavior). The study investigated possible moderating effects of national CAMH policies on the association between family affluence and mental health outcomes. Higher family affluence was associated with higher life satisfaction and lower psychosomatic complaints. The association between family affluence and adolescent life satisfaction, psychosomatic complaints, and aggressive behavior varied across countries/regions. Results showed no association between national CAMH policies and two indicators of mental health (life satisfaction and psychosomatic complaints), while for a third indicator, more monitoring of adolescent mental health was associated with fewer reported adolescent aggressive behaviors.

The given results are in line with previous research on the social gradient in adolescent mental health (e.g., Zaborskis et al., 2019), demonstrating worse mental health outcomes in adolescents of socioeconomically disadvantaged families across countries. However, this was not true for all mental health outcomes; in line with recent findings on this social gradient in adolescent mental health (e.g., Weinberg et al., 2021), family affluence showed no association with aggressive behavior.

Results from the current study did not replicate findings from Hendricks et al. (2020) on the effect of CAMH policy indicators on aggressive behavior among adolescents. Combined policies were not associated with fewer reported adolescent aggressive behaviors. Similarly, to findings of Hendricks and colleagues CAMH policy indicators were not associated with life satisfaction and psychosomatic complaints. Using the 2017/18 HBSC dataset and more recent data for policy indicators where possible, the given results only found support for Hendricks and colleague's findings of an association between national monitoring of adolescent mental health and aggressive behavior. Other policy indicators or the total policy score were not associated with higher reported aggressive behavior among adolescents in the current study. The absence of the association between policy indicators and adolescent aggressive behavior in the current dataset may be due to differences in the 2017/18 dataset in comparison to the 2013/14 or the more recent policy data. Data on the amount of monitoring of adolescent mental health was obtained from the Global Burden of Disease Study (GBD, Institute for Health Metrics and Evaluation, 2018). Possible data points ranged from 0 to 6, yet data was not normally distributed but centered on the extremes of the scale (SD = 2.05). Future studies could use more normally distributed data or differently code the scale.

Recent findings have shown an association of social security policies and adult mental health outcomes and inequalities (Simpson et al., 2021). Evidence on the effect of national CAMH policies on adolescent mental health outcomes and inequalities remains inconclusive. Results of Hendricks et al. (2020) and the current study suggest that national CAMH policies are only in parts associated with adolescent mental health outcomes and show no association with mental health inequalities. The selection of policy indicators could be reviewed and a different selection of national-level CAMH policies may yield other results. For example, public spending on family benefits has previously shown no association with adolescent psychological health complaints. In contrast, greater socioeconomic inequalities in psychological health complaints were found for countries with higher change rates in public spending on family benefits (Rathmann et al., 2016). Public spending on family benefits might rather benefit adolescents from better-off families. Health inequalities may not necessarily be ameliorated by initiatives to increase public spending, but rather be increased. Future studies could use different data on national indicators of CAMH policies.

Strengths and Limitations

This study has many strengths, including the use of comparable individual-level data from adolescents in 30 European countries, with multiple indicators of mental health.

There are several limitations for the given study. The usage of cross-sectional data prevents causal inference. When analyzing policies, it is important to acknowledge the time lag from policy implementation to observing any associated effects on mental health (Zhen, 2012). The combination of individual and national-level data only allows for the national level comparisons, yet adolescent mental health may be more susceptible to influence of more proximal-level contexts such as regions, schools, peers, and the family (UNICEF, 2018). These levels may also be differently affected by national CAMH policies. The implementation of CAMH policies may also vary within countries and national-level data may not necessarily reflect the association between CAMH policies and adolescent mental health. The HBSC data set has several limitations such that neither the gender of nonconforming adolescent can be studies, nor information on other important facets of adolescent mental health, such as depression, anxiety, attention-deficit/hyperactivity disorder, and trauma can be investigated.

Conclusion

To the best of knowledge, this is the first study to examine the interaction between national-level policy indicators and socio-economic status on the association with adolescent mental health outcomes. Findings relate to existing work showing cross-country variation in the social gradient in adolescent mental health. The results highlight the importance to further research the association between national policy indicators and adolescent mental health outcomes. Whereas recent evidence shows an association between policies and positive mental health outcomes and lower inequalities in adults (Simpson et al., 2021), this association might not apply to adolescent mental health. More research on the specific effect of CAMH policies and the association with adolescent mental health and mental health inequalities is highly needed.

References:

Aguinis, H., Gottfredson, R. K., & Culpepper, S. A. (2013). Best-Practice Recommendations for Estimating Cross-Level Interaction Effects Using Multilevel Modeling. Journal of Management, 39(6), 1490–1528. https://doi.org/10.1177/0149206313478188

Alegría, M., NeMoyer, A., Falgàs Bagué, I., Wang, Y., & Alvarez, K. (2018). Social Determinants of Mental Health: Where We Are and Where We Need to Go. *Current Psychiatry Reports*, *20*(11), 95. https://doi.org/10.1007/s11920-018-0969-9

Antaramian, S. P., Huebner, E. S., Hills, K. J., & Valois, R. F. (2010). A dual□factor model of mental health: Toward a more comprehensive understanding of youth functioning. *American Journal of Orthopsychiatry, 80*(4), 462–472. https://doi.org/10.1111/j.1939-0025.2010.01049.x

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, *67*(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Campbell, O. L. K., Bann, D., & Patalay, P. (2021). The gender gap in adolescent mental health: A cross-national investigation of 566,829 adolescents across 73 countries. *SSM - Population Health*, *13*, 100742. https://doi.org/10.1016/j.ssmph.2021.100742

Chung, H., Ng, E., Ibrahim, S., Karlsson, B., Benach, J., Espelt, A., & Muntaner, C. (2013). Welfare State Regimes, Gender, and Depression: A Multilevel Analysis of Middle and High Income Countries. *International Journal of Environmental Research and Public Health*, *10*(4), 1324–1341. https://doi.org/10.3390/ijerph10041324

Currie, C., Zanotti, C., Morgan, A., Currie, D., de Looze, M., Roberts, C., Samdal, O., Smith, O. R. F., & Barnekow, V. (Eds.) (2012). *Social determinants of health and well-being among young people. Health Behaviour in School-aged Children (HBSC) study: International report from the 2009/2010 survey*. (Health Policy for Children and Adolescents). WHO Regional Office for Europe. http://www.euro.who.int/__data/assets/pdf_file/0003/163857/Social-determinants-of-health-and-well-being-among-young-people.pdf

Currie, C., Inchley, J., Molcho, M., Lenzi, M., Veselska, Z., & Wild, F. (Eds.) (2014). *Health Behaviour in School-aged Children (HBSC) Study Protocol: Background, Methodology* *and Mandatory items for the 2013/14 Survey*. Child and Adolescent Health Research Unit (CAHRU).

Dohrenwend, B. P., & Dohrenwend, B. S. (1969). *Social status and psychological disorder: A causal inquiry*. New York: Wiley-Interscience.

Eaton, W. W. (1980). A formal theory of selection for schizophrenia. *American Journal of Sociology, 86*(1), 149e158.

Bambra, C., & Eikemo, T. A. (2009). Welfare state regimes, unemployment and health: A comparative study of the relationship between unemployment and self-reported health in 23 European countries. *Journal of Epidemiology and Community Health*, *63*(2), 92. https://doi.org/10.1136/jech.2008.077354

Elgar, F., Xie, A., Pförtner, T., White, J., & Pickett, K. (2017). Assessing the view from bottom: How to measure socioeconomic position and relative deprivation in adolescents.In *SAGE Research Methods Cases*. https://dx.doi.org/10.4135/9781526406347

Elgar, F. J., Pförtner, T.-K., Moor, I., De Clercq, B., Stevens, G. W. J. M., & Currie, C. (2015). Socioeconomic inequalities in adolescent health 2002–2010: A time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *The Lancet*, *385*(9982), 2088–2095. https://doi.org/10.1016/S0140-6736(14)61460-4

Erskine, H. E., Baxter, A. J., Patton, G., Moffitt, T. E., Patel, V., Whiteford, H. A., & Scott, J. G. (2017). The global coverage of prevalence data for mental disorders in children and adolescents. *Epidemiology and Psychiatric Sciences*, *26*(4), 395–402. Cambridge Core. https://doi.org/10.1017/S2045796015001158

Eurostat. (2020) Social protection statistics – family and children benefits. Retrieved from https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Social_protection_statistics_-_family_and_children_benefits

Eurostat. (2022) Public expenditure on education – Percent of GDP. Retrieved from https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Government_expenditure_on_education

Evans, G. W., & Kim, P. (2007). Childhood Poverty and Health: Cumulative Risk Exposure and Stress Dysregulation. Psychological Science, 18(11), 953–957. https://doi.org/10.1111/j.1467-9280.2007.02008.x

Gariépy, G., & Elgar, F. J. (2016). Trends in Psychological Symptoms among Canadian Adolescents from 2002 to 2014: Gender and Socioeconomic Differences. *The Canadian Journal of Psychiatry, 61*(12), 797–802. https://doi.org/10.1177/0706743716670130

Hendriks, A. M., Bartels, M., Stevens, G. W. J. M., Walsh, S. D., Torsheim, T., Elgar, F. J., & Finkenauer, C. (2020). National Child and Adolescent Health Policies as Indicators of Adolescent Mental Health: A Multilevel Analysis of 30 European Countries. *The Journal of Early Adolescence, 40*(4), 537–565. https://doi.org/10.1177/0272431619858413

Holstein, B.E., Currie, C., Boyce, W. *et al.* Socio-economic inequality in multiple health complaints among adolescents: international comparative study in 37 countries. *Int J Public Health* **54,** 260–270 (2009). https://doi.org/10.1007/s00038-009-5418-4

Howell, R. T., & Howell, C. J. (2008). The relation of economic status to subjective well-being in developing countries: A meta-analysis. *Psychological Bulletin, 134*(4), 536–560. https://doi.org/10.1037/0033-2909.134.4.536

House of Commons Library (2021, November 15). *Education spending in the UK.* https://commonslibrary.parliament.uk/research-briefings/sn01078/ https://doi-org.proxy.library.uu.nl/10.1007/s12187-015-9339-x

Inchley J., Currie D., Young T., et al. (2016). *Growing up unequal: gender and socioeconomic differences in young people's health and well-being. Health Behaviour in School-aged Children (HBSC) study: international report from the 2013/2014 survey* (No. 7).

World Health Organization.

Institute for Health Metrics and Evaluation. (2018). *Global burden of disease.* Retrieved from http://www.healthdata.org/gbd

Kuznetsova A, Brockhoff PB, Christensen RHB (2017). "lmerTest Package: Tests in Linear Mixed Effects Models." *Journal of Statistical Software*, 82(13), 1–26. doi: 10.18637/jss.v082.i13.

Levin, K.A., Currie, C. (2014). Reliability and Validity of an Adapted Version of the Cantril Ladder for Use with Adolescent Samples. *Soc Indic Res 119*, 1047–1063 https://doi.org/10.1007/s11205-013-0507-4

Lundberg, O., Fritzell, J., Åberg Yngwe, M. and Kölegård, M.L. (2010), The potential power of social policy programmes: income redistribution, economic resources and health. *International Journal of Social Welfare, 19*: S2-S13. https://doi.org/10.1111/j.1468-2397.2010.00727.x

Mackenbach, J.P. (2015) Socioeconomic inequalities in health in high-income countries: the facts and the options. *Oxford Textbook of Global Public Health. 1,* 106-26

OECD (2022). Family benefits public spending (indicator). doi: 10.1787/8e8b3273-en (Accessed on 24 May 2022)

Ottova, V., Erhart, M., Vollebergh, W., Kökönyei, G., Morgan, A., Gobina, I., Jericek, H., Cavallo, F., Välimaa, R., de Matos, M. G., Gaspar, T., Schnohr, C. W., & Ravens-Sieberer, U. (2012). The Role of Individual- and Macro-Level Social Determinants on Young Adolescents' Psychosomatic Complaints. The Journal of Early Adolescence, 32(1), 126–158. https://doi.org/10.1177/0272431611419510

Rathmann, K., Pförtner, TK., Osorio, A.M. *et al.* Adolescents' psychological health during the economic recession: does public spending buffer health inequalities among young people?. *BMC Public Health* **16,** 860 (2016). https://doi.org/10.1186/s12889-016-3551-6

R Core Team. (2022). *R: A Language and Environment for Statistical Computing*. Vienna, Austria. Retrieved from https://www.R-project.org/

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, *90*, 24–31. https://doi.org/10.1016/j.socscimed.2013.04.026

Ross, C. E., & Mirowsky, J. (2011). The interaction of personal and parental education on health. *Social science & medicine (1982)*, *72*(4), 591–599. https://doi.org/10.1016/j.socscimed.2010.11.028

Santiago, C. D., Kaltman, S., & Miranda, J. (2013). Poverty and mental health: how do low-income adults and children fare in psychotherapy?. *Journal of clinical psychology*, *69*(2), 115–126. https://doi.org/10.1002/jclp.21951

Shatkin, J. P., & Belfer, M. L. (2004). The Global Absence of Child and Adolescent Mental Health Policy. *Child and Adolescent Mental Health*, *9*(3), 104–108. https://doi.org/10.1111/j.1475-3588.2004.00090.x

Signorini, G., Singh, S. P., Boricevic-Marsanic, V., Dieleman, G., Dodig-Ćurković, K., Franic, T., Gerritsen, S. E., Griffin, J., Maras, A., McNicholas, F., O'Hara, L., Purper-Ouakil, D., Paul, M., Santosh, P., Schulze, U., Street, C., Tremmery, S., Tuomainen, H., Verhulst, F., … de Girolamo, G. (2017). Architecture and functioning of child and adolescent mental health services: A 28-country survey in Europe. *The Lancet Psychiatry*, *4*(9), 715–724. https://doi.org/10.1016/S2215-0366(17)30127-X

Simpson, J., Albani, V., Bell, Z., Bambra, C., & Brown, H. (2021). Effects of social security policy reforms on mental health and inequalities: A systematic review of observational studies in high-income countries. *Social Science & Medicine*, *272*, 113717. https://doi.org/10.1016/j.socscimed.2021.113717

Smeets, L., & van de Schoot, R. (2019, August 26). LME4 tutorial: Popularity data. https://www.rensvandeschoot.com/tutorials/lme4

Social Inequality in Adolescent Life Satisfaction: Comparison of Measure Approaches and Correlation with Macro-level Indices in 41 Countries. *Social Indicators Research*, *141*(3), 1055–1079. https://doi.org/10.1007/s11205-018-1860-0

Torsheim, T., Cavallo, F., Levin, K.A. et al. (2016). Psychometric Validation of the Revised Family Affluence Scale: a Latent Variable Approach. Child Ind Res 9, 771–784. https://doi-org.proxy.library.uu.nl/10.1007/s12187-015-9339-x

Thomson, K., Hillier-Brown, F., Todd, A., McNamara, C., Huijts, T., & Bambra, C. (2018). The effects of public health policies on health inequalities in high-income countries: An umbrella review. *BMC Public Health*, *18*(1), 869. https://doi.org/10.1186/s12889-018-5677-1

Tylee, A., Haller, D. M., Graham, T., Churchill, R., & Sanci, L. A. (2007). Youth-friendly primary-care services: How are we doing and what more needs to be done? *The Lancet*, *369*(9572), 1565–1573. https://doi.org/10.1016/S0140-6736(07)60371-7

United Nations International Children's Emergency Fund. (2018). Communication for Development (C4D): Global Progress and Country Level Highlights Across Programme Areas. Retrieved from https://www.unicef.org/publications/ index_102938.html

Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *Lancet (London, England)*, *379*(9826), 1641–1652. https://doi.org/10.1016/S0140-6736(12)60149-4

Wadsworth, M. E., & Achenbach, T. M. (2005). Explaining the link between low socioeconomic status and psychopathology: testing two mechanisms of the social causation hypothesis. *Journal of consulting and clinical psychology*, *73*(6), 1146–1153. https://doi.org/10.1037/0022-006X.73.6.1146

Weinberg, D., Delaruelle, K., & Finkenauer, C. (2021). Country-Level Meritocratic Beliefs Moderate the Social Gradient in Adolescent Mental Health: A Multilevel Study in 30 European Countries. *Journal of Adolescent Health*, 10. https://doi.org/10.1016/j.jadohealth.2020.06.031

Wittchen, H. U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., Olesen, J., Allgulander, C., Alonso, J., Faravelli, C., Fratiglioni, L., Jennum, P., Lieb, R., Maercker, A., van Os, J., Preisig, M., Salvador-Carulla, L., Simon, R., & Steinhausen, H.-C. (2011). The size and burden of mental disorders and other disorders of the brain in Europe 2010. *European Neuropsychopharmacology*, *21*(9), 655–679. https://doi.org/10.1016/j.euroneuro.2011.07.018

Zaborskis, A., Grincaite, M., Lenzi, M. *et al.* Social Inequality in Adolescent Life Satisfaction: Comparison of Measure Approaches and Correlation with Macro-level Indices in 41 Countries. *Soc Indic Res* **141,** 1055–1079 (2019).

Supplement Table 1

Untransformed values of the separate policies.

Countries	GBD coverage	Number of CAMHS per 100000 young people	Number of CAMH psychiatrists per 100000 young people	Number of CAMH psychologists per 100000 young people	OECD % of GDP spent on family benefits in 2017 or latest	% of GDP spent on education in 2020
Austria	0	0,7	6		2,62	5,1
Belgium	1	2,4	11,1		3,15	6,6
Bulgaria	0	0,5	1,9	1,7	1,8*	4
Croatia	0	1,3	6,3	3,1	1,8*	5,4
Czech Republic	0	0,8	6,8	4,4	2,92	5,1
Denmark	1	1,1	10,3	22,4	3,4	6,4
Estonia	1	2,1	16,8	25,2	3	6,6
Finland	6	12,9	36	36,9	2,87	5,9
France	5	3	9,1		3,6	5,5
Germany	4	4,1	8	32,9	3,17	4,7
Greece	1	2,4	16,3		1,62	4,5
Hungary	1	3,1	3,4	8,4	3,47	4,7
Iceland	1				3,27	7,7
Ireland	2	5,2	5,2	5,1	1,62	3,1
Italy	4	2,1	20		2,47	4,3
Latvia	1	5,3	11,2		2,23	5,9
Lithuania	0	0,9	14	21	2,08	5,2
Luxembourg	0	1,9	21,4	65,3	3,3	5
Malta	0	3	3		0,9*	5,9
Netherlands	5	3,2	10,7		1,84	5,3
Norway	5				3,35	5,9
Poland	0	2,5	3,5		2,99	5,2
Portugal	1	1,8	5,4	4,7	1,69	5
Romania	0		3,1		1,1*	3,7
Slovakia	0	3,6	3,6	2,7	2,01	4,6
Slovenia	0	9,7	6	15,4	1,85	5,8
Spain	4	2,4			1,31	4,6
Sweden	2	1	23,4	104,2	3,4	7,2
Switzerland	2				2,32	5,7
UK	6	7	4,5		3,23	4,36+

Note. Values with an asterisk were derived from OECD. Value with a plus from the UK House of Parliament.

Supplement 2

Access to the dataset was enabled by the supervisor.

Syntax

```
## Clean variables

#### Change sex to factor

HBSC$sex <- factor(HBSC$sex, levels= 1:2, labels = c("boy", "girl"))

#### Change age to categorical

HBSC$agecat <- factor(HBSC$agecat, levels= 1:3, labels = c("1", "2", "3"))

#### Change countryno to categorical

HBSC$countryno <- haven::as_factor(HBSC$countryno)

#### Change cluster to categorical

HBSC$cluster <- as.factor(HBSC$cluster)

#### Mental Health outcomes

#### factors with 5 levels

### Life satisfaction

HBSC$lifesat <- as.numeric(as.character(HBSC$lifesat))

### Health complaints

HBSC$headache <- as.numeric(as.character(HBSC$headache))

HBSC$headache <- car::recode(HBSC$headache, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$stomachache <- as.numeric(as.character(HBSC$stomachache))

HBSC$stomachache <- car::recode(HBSC$stomachache, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$backache <- as.numeric(as.character(HBSC$backache))

HBSC$backache <- car::recode(HBSC$backache, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$feellow <- as.numeric(as.character(HBSC$feellow))

HBSC$feellow <- car::recode(HBSC$feellow, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$irritable <- as.numeric(as.character(HBSC$irritable))

HBSC$irritable <- car::recode(HBSC$irritable, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$nervous <- as.numeric(as.character(HBSC$nervous))
```

~~~
HBSC$nervous <- car::recode(HBSC$nervous, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$sleepdificulty <- as.numeric(as.character(HBSC$sleepdificulty))

HBSC$sleepdificulty <- car::recode(HBSC$sleepdificulty, "5=0; 4=1; 3=2; 2=3; 1=4")

HBSC$dizzy <- as.numeric(as.character(HBSC$dizzy))

HBSC$dizzy <- car::recode(HBSC$dizzy, "5=0; 4=1; 3=2; 2=3; 1=4")

### Aggressive behavior

HBSC$bulliedothers <- as.numeric(as.character(HBSC$bulliedothers))

HBSC$bulliedothers <- car::recode(HBSC$bulliedothers, "5=4; 4=3; 3=2; 2=1; 1=0")

HBSC$bulliedothers_CH <- as.numeric(as.character(HBSC$bulliedothers_CH))

HBSC$bulliedothers_CH <- car::recode(HBSC$bulliedothers_CH, "5=4; 4=3; 3=2; 2=1; 1=0")

HBSC$fight12m <- as.numeric(as.character(HBSC$fight12m))

HBSC$fight12m <- car::recode(HBSC$fight12m, "5=4; 4=3; 3=2; 2=1; 1=0")

#### Socioeconomic variables

#### factors with 4 levels

HBSC$fascomputers <- as.numeric(as.character(HBSC$fascomputers))

HBSC$fasbathroom <- as.numeric(as.character(HBSC$fasbathroom))

HBSC$fasholidays <- as.numeric(as.character(HBSC$fasholidays))

#### factors with 3 levels

HBSC$fasfamcar <- as.numeric(as.character(HBSC$fasfamcar))

#### factors with 2 levels

HBSC$fasbedroom <- as.numeric(as.character(HBSC$fasbedroom))

HBSC$fasdishwash <- as.numeric(as.character(HBSC$fasdishwash))

```

```{r compute scores, include=FALSE}

### Aggressive behaviour

HBSC %>%

  rowwise() %>%

  mutate(AggBeh= ifelse(test =
~~~

```
countryno=="Switzerland",mean(c(bulliedothers_CH,fight12m)),mean(c(bulliedothers,fight12m)))) -> HBSC
### Psychosomatic health complaints
# HBSC %>%
#     rowwise() %>%
mutate(HealthComplaints=sum(c(headache,stomachache,backache,feellow,irritable,nervous,sleepdificulty,dizzy)))
-> HBSC
HBSC %>%
  rowwise() %>%
  mutate(PsyH = ifelse(mean(is.na(c_across(headache:dizzy))) <= 2,
                    sum(c_across(headache:dizzy), na.rm = FALSE), NA)) -> HBSC
```

```{r limit dataset to countries, include=FALSE}
##### Combine for Belgium
HBSC$countryno <- recode_factor(HBSC$countryno, "Belgium (Flemish)" = "Belgium", "Belgium (French)" =
"Belgium")
#### Combine for UK
HBSC$countryno <- recode_factor(HBSC$countryno, "England" = "UK", "Scotland" = "UK", "Northern Ireland" =
"UK", "Wales" = "UK")
#### Limit to desired selection of countries
select <- c("Austria",
          "Belgium",
          "Bulgaria",
          "Croatia",
          "Czech Republic",
          "Denmark",
           "Estonia",
           "Finland",
           "France",
```

```
    "Germany",
    "Greece",
    "Hungary",
    "Iceland",
    "Ireland",
    "Italy",
    "Latvia",
    "Lithuania",
    "Luxembourg",
    "Malta",
    "Netherlands",
    "Norway",
    "Poland",
    "Portugal",
    "Romania",
    "Slovakia",
    "Slovenia",
    "Spain",
    "Sweden",
    "Switzerland",
    "UK")

HBSC <- HBSC[HBSC$countryno %in% select,]
```

```{r clean policy data, include=FALSE}
#### Mental health facilities
# Standardize Monitoring to mean 0 and sd 1
Policy_indicators$Monitoring_s <- scale(Policy_indicators$Monitoring) %>% as.vector()
```

```
# Standardize Number of public CAMHS per 100.000
Policy_indicators$`Number of public CAMHS per 100,000  young people` %>% scale() %>% as.vector() -> Policy_indicators$PublicCAMHS_s
# Standardize Number of Psychiatrists per 100.000
Policy_indicators$`Number of child and adolescent psychiatristis per 100,000 young people` %>% scale() %>% as.vector() -> Policy_indicators$Psychiatrists_s
# Standardize Number of Psychologists per 100.000
Policy_indicators$`Number of child and adolescent psychologists per 100,000 young people` %>% scale() %>% as.vector() -> Policy_indicators$Psychologists_s
##### Combine standardized variables to 1
Policy_indicators %>% rowwise() %>% mutate(Facilities=mean(c(PublicCAMHS_s, Psychiatrists_s, Psychologists_s), na.rm = T)) -> Policy_indicators
Policy_indicators$Facilities_s <- scale(Policy_indicators$Facilities) %>% as.vector()
# Standardize family benefits
Policy_indicators$`Public spending on family benefits` %>% scale() %>% as.vector() -> Policy_indicators$Familybenefits_s
# Standardize Expenditure on eduction
Policy_indicators$`Government expenditure on education` %>% scale() %>% as.vector() -> Policy_indicators$Education_s
# Rename
Policy_indicators %>% rename(Familybenefits = `Public spending on family benefits`) -> Policy_indicators
Policy_indicators %>% rename(Education = `Government expenditure on education`) -> Policy_indicators
######### COMPUTE UPSTREAM AND DOWNSTREAM POLICY SCORES
### DOWNSTREAM (Medical care: Facilities & Monitoring)
Policy_indicators %>% rowwise() %>% mutate(Downstream=mean(c(Facilities_s,Monitoring_s), na.rm = T)) -> Policy_indicators
### UPSTREAM (Economic and social opportunities and resources)
```

```
Policy_indicators %>% rowwise() %>% mutate(Upstream=mean(c(Familybenefits_s, Education_s), na.rm = T)) ->
Policy_indicators
######## Compute Total Policy Score
Policy_indicators %>% rowwise() %>%
mutate(TotalP=mean(c(Facilities_s,Monitoring_s,Familybenefits_s,Education_s), na.rm = T)) -> Policy_indicators
#### Merge data
HBSC <- merge(HBSC, Policy_indicators, by = "countryno")
```

```{r exclude missing, include=FALSE}
#### Skim for missingness
#skim(HBSC)
#### exclude missing
HBSC_complete <- HBSC[complete.cases(HBSC[ , c('age','sex', 'lifesat','PIRFAS','AggBeh','PsyH')]), ]
```

```{r scale ourcome variables}
HBSC_complete$lifesat_s <- HBSC_complete$lifesat %>% scale() %>% as.vector()
HBSC_complete$AggBeh_s <- HBSC_complete$AggBeh %>% scale() %>% as.vector()
HBSC_complete$PsyH_s <- HBSC_complete$PsyH %>% scale() %>% as.vector()
```

```{r item correlation, include=FALSE}
Cor_agg <- HBSC_complete[ , c('bulliedothers','fight12m')]
Cor_agg_r <- stats::cor(Cor_agg, use = "complete.obs") %>% round(.,2)
```

```{r reliability number CAMHS, include=FALSE}
CAMHS_a <- dplyr::select(Policy_indicators,PublicCAMHS_s,Psychiatrists_s,Psychologists_s)
Service_a<- psych::alpha(CAMHS_a)[1] %>% as.data.frame()
```

```{r reliability total policy, include=FALSE}
```

```
TotalP <- dplyr::select(Policy_indicators,Monitoring_s,Facilities_s,Education_s,Familybenefits_s)

TotalP_a<- psych::alpha(TotalP)[1] %>% as.data.frame()

```

```{r descriptives, include=FALSE}

### descriptive table

HBSC_complete %>%

  group_by(countryno) %>%

  summarise(N = length(unique(id, na.rm = T)),

            Girls = (100 * (mean(sex == "girl"))),

            Age = mean(age, na.rm = T),

            Lifesat = mean(lifesat, na.rm = T),

            AGG = mean(AggBeh, na.rm = T),

            PSH = mean(PsyH, na.rm = T),

            Monitoring = mean(Monitoring_s, na.rm = T),

            Facilities = mean(Facilities_s, na.rm = T),

            Benefit = mean(Familybenefits_s, na.rm = T),

            Education = mean(Education_s, na.rm = T),

            MeanPolicy = mean(TotalP))%>%

  mutate_if(is.numeric, ~round(., 1)) %>%

  print(n = 30) -> DTable

nice_table(DTable) -> DTable_apa

save_as_docx(DTable_apa, path = "/Users/nik/Documents/DTable.docx")

```

```{r Correlations, include=FALSE}

# dataframe with variables

Cor_var <- HBSC_complete[ , c('sex','age','lifesat','AggBeh','PsyH','PIRFAS')]

Cor_var$sex <- as.numeric(Cor_var$sex)

Cor_table <- stats::cor(Cor_var, use = "complete.obs") %>% round(.,2)
```

```
### Correlation Table
corrplot(Cor_tablep, type = "upper", order = "hclust",
    tl.col = "black", tl.srt = 45, sig.level = 0.05, insig = "p-value")
rcorr(as.matrix(Cor_var)) -> CorrTable
CorrTable$r -> CorT_r
CorrTable$P -> CorT_p
nice_table(as.data.frame(CorT_p)) -> CTable_apa
save_as_docx(CTable_apa, path = "/Users/nik/Documents/CTable.docx")
Cor_varp <- Policy_indicators[, c("Familybenefits", "Education", "Monitoring", "Facilities")]
Cor_tablep <- stats::cor(Cor_varp, use = "complete.obs") %>% round(.,2)
rcorr(as.matrix(Cor_varp)) -> CorrTablep
```

```
```{r Figure Map europe lifesat, include=FALSE}
###########################################
HBSC_complete %>% group_by(countryno) %>% summarise(Lifesat = mean(lifesat_s)) %>%
mutate_if(is.numeric, ~round(., 2)) %>% as.data.frame() %>% rename(region = countryno) -> map_lifesat
levels(map_lifesat$region)[levels(map_lifesat$region)=="UK"] <- "United Kingdom"
levels(map_lifesat$region)[levels(map_lifesat$region)=="Czech Republic"] <- "Czech Rep."
worldMap <- getMap()
# Member States of the European Union
europeanUnion <- c("Austria","Belgium","Bulgaria","Croatia",
          "Czech Rep.","Denmark","Estonia","Finland","France",
          "Germany","Greece","Hungary","Iceland","Ireland","Italy","Latvia",
          "Lithuania","Luxembourg","Malta","Netherlands","Norway","Poland",
          "Portugal","Romania","Slovakia","Slovenia","Spain",
          "Sweden","Switzerland","United Kingdom")
# Select only the index of states member of the E.U.
```
```

```
indEU <- which(worldMap$NAME%in%europeanUnion)
# Extract longitude and latitude border's coordinates of members states of E.U.
europeCoords <- lapply(indEU, function(i){
  df <- data.frame(worldMap@polygons[[i]]@Polygons[[1]]@coords)
  df$region =as.character(worldMap$NAME[i])
  colnames(df) <- list("long", "lat", "region")
  return(df)
})
europeCoords <- do.call("rbind", europeCoords)
europeanUnionTable <- data.frame(country = map_lifesat$region, value = map_lifesat$Lifesat)
europeCoords$value <- europeanUnionTable$value[match(europeCoords$region,europeanUnionTable$country)]
# Plot the map
P <- ggplot() + geom_polygon(data = europeCoords, aes(x = long, y = lat, group = region, fill = value),
                             colour = "black", size = 0.1) +
  coord_map(xlim = c(-25, 35),  ylim = c(32, 71))
P <- P + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
               panel.background = element_blank(),
               axis.text.x = element_blank(),
               axis.text.y = element_blank(), axis.ticks.x = element_blank(),
               axis.ticks.y = element_blank(), axis.title = element_blank(),
               #rect = element_blank(),
               plot.margin = unit(0 * c(-1.5, -1.5, -1.5, -1.5), "lines"))
P <- P + scale_fill_gradient(name = "Mean LS", low = "#FFFFFF", high = "#006600", na.value = "grey50")
P <- P + theme(legend.title = element_text(size = 25)) + theme(legend.key.size = unit(2, 'cm')) + theme(legend.text
= element_text(size = 25))
P
```

```{r Figure Map europe PsyH, include=FALSE}
```

```
########################################
HBSC_complete %>% group_by(countryno) %>% summarise(PsyH = mean(PsyH_s)) %>% mutate_if(is.numeric,
~round(., 2)) %>% as.data.frame() %>% rename(region = countryno) -> map_PsyH
levels(map_PsyH$region)[levels(map_PsyH$region)=="UK"] <- "United Kingdom"
levels(map_PsyH$region)[levels(map_PsyH$region)=="Czech Republic"] <- "Czech Rep."
worldMap <- getMap()
# Member States of the European Union
europeanUnion <- c("Austria","Belgium","Bulgaria","Croatia",
                   "Czech Rep.","Denmark","Estonia","Finland","France",
                   "Germany","Greece","Hungary","Iceland","Ireland","Italy","Latvia",
                   "Lithuania","Luxembourg","Malta","Netherlands","Norway","Poland",
                   "Portugal","Romania","Slovakia","Slovenia","Spain",
                   "Sweden","Switzerland","United Kingdom")
# Select only the index of states member of the E.U.
indEU <- which(worldMap$NAME%in%europeanUnion)
# Extract longitude and latitude border's coordinates of members states of E.U.
europeCoords <- lapply(indEU, function(i){
  df <- data.frame(worldMap@polygons[[i]]@Polygons[[1]]@coords)
  df$region =as.character(worldMap$NAME[i])
  colnames(df) <- list("long", "lat", "region")
  return(df)
})
europeCoords <- do.call("rbind", europeCoords)
europeanUnionTable_PsyH <- data.frame(country = map_PsyH$region, value = map_PsyH$PsyH)
europeCoords$value <-
europeanUnionTable_PsyH$value[match(europeCoords$region,europeanUnionTable_PsyH$country)]
# Plot the map
D <- ggplot() + geom_polygon(data = europeCoords, aes(x = long, y = lat, group = region, fill = value),
```

```
                    colour = "black", size = 0.1) +
  coord_map(xlim = c(-25, 35),  ylim = c(32, 71))
D <- D + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
          panel.background = element_blank(),
          axis.text.x = element_blank(),
          axis.text.y = element_blank(), axis.ticks.x = element_blank(),
          axis.ticks.y = element_blank(), axis.title = element_blank(),
          #rect = element_blank(),
          plot.margin = unit(0 * c(-1.5, -1.5, -1.5, -1.5), "lines"))
D <- D + scale_fill_gradient(name = "Mean PS", low = "#FFFFFF", high = "#660066", na.value = "grey50")
D <- D + theme(legend.title = element_text(size = 25)) + theme(legend.key.size = unit(2, 'cm')) + theme(legend.text
= element_text(size = 25))
D
```

```{r Figure Map europe AggBeh, include=FALSE}
#########################################
HBSC_complete %>% group_by(countryno) %>% summarise(AggBeh = mean(AggBeh_s)) %>%
mutate_if(is.numeric, ~round(., 2)) %>% as.data.frame() %>% rename(region = countryno) -> map_AggBeh
levels(map_AggBeh$region)[levels(map_AggBeh$region)=="UK"] <- "United Kingdom"
levels(map_AggBeh$region)[levels(map_AggBeh$region)=="Czech Republic"] <- "Czech Rep."
worldMap <- getMap()
# Member States of the European Union
europeanUnion <- c("Austria","Belgium","Bulgaria","Croatia",
            "Czech Rep.","Denmark","Estonia","Finland","France",
            "Germany","Greece","Hungary","Iceland","Ireland","Italy","Latvia",
            "Lithuania","Luxembourg","Malta","Netherlands","Norway","Poland",
            "Portugal","Romania","Slovakia","Slovenia","Spain",
            "Sweden","Switzerland","United Kingdom")
```

```
# Select only the index of states member of the E.U.
indEU <- which(worldMap$NAME%in%europeanUnion)
# Extract longitude and latitude border's coordinates of members states of E.U.
europeCoords <- lapply(indEU, function(i){
  df <- data.frame(worldMap@polygons[[i]]@Polygons[[1]]@coords)
  df$region =as.character(worldMap$NAME[i])
  colnames(df) <- list("long", "lat", "region")
  return(df)
})
europeCoords <- do.call("rbind", europeCoords)
europeanUnionTable_AggBeh <- data.frame(country = map_AggBeh$region, value = map_AggBeh$AggBeh)
europeCoords$value <-
europeanUnionTable_AggBeh$value[match(europeCoords$region,europeanUnionTable_AggBeh$country)]
# Plot the map
E <- ggplot() + geom_polygon(data = europeCoords, aes(x = long, y = lat, group = region, fill = value),
                             colour = "black", size = 0.1) +
  coord_map(xlim = c(-25, 35),  ylim = c(32, 71))
E <- E + scale_fill_gradient(name = "Growth Rate", low = "#FFFFFF", high = "#FF3300", na.value = "grey50")
E <- E + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
               panel.background = element_blank(),
               axis.text.x = element_blank(),
               axis.text.y = element_blank(), axis.ticks.x = element_blank(),
               axis.ticks.y = element_blank(), axis.title = element_blank(),
               #rect = element_blank(),
               plot.margin = unit(0 * c(-1.5, -1.5, -1.5, -1.5), "lines"))
E <- E + scale_fill_gradient(name = "Mean AGG", low = "#FFFFFF", high = "#FF3300", na.value = "grey50")
E <- E + theme(legend.title = element_text(size = 25)) + theme(legend.key.size = unit(2, 'cm')) + theme(legend.text
```

````
= element_text(size = 25))

E

```

```{r Figure Map europe Policy, include=FALSE}

########################################

HBSC_complete %>% group_by(countryno) %>% summarise(TotalP = mean(TotalP)) %>% mutate_if(is.numeric,
~round(., 2)) %>% as.data.frame() %>% rename(region = countryno) -> map_TotalP

levels(map_TotalP$region)[levels(map_TotalP$region)=="UK"] <- "United Kingdom"

levels(map_TotalP$region)[levels(map_TotalP$region)=="Czech Republic"] <- "Czech Rep."

worldMap <- getMap()

# Member States of the European Union

europeanUnion <- c("Austria","Belgium","Bulgaria","Croatia",
                   "Czech Rep.","Denmark","Estonia","Finland","France",
                   "Germany","Greece","Hungary","Iceland","Ireland","Italy","Latvia",
                   "Lithuania","Luxembourg","Malta","Netherlands","Norway","Poland",
                   "Portugal","Romania","Slovakia","Slovenia","Spain",
                   "Sweden","Switzerland","United Kingdom")

# Select only the index of states member of the E.U.

indEU <- which(worldMap$NAME%in%europeanUnion)

# Extract longitude and latitude border's coordinates of members states of E.U.

europeCoords <- lapply(indEU, function(i){
  df <- data.frame(worldMap@polygons[[i]]@Polygons[[1]]@coords)
  df$region =as.character(worldMap$NAME[i])
  colnames(df) <- list("long", "lat", "region")
  return(df)
})

europeCoords <- do.call("rbind", europeCoords)

europeanUnionTable_TotalP <- data.frame(country = map_TotalP$region, value = map_TotalP$TotalP)
````

```
europeCoords$value <-
europeanUnionTable_TotalP$value[match(europeCoords$region,europeanUnionTable_TotalP$country)]
# Plot the map
W <- ggplot() + geom_polygon(data = europeCoords, aes(x = long, y = lat, group = region, fill = value),
                             colour = "black", size = 0.1) +
  coord_map(xlim = c(-25, 35),  ylim = c(32, 71))
W <- W + scale_fill_gradient(name = "Growth Rate", low = "#FFFFFF", high = "#FF3300", na.value = "grey50")
W <- W + theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
               panel.background = element_blank(),
               axis.text.x = element_blank(),
               axis.text.y = element_blank(), axis.ticks.x = element_blank(),
               axis.ticks.y = element_blank(), axis.title = element_blank(),
               #rect = element_blank(),
               plot.margin = unit(0 * c(-1.5, -1.5, -1.5, -1.5), "lines"))
W <- W + scale_fill_gradient(name = "Mean Policy", low = "#FFFFFF", high = "#3399CC", na.value = "grey50")
W <- W + theme(legend.title = element_text(size = 25)) + theme(legend.key.size = unit(2, 'cm')) +
theme(legend.text = element_text(size = 25))
W
```

```{r centering variables}
#### grand-mean centering variables national-level
HBSC_complete$TotalP_c <- misty::center(HBSC_complete$TotalP, type = c("CGM"), cluster =
HBSC_complete$countryno)
HBSC_complete$Familybenefits_c <- misty::center(HBSC_complete$Familybenefits, type = c("CGM"), cluster =
HBSC_complete$countryno)
HBSC_complete$Education_c <- misty::center(HBSC_complete$Education, type = c("CGM"), cluster =
HBSC_complete$countryno)
HBSC_complete$Monitoring_c <- misty::center(HBSC_complete$Monitoring, type = c("CGM"), cluster =
```

```
HBSC_complete$countryno)
HBSC_complete$Facilities_c <- misty::center(HBSC_complete$Facilities, type = c("CGM"), cluster =
HBSC_complete$countryno)
#### group-mean centering variables individual-level
HBSC_complete$PIRFAS_c <- misty::center(HBSC_complete$PIRFAS, type = c("CWC"), cluster =
HBSC_complete$countryno)
HBSC_complete$age_c <- misty::center(HBSC_complete$age, type = c("CWC"), cluster =
HBSC_complete$countryno)
```

```{r random intercept models}
#### Unconditional means model
# the purpose of the unconditional means model is to assess the amount of variation at each level—to compare
variability within countries to variability between countries.
# And then compute the intra-class correlation (ICC) as the ratio of the random intercept variance (between-country)
to the total variance, defined as the sum of the random intercept variance and residual variance (between + within).
########## Unconditional model lifesat
m1_lifesat <- lmerTest::lmer(lifesat ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)
RandomEffects_lifesat <- as.data.frame(VarCorr(m1_lifesat))
ICC_between_lifesat <- RandomEffects_lifesat[1,4]/(RandomEffects_lifesat[1,4]+RandomEffects_lifesat[2,4])
predict(m1_lifesat) -> pred_lifesat
HBSC_complete %>%
  ggplot(aes(lifesat, pred_lifesat, color = countryno, group = countryno)) +
  geom_smooth(se = F, method = lm) +
  theme_bw() +
  theme(axis.text.x = element_blank(),
        axis.ticks = element_blank()) +
  labs(x = "", y = "Lifesat", color = "Country")
########## Unconditional Aggressive Behavior
```

~~~
m1_AggBeh <- lmerTest::lmer(AggBeh ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)
RandomEffects_AggBeh <- as.data.frame(VarCorr(m1_AggBeh))
ICC_between_AggBeh <-
RandomEffects_AggBeh[1,4]/(RandomEffects_AggBeh[1,4]+RandomEffects_AggBeh[2,4])
########## Unconditional Psy H
m1_PsyH <- lmerTest::lmer(PsyH ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)
RandomEffects_PsyH <- as.data.frame(VarCorr(m1_PsyH))
ICC_between_PsyH <- RandomEffects_PsyH[1,4]/(RandomEffects_PsyH[1,4]+RandomEffects_PsyH[2,4])
```
```{r stepwise lifesat, include=FALSE}
######################## lifesat
m_lifesat <- lmerTest::lmer(lifesat ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)
m_lifesat_s <- lmerTest::lmer(lifesat ~ 1 + sex + (1|countryno), data = HBSC_complete, REML = F, weights =
weight)
m_lifesat_s_a <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + (1|countryno), data = HBSC_complete, REML = F,
weights = weight)
m_lifesat_s_a_ses <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c + (1|countryno), data =
HBSC_complete, REML = F, weights = weight)
m_lifesat_s_a_ses_p <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1|countryno), data =
HBSC_complete, REML = F, weights = weight)
m_lifesat_s_a_ses_allp <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c + Facilities_c +
Familybenefits_c + Education_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)
m_lifesat_s_a_ses_p_slopes <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1 + PIRFAS_c|
countryno), data = HBSC_complete, REML = T, weights = weight, lmerControl(optimizer = "bobyqa"))
m_lifesat_s_a_ses_allp_slopes <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c +
Facilities_c + Familybenefits_c + Education_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T,
weights = weight)
m_lifesat_s_a_ses_p_slopes_interaction <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c*TotalP_c + (1 +
~~~

PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_lifesat_s_a_ses_allp_slopes_interaction <- lmerTest::lmer(lifesat ~ 1 + sex + age_c + PIRFAS_c*(Monitoring_c + Facilities_c + Familybenefits_c + Education_c) + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

fill in anvova

```

```{r stepwise psyH}

################## Psychosomatic Complaints

m_PsyH <- lmerTest::lmer(PsyH ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s <- lmerTest::lmer(PsyH ~ 1 + sex + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s_a <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s_a_ses <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s_a_ses_p <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s_a_ses_allp <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c + Facilities_c + Familybenefits_c + Education_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_PsyH_s_a_ses_p_slopes <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_PsyH_s_a_ses_allp_slopes <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c + Facilities_c + Familybenefits_c + Education_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_PsyH_s_a_ses_p_slopes_interaction <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c*TotalP_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_PsyH_s_a_ses_allp_slopes_interaction <- lmerTest::lmer(PsyH ~ 1 + sex + age_c + PIRFAS_c*(Monitoring_c + Facilities_c + Familybenefits_c + Education_c) + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

### fill in anova

```

```{r stepwise aggressive behavior}

################### Aggressive Behaviour

m_AggBeh <- lmerTest::lmer(AggBeh ~ 1 + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s <- lmerTest::lmer(AggBeh ~ 1 + sex + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s_a <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s_a_ses <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s_a_ses_p <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s_a_ses_allp <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c + Facilities_c + Familybenefits_c + Education_c + (1|countryno), data = HBSC_complete, REML = F, weights = weight)

m_AggBeh_s_a_ses_p_slopes <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c + TotalP_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_AggBeh_s_a_ses_allp_slopes <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c + Monitoring_c + Facilities_c + Familybenefits_c + Education_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_AggBeh_s_a_ses_p_slopes_interaction <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c*TotalP_c + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

m_AggBeh_s_a_ses_allp_slopes_interaction <- lmerTest::lmer(AggBeh ~ 1 + sex + age_c + PIRFAS_c*(Monitoring_c + Facilities_c + Familybenefits_c + Education_c) + (1 + PIRFAS_c|countryno), data = HBSC_complete, REML = T, weights = weight)

### fill in anova

```
```

```{r beta function}
# create a function for beta.
stdCoef.merMod <- function(object)
{sdy <- sd(getME(object,"y"))
  sdx <- apply(getME(object,"X"), 2, sd)
  sc <- fixef(object)*sdx/sdy
  se.fixef <- coef(summary(object))[,"Std. Error"]
  se <- se.fixef*sdx/sdy
  return(data.frame(stdcoef=sc, stdse=se))}
```

```{r Analysis, include=FALSE}
#############################################
############ Regression ###################
############## MODEL 0 #### Null model
m_lifesat
summary(m_lifesat)
jtools::summ(m_lifesat)
stdCoef.merMod(m_lifesat)
ranova(m_lifesat)

m_AggBeh
summary(m_AggBeh)
jtools::summ(m_AggBeh)
stdCoef.merMod(m_AggBeh)
ranova(m_AggBeh)
```

```
m_PsyH
summary(m_PsyH )
jtools::summ(m_PsyH )
stdCoef.merMod(m_PsyH )
ranova(m_PsyH )
###############################################
############# MODEL 1 #### SEX + AGE + SES
m_lifesat_s_a_ses
summary(m_lifesat_s_a_ses)
jtools::summ(m_lifesat_s_a_ses)
stdCoef.merMod(m_lifesat_s_a_ses)
ranova(m_lifesat_s_a_ses)

m_AggBeh_s_a_ses
summary(m_AggBeh_s_a_ses)
jtools::summ(m_AggBeh_s_a_ses)
stdCoef.merMod(m_AggBeh_s_a_ses)
ranova(m_AggBeh_s_a_ses)

m_PsyH_s_a_ses
summary(m_PsyH_s_a_ses)
jtools::summ(m_PsyH_s_a_ses)
stdCoef.merMod(m_PsyH_s_a_ses)
ranova(m_PsyH_s_a_ses)
###############################################
############# MODEL 1a #### SEX + AGE + SES + Total Policy
m_lifesat_s_a_ses_p
summary(m_lifesat_s_a_ses_p)
```

```
jtools::summ(m_lifesat_s_a_ses_p)

stdCoef.merMod(m_lifesat_s_a_ses_p)

ranova(m_lifesat_s_a_ses_p)


m_AggBeh_s_a_ses_p

summary(m_AggBeh_s_a_ses_p)

jtools::summ(m_AggBeh_s_a_ses_p)

stdCoef.merMod(m_AggBeh_s_a_ses_p)

ranova(m_AggBeh_s_a_ses_p)


m_PsyH_s_a_ses_p

summary(m_PsyH_s_a_ses_p)

jtools::summ(m_PsyH_s_a_ses_p)

stdCoef.merMod(m_PsyH_s_a_ses_p)

ranova(m_PsyH_s_a_ses_p)

############################################

############# MODEL 1a #### SEX + AGE + SES + Individual Policies


m_lifesat_s_a_ses_allp

summary(m_lifesat_s_a_ses_allp)

jtools::summ(m_lifesat_s_a_ses_allp)

stdCoef.merMod(m_lifesat_s_a_ses_allp)

ranova(m_lifesat_s_a_ses_allp)


m_AggBeh_s_a_ses_allp

summary(m_AggBeh_s_a_ses_allp)

jtools::summ(m_AggBeh_s_a_ses_allp)

stdCoef.merMod(m_AggBeh_s_a_ses_allp)
```

```
ranova(m_AggBeh_s_a_ses_allp)


m_PsyH_s_a_ses_allp

summary(m_PsyH_s_a_ses_allp)

jtools::summ(m_PsyH_s_a_ses_allp)

stdCoef.merMod(m_PsyH_s_a_ses_allp)

ranova(m_PsyH_s_a_ses_allp)

##### ADDING SLOPES ########

###########################################

############# MODEL 2.1 #### AGE + SEX + SES + Total Policy + (1 + SES)

m_lifesat_s_a_ses_p_slopes

summary(m_lifesat_s_a_ses_p_slopes)

jtools::summ(m_lifesat_s_a_ses_p_slopes)

stdCoef.merMod(m_lifesat_s_a_ses_p_slopes)

ranova(m_lifesat_s_a_ses_p_slopes)


m_AggBeh_s_a_ses_p_slopes

summary(m_AggBeh_s_a_ses_p_slopes)

jtools::summ(m_AggBeh_s_a_ses_p_slopes)

stdCoef.merMod(m_AggBeh_s_a_ses_p_slopes)

ranova(m_AggBeh_s_a_ses_p_slopes)


m_PsyH_s_a_ses_p_slopes

summary(m_PsyH_s_a_ses_p_slopes)

jtools::summ(m_PsyH_s_a_ses_p_slopes)

stdCoef.merMod(m_PsyH_s_a_ses_p_slopes)

ranova(m_PsyH_s_a_ses_p_slopes)

###########################################
```

############# MODEL 2.2 #### AGE + SEX + SES + Individual Policy + (1 + SES)

m_lifesat_s_a_ses_allp_slopes

summary(m_lifesat_s_a_ses_allp_slopes)

jtools::summ(m_lifesat_s_a_ses_allp_slopes)

stdCoef.merMod(m_lifesat_s_a_ses_allp_slopes)

ranova(m_lifesat_s_a_ses_allp_slopes)

m_AggBeh_s_a_ses_allp_slopes

summary(m_AggBeh_s_a_ses_allp_slopes)

jtools::summ(m_AggBeh_s_a_ses_allp_slopes)

stdCoef.merMod(m_AggBeh_s_a_ses_allp_slopes)

ranova(m_AggBeh_s_a_ses_allp_slopes)

m_PsyH_s_a_ses_allp_slopes

summary(m_PsyH_s_a_ses_allp_slopes)

jtools::summ(m_PsyH_s_a_ses_allp_slopes)

stdCoef.merMod(m_PsyH_s_a_ses_allp_slopes)

ranova(m_PsyH_s_a_ses_allp_slopes)

###

############# MODEL 3.1 #### AGE + SEX + SES * Total Policy + (1 + SES)

m_lifesat_s_a_ses_p_slopes_interaction

summary(m_lifesat_s_a_ses_p_slopes_interaction)

jtools::summ(m_lifesat_s_a_ses_p_slopes_interaction)

stdCoef.merMod(m_lifesat_s_a_ses_p_slopes_interaction)

ranova(m_lifesat_s_a_ses_p_slopes_interaction)

```
m_AggBeh_s_a_ses_p_slopes_interaction

summary(m_AggBeh_s_a_ses_p_slopes_interaction)

jtools::summ(m_AggBeh_s_a_ses_p_slopes_interaction)

stdCoef.merMod(m_AggBeh_s_a_ses_p_slopes_interaction)

ranova(m_AggBeh_s_a_ses_p_slopes_interaction)


m_PsyH_s_a_ses_p_slopes_interaction

summary(m_PsyH_s_a_ses_p_slopes_interaction)

jtools::summ(m_PsyH_s_a_ses_p_slopes_interaction)

stdCoef.merMod(m_PsyH_s_a_ses_p_slopes_interaction)

ranova(m_PsyH_s_a_ses_p_slopes_interaction)

###########################################

############# MODEL 3.1 #### AGE + SEX + SES * Individual Policy + (1 + SES)

m_lifesat_s_a_ses_allp_slopes_interaction

summary(m_lifesat_s_a_ses_allp_slopes_interaction)

jtools::summ(m_lifesat_s_a_ses_allp_slopes_interaction)

stdCoef.merMod(m_lifesat_s_a_ses_allp_slopes_interaction)

ranova(m_lifesat_s_a_ses_allp_slopes_interaction)


m_AggBeh_s_a_ses_allp_slopes_interaction

summary(m_AggBeh_s_a_ses_allp_slopes_interaction)

jtools::summ(m_AggBeh_s_a_ses_allp_slopes_interaction)

stdCoef.merMod(m_AggBeh_s_a_ses_allp_slopes_interaction)

ranova(m_AggBeh_s_a_ses_allp_slopes_interaction)


m_PsyH_s_a_ses_allp_slopes_interaction

summary(m_PsyH_s_a_ses_allp_slopes_interaction)

jtools::summ(m_PsyH_s_a_ses_allp_slopes_interaction)
```

```
stdCoef.merMod(m_PsyH_s_a_ses_allp_slopes_interaction)

ranova(m_PsyH_s_a_ses_allp_slopes_interaction)
```