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Original article

## Country-Level Meritocratic Beliefs Moderate the Social Gradient in Adolescent Mental Health: A Multilevel Study in 30 European Countries



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### A B S T R A C T

**Purpose:** Adolescents with higher socioeconomic status (SES) report better mental health. The strength of the association—the “social gradient in adolescent mental health”—varies across countries, with stronger associations in countries with greater income inequality. Country-level meritocratic beliefs (beliefs that people get what they deserve) may also strengthen the social gradient in adolescent mental health; higher SES may be more strongly linked to adolescent’s perceptions of capability and respectful treatment.

**Methods:** Using data from 11–15 year olds across 30 European countries participating in the 2013/2014 Health Behaviour in School-aged Children study ( $n = 131,101$ ), multilevel regression models with cross-level interactions examined whether country-level meritocratic beliefs moderated the association between two individual-level indicators of SES, family affluence and perceived family wealth, and three indicators of adolescent mental health (life satisfaction, psychosomatic complaints, and aggressive behavior).

**Results:** For family affluence, in some countries, there was a social gradient in adolescent mental health, but in others the social gradient was absent or reversed. For perceived family wealth, there was a social gradient in adolescent life satisfaction and psychosomatic complaints in all countries. Country-level meritocratic beliefs moderated associations between SES and both life satisfaction and psychosomatic complaints: in countries with stronger meritocratic beliefs associations with family affluence strengthened, while associations with perceived family wealth weakened.

**Conclusions:** Country-level meritocratic beliefs moderate the associations between SES and adolescent mental health, with contrasting results for two different SES measures. Further

### IMPLICATIONS AND CONTRIBUTION

This study suggests that country-level meritocratic beliefs (aggregated beliefs that people get what they deserve) influence social gradients in adolescent mental health. Understanding the interplay among meritocratic beliefs, socioeconomic status, and adolescent mental health can strengthen the knowledge base on country-level differences in the social gradient in adolescent mental health.

**Conflicts of interest:** All authors have declared that they have no conflicts of interest to disclose.

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understanding of the mechanisms connecting meritocratic beliefs, SES, and adolescent mental health is warranted.

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In almost all European countries, adolescents with higher socioeconomic status (SES) have better mental health [1,2]. However, the strength of this association (the “social gradient in adolescent mental health”) varies across countries [3]. Previous studies have focused on the moderating role of country-level economic and policy factors and consistently found stronger social gradients in adolescent mental health in countries with greater income inequality [1,4]. However, other country-level economic and policy factors have produced less consistent findings: some studies showed a stronger social gradient in countries with lower national income [1,3] and lower welfare expenditure [5]; others indicated no such moderating effects [4,6].

The absence of country-level sociocultural factors from existing research may have limited our understanding of cross-country variation in the social gradient in adolescent mental health. Given the expansion of education and opportunities for upward social mobility, one such factor that may be important is meritocratic beliefs—the extent to which people believe that people get what they deserve [7,8]. The proportion of the population that holds such a view varies substantially between countries (from 19% of adults in Greece to 61% of adults in Austria [9]), and the indicator has been used in previous cross-country research [10].

Individuals, including adolescents, are expected to internalize country-level meritocratic beliefs. For at least two reasons, this may lead to stronger social gradients in adolescent mental health in countries with stronger meritocratic beliefs. First, in such countries, adolescents may be more likely to believe that SES indicates levels of talent and effort [11,12]. The higher an adolescents’ SES, the more they may perceive that they (and their family) are relatively talented and hardworking and thus capable of achieving their goals, which can have a positive effect on their mental health [13,14]. Second, in countries with stronger meritocratic beliefs, people may more strongly perceive adolescents (and their family) to be deserving of their SES and treat them accordingly. The higher an adolescents’ SES, the more they may feel respected and socially valued, with positive effects for their mental health [7,15].

Using nationally representative samples of adolescents from 30 countries, this study examined two research questions: (1) Does the social gradient in adolescent mental health vary across countries? (2) Does the strength of a country’s meritocratic beliefs moderate the association between SES and adolescent mental health? We hypothesized that the social gradient in adolescent mental health would vary across countries (1) and would be stronger in countries with stronger meritocratic beliefs (2). We included two measures of SES—family affluence and perceived family wealth—as research has indicated that they are moderately correlated and associated with adolescent mental health through different, though related, mechanisms [16,17]. We included three indicators of mental health—life satisfaction, psychosomatic complaints, and aggressive behavior—

incorporating positive mental health as well as emotional and behavioral problems [18].

## Methods

### Sample

Individual-level data were obtained from the 2013/2014 Health Behaviour in School-aged Children (HBSC) study [2]. Adolescents in 42 countries/regions completed surveys conducted in classrooms. All countries/regions adhered to a standard international protocol to ensure consistency of measures, sampling, and implementation procedures [19]. Each country/region used cluster sampling for selecting schools (both public and private) and classes to generate a representative sample of boys and girls aged 11, 13, and 15 years. Appropriate ethical approval for the survey was granted in each country/region, participation was voluntary, and passive or active consent was sought from school administrators, parents, and adolescents [19].

Two inclusion criteria were applied. First, only adolescents from countries/regions with complete data on country-level variables were included, comprising 152,171 individuals from 30 European countries. Individual-level data from three constituent countries of the United Kingdom (England, Wales, and Scotland) were collected in independent HBSC surveys so we analyzed these countries separately, using available country-level measures applying to the United Kingdom for all three. For the same reason, individual-level data from the French and Flemish regions of Belgium were analyzed separately, using country-level data from Belgium for both. Second, we included only individuals with complete data on all analysis measures ( $n = 131,101$ ). Missingness was spread across variables: age (.8%); family affluence (9.0%); perceived family wealth (4.1%); life satisfaction (2.7%); psychosomatic complaints (2.5%); and aggressive behavior (2.6%). Compared with excluded adolescents, included adolescents were significantly more likely to be older ( $M_{\text{age}} = 13.6$  vs.  $M_{\text{age}} = 13.3$ ), female (51.5% vs. 44.6%), and score higher on family affluence (.50 vs. .49) and perceived family wealth (3.59 vs. 3.56).

### Measures

**Adolescent mental health.** Life satisfaction was measured using the Cantril Ladder, an 11-point ladder with steps for reporting how participants feel about their life (0 = worst possible life to 10 = best possible life). The Cantril Ladder is easily understood and has shown high reliability among adolescents [20].

Psychosomatic complaints were measured using the HBSC-symptom checklist [21], comprising headache, abdominal pain, backache, dizziness, feeling low, irritability/bad temper, feeling nervous, and sleeping difficulties. Each item included a 5-point response scale for reporting how often during the past 6 months the complaint was experienced (0 = rarely or never, 1 = about every month, 2 = about every week, 3 = more than

once a week, 4 = about every day). We computed a sum score for participants who completed at least six of the eight subscale items; higher scores indicated more problems (range, 0–32). The checklist had good internal consistency in all survey years (Cronbach's  $\alpha = .76-.82$ ) and has convergent validity with indicators of emotional symptoms and emotional well-being [21].

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

**Socioeconomic status.** Family affluence was assessed as an indicator of objective SES. The Family Affluence Scale (FAS) consisted of six items that indicated family material assets: car/van ownership, having own bedroom; holidays abroad; computer ownership; dishwasher ownership; bathrooms [23]. For participants who completed all scale items, the item scores were summed to compute an FAS score (range, 0–13); higher scores indicated more material assets. The FAS has been shown to be a reliable instrument, easily answered by adolescents, with greater response rates than other adolescent SES indicators [23]. In line with previous HBSC research, each adolescent's absolute FAS score was r-dit-transformed to a country-specific relative score (range, 0–1, with a mean of .5 in each country), measuring adolescents' relative family affluence in their country of residence [24].

Perceived family wealth was assessed as an indication of subjective SES using the question, "How well off do you think your family is?" The item included a 5-point response scale (1 = very well off, 2 = quite well off, 3 = average, 4 = not so well off, 5 = not at all well off). The scale was reversed so that higher scores indicated higher levels of perceived family wealth. The measure has been found to be easy to answer for adolescents.

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

**Country-level indicators.** Country-level data for meritocratic beliefs were aggregated from individual-level data collected by Eurobarometer 88.4 in 2017 [25]. Over 1,000 participants in 31 countries (500 participants for Cyprus, Luxembourg and Malta) responded to the statement "People get what they deserve in [country name]" on a scale (1 = strongly agree, 5 = strongly disagree). The percentage of participants who indicated strongly agree or agree was summed for each country so that a higher value indicated stronger meritocratic beliefs. The mean rater reliability for this aggregated measure was .97, suggesting

meritocratic beliefs was a country-level phenomenon shared by individuals within a country [26].

Data on income inequality (the Gini coefficient of equivalised disposable income) were obtained from Eurostat for 2014 [27]. The Gini coefficient theoretically ranges from 0 (everyone having equal income) to 100 (one person having all the income). Data on national income—Gross Domestic Product (GDP) per capita in Purchasing Power Standards (PPS)—were obtained from Eurostat for 2014 [28]. Purchasing Power Standards is a common currency that allows comparisons of GDP between countries. Data on welfare expenditure (% of GDP spent on social protection) were obtained from Eurostat for 2014 [29].

### Analysis strategy

Analyses were conducted with Mplus version 8 using the maximum likelihood estimator with robust standard errors [30]. Associations between individual-level mental health outcomes and country-level variables were tested by fitting two-level linear regression models, with individuals clustered within countries ( $n = 30$ ). Individual- and country-level variables were added to models using a stepwise approach. Individual-level variables were group mean centered and country-level variables were grand mean centered [31]. Model 1 included random slopes for family affluence (1a), perceived family wealth (1b), and both family affluence and perceived family wealth (1c) to assess the strength of the social gradient in adolescent mental health (adjusting for age and gender) and examine variation between countries in their social gradients. We interpreted random slopes using the 95% prediction interval (PI), indicating the range of the estimated slope across countries. Model 2 added all four country-level variables, and cross-level interaction terms between both SES indicators and each country-level indicator. We used an  $\alpha$ -level of .05. The model building sequence was followed separately for life satisfaction, psychosomatic complaints, and aggressive behavior.

## Results

### Descriptive results

Table 1 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). Table 2 shows correlations between individual-level variables: family affluence and perceived family wealth had small positive associations with life satisfaction and negligible to small negative associations with psychosomatic complaints and aggressive behavior, and a small positive association with each other. Psychosomatic complaints and aggressive behavior had a small positive association and the former had a small negative and the latter a medium negative association with life satisfaction. Country-level variable correlations ( $n = 30$ ) were medium to large: meritocratic beliefs positively correlated with national income ( $r = .60, p < .001$ ), was borderline significantly positively correlated with welfare expenditure ( $r = .35, p = .058$ ), and negatively correlated with income inequality ( $r = -.39, p = .032$ ).

### Individual-level associations

Tables 3–5 display results of life satisfaction, psychosomatic complaints, and aggressive behavior analyses, respectively.

**Table 1**  
Descriptive characteristics of the individual- and country-level sample (N = 131,101)

| Sample            | N     | Individual-level characteristics |           |         |                             |                       |                       | Country-level characteristics |                      |                   |                 |
|-------------------|-------|----------------------------------|-----------|---------|-----------------------------|-----------------------|-----------------------|-------------------------------|----------------------|-------------------|-----------------|
|                   |       | Country                          | Girls (%) | Age (M) | Perceived family wealth (M) | Life satisfaction (M) | Psych. complaints (M) | Aggressive behavior (M)       | Meritocratic beliefs | Income inequality | National income |
| Austria           | 3,037 | 53.7                             | 13.4      | 3.9     | 7.9                         | 6.5                   | 0.7                   | 61.2                          | 27.6                 | 130               | 29.8            |
| Belgium (Flemish) | 3,890 | 46.1                             | 13.6      | 3.1     | 7.1                         | 7.1                   | 0.4                   | 44.7                          | 25.9                 | 119               | 30.2            |
| Belgium (French)  | 5,288 | 51.1                             | 13.5      | 3.4     | 7.5                         | 9.1                   | 0.7                   | 44.7                          | 25.9                 | 119               | 30.2            |
| Bulgaria          | 4,202 | 49.4                             | 13.8      | 3.9     | 7.8                         | 8.5                   | 0.7                   | 27.6                          | 35.4                 | 47                | 18.5            |
| Croatia           | 4,375 | 51.0                             | 13.7      | 3.9     | 7.9                         | 7.7                   | 0.5                   | 24.3                          | 30.2                 | 59                | 21.8            |
| Czech Republic    | 4,766 | 52.7                             | 13.5      | 3.5     | 7.2                         | 8.3                   | 0.5                   | 42.1                          | 25.1                 | 86                | 19.7            |
| Denmark           | 3,351 | 54.1                             | 13.8      | 3.2     | 7.6                         | 7.8                   | 0.5                   | 58.0                          | 27.7                 | 128               | 32.8            |
| England           | 4,211 | 49.5                             | 13.6      | 3.6     | 7.3                         | 7.9                   | 0.4                   | 46.6                          | 31.6                 | 109               | 27.5            |
| Estonia           | 3,908 | 50.2                             | 13.8      | 3.8     | 7.8                         | 7.9                   | 0.5                   | 38.2                          | 35.6                 | 77                | 14.9            |
| Finland           | 5,574 | 51.7                             | 13.8      | 4.0     | 7.7                         | 9.0                   | 0.3                   | 57.2                          | 25.6                 | 110               | 31.9            |
| France            | 4,912 | 50.8                             | 13.6      | 3.7     | 7.3                         | 9.9                   | 0.6                   | 28.8                          | 29.2                 | 107               | 34.5            |
| Germany           | 5,280 | 49.6                             | 13.5      | 3.7     | 7.4                         | 7.5                   | 0.5                   | 40.3                          | 30.7                 | 126               | 29.0            |
| Greece            | 3,931 | 50.7                             | 13.7      | 3.4     | 7.7                         | 7.6                   | 0.5                   | 19.1                          | 34.5                 | 71                | 26.0            |
| Hungary           | 3,586 | 50.7                             | 13.4      | 3.6     | 7.5                         | 9.0                   | 0.6                   | 37.9                          | 28.6                 | 68                | 19.8            |
| Ireland           | 3,424 | 61.5                             | 13.7      | 3.5     | 7.6                         | 8.1                   | 0.3                   | 58.1                          | 31.1                 | 136               | 20.6            |
| Italy             | 3,817 | 50.4                             | 13.7      | 3.5     | 7.4                         | 10.4                  | 0.4                   | 36.3                          | 32.4                 | 96                | 29.9            |
| Latvia            | 5,298 | 53.0                             | 13.6      | 3.6     | 7.4                         | 8.6                   | 0.9                   | 22.8                          | 35.5                 | 63                | 14.5            |
| Lithuania         | 5,398 | 50.4                             | 13.6      | 3.2     | 7.9                         | 7.7                   | 0.8                   | 32.1                          | 35.0                 | 75                | 15.3            |
| Luxembourg        | 2,663 | 53.6                             | 13.6      | 3.5     | 7.5                         | 9.5                   | 0.6                   | 53.0                          | 28.7                 | 269               | 22.5            |
| Malta             | 1,993 | 51.2                             | 13.6      | 3.4     | 7.6                         | 9.4                   | 0.5                   | 41.9                          | 27.7                 | 89                | 18.2            |
| Netherlands       | 3,823 | 51.7                             | 13.5      | 3.1     | 7.7                         | 7.6                   | 0.4                   | 40.3                          | 26.2                 | 131               | 30.6            |
| Poland            | 4,113 | 51.3                             | 13.6      | 3.3     | 7.4                         | 8.8                   | 0.6                   | 47.4                          | 30.8                 | 67                | 19.3            |
| Portugal          | 4,368 | 52.7                             | 13.6      | 3.4     | 7.4                         | 5.7                   | 0.4                   | 35.0                          | 34.5                 | 77                | 26.9            |
| Romania           | 3,407 | 54.3                             | 13.3      | 3.8     | 8.1                         | 8.6                   | 0.7                   | 33.5                          | 35.0                 | 55                | 14.7            |
| Scotland          | 5,240 | 51.1                             | 13.7      | 3.7     | 7.7                         | 7.8                   | 0.4                   | 46.6                          | 31.6                 | 109               | 27.5            |
| Slovakia          | 5,053 | 51.4                             | 13.5      | 4.0     | 7.4                         | 8.6                   | 0.7                   | 25.9                          | 26.1                 | 77                | 18.5            |
| Slovenia          | 4,652 | 51.6                             | 13.6      | 3.7     | 7.7                         | 7.3                   | 0.5                   | 27.1                          | 25.0                 | 82                | 23.9            |
| Spain             | 6,189 | 52.3                             | 13.7      | 3.0     | 7.8                         | 6.9                   | 0.4                   | 28.1                          | 34.7                 | 90                | 25.4            |
| Sweden            | 6,768 | 51.5                             | 13.6      | 4.2     | 7.3                         | 9.6                   | 0.3                   | 37.5                          | 26.9                 | 124               | 29.8            |
| Wales             | 4,584 | 49.7                             | 13.7      | 3.5     | 7.4                         | 7.9                   | 0.4                   | 46.6                          | 31.6                 | 109               | 27.5            |
| Mean              | 4,370 | 51.5                             | 13.6      | 3.6     | 7.6                         | 8.2                   | 0.5                   | 39.4                          | 30.2                 | 100               | 24.4            |

N = sample size; M = mean; Psych. = psychosomatic.

Models showed higher life satisfaction, fewer psychosomatic complaints, and more aggressive behavior among boys and younger adolescents. Life satisfaction showed a small positive association with family affluence (model 1a) and a stronger small positive association with perceived family wealth (1b). When examining both SES indicators simultaneously the association with family affluence attenuated to become negligible in size, while the association with perceived family wealth remained small and positive (1c). There was significant cross-country variance in both associations: the family affluence-life

satisfaction association ranged across countries from a negligible negative association to a small positive association (95% PI); and the associations between perceived family wealth and life satisfaction were positive in all countries and ranged from small to medium in size (95% PI).

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

Aggressive behavior showed no association with family affluence (1a) and a negligible negative association with perceived family wealth (1b). In model 1c, the association with family affluence was negligible in size and positive, and the association with perceived family wealth remained negligible and

**Table 2**  
Correlations between individual-level variables (N = 131,101)

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

<sup>a</sup> Female is the reference group. \* $p < .01$ , \*\* $p < .001$ .



**Table 3**

Multilevel models for life satisfaction with unstandardized and standardized fixed effects at individual and country level (N = 131,101)

|                                  | Model 1a (FA only)  |       |       | Model 1b (PFW only) |       |       | Model 1c (both SES variables) |       |       | Model 2 (second-level predictors) |       |       |
|----------------------------------|---------------------|-------|-------|---------------------|-------|-------|-------------------------------|-------|-------|-----------------------------------|-------|-------|
|                                  | b (SE)              | p     | β     | b (SE)              | p     | β     | b (SE)                        | p     | β     | b (SE)                            | p     | β     |
| Fixed effects (individual level) |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Intercept                        | 7.568 (.043)        | <.001 | .004  | 7.568 (.043)        | <.001 | .004  | 7.568 (.043)                  | <.001 | .004  | 7.568 (.040)                      | <.001 | .003  |
| Gender <sup>a</sup>              | <b>.339 (.023)</b>  | <.001 | .089  | <b>.281 (.024)</b>  | <.001 | .073  | <b>.284 (.023)</b>            | <.001 | .074  | <b>.284 (.023)</b>                | <.001 | .074  |
| Age                              | –.222 (.013)        | <.001 | –.190 | –.174 (.014)        | <.001 | –.149 | –.176 (.014)                  | <.001 | –.150 | –.176 (.014)                      | <.001 | –.150 |
| Family affluence                 | <b>.782 (.044)</b>  | <.001 | .117  |                     |       |       | <b>.301 (.052)</b>            | <.001 | .045  | <b>.304 (.040)</b>                | <.001 | .044  |
| Perceived fam. wealth            |                     |       |       | <b>.588 (.019)</b>  | <.001 | .257  | <b>.556 (.020)</b>            | <.001 | .243  | <b>.555 (.017)</b>                | <.001 | .244  |
| Fixed effects (country level)    |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Meritocratic beliefs             |                     |       |       |                     |       |       |                               |       |       | .003 (.005)                       | .560  | .016  |
| Income inequality                |                     |       |       |                     |       |       |                               |       |       | .017 (.013)                       | .201  | .032  |
| National income                  |                     |       |       |                     |       |       |                               |       |       | –.001 (.001)                      | .225  | –.017 |
| Welfare expenditure              |                     |       |       |                     |       |       |                               |       |       | –.006 (.007)                      | .361  | –.019 |
| Cross-level interactions         |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| FA × Merit.                      |                     |       |       |                     |       |       |                               |       |       | <b>.011 (.003)</b>                | <.001 | .017  |
| FA × Inc. ineq.                  |                     |       |       |                     |       |       |                               |       |       | <b>.039 (.014)</b>                | .004  | .021  |
| FA × Ntl. inc.                   |                     |       |       |                     |       |       |                               |       |       | .001 (.001)                       | .555  | .003  |
| FA × Welfare                     |                     |       |       |                     |       |       |                               |       |       | –.014 (.007)                      | .059  | –.012 |
| PFW × Merit.                     |                     |       |       |                     |       |       |                               |       |       | <b>–.004 (.002)</b>               | .043  | –.018 |
| PFW × Inc. ineq.                 |                     |       |       |                     |       |       |                               |       |       | –.005 (.006)                      | .360  | –.008 |
| PFW × Ntl. inc.                  |                     |       |       |                     |       |       |                               |       |       | .000 (.000)                       | .267  | –.004 |
| PFW × Welfare                    |                     |       |       |                     |       |       |                               |       |       | –.002 (.003)                      | .462  | –.006 |
| Residual variance                |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Family affluence                 | <b>.049 (.014)</b>  | .001  | .001  |                     |       |       | <b>.067 (.022)</b>            | .002  | .001  | .037 (.022)                       | .095  | .001  |
| Perceived fam. wealth            |                     |       |       | <b>.008 (.003)</b>  | .003  | .002  | <b>.009 (.003)</b>            | .001  | .002  | <b>.006 (.002)</b>                | .005  | .001  |
| Variance components              |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Individual-level                 | <b>3.384 (.076)</b> | <.001 | .927  | <b>3.195 (.078)</b> | <.001 | .875  | <b>3.183 (.078)</b>           | <.001 | .872  | <b>3.183 (.078)</b>               | <.001 | .872  |
| Country-level                    | <b>.055 (.011)</b>  | <.001 | .015  | <b>.055 (.011)</b>  | <.001 | .015  | <b>.055 (.011)</b>            | <.001 | .015  | <b>.047 (.008)</b>                | <.001 | .013  |
| 95% prediction intervals (std)   |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Family affluence                 | [.052/.182]         |       |       |                     |       |       | [–.031/.121]                  |       |       |                                   |       |       |
| Perceived fam. wealth            |                     |       |       | [.178/.336]         |       |       | [.162/.324]                   |       |       |                                   |       |       |
| Model statistics                 |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Free parameters                  | 7                   |       |       | 7                   |       |       | 9                             |       |       | 21                                |       |       |
| AIC                              | 532059.11           |       |       | 524534.88           |       |       | 524128.73                     |       |       | <b>524125.00</b>                  |       |       |
| BIC                              | 532127.59           |       |       | 524603.37           |       |       | <b>524216.78</b>              |       |       | 524330.46                         |       |       |

$p < .05$  and lowest AIC and BIC are shown in bold. Explained cross-country variance in family affluence slope =  $(.067 \dots - .037 \dots) / 0.067 \dots = .45$ . Explained cross-country variance in perceived family wealth slope =  $(.009 \dots - .006 \dots) / 0.009 \dots = .31$ .

AIC = Akaike information criterion; BIC = Bayesian information criterion; FA = family affluence; PFW = perceived family wealth; Merit. = meritocratic beliefs; Inc. ineq. = income inequality; Ntl. inc. = national income; SE = standard error; SES = socioeconomic status; Welfare = welfare expenditure.

<sup>a</sup> Female is the reference group.

negative. Associations varied across countries, ranging from positive to negative, but were negligible in size in all countries (95% PIs).

### Cross-level interactions

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

Meritocratic beliefs moderated the associations between both SES indicators and life satisfaction and psychosomatic complaints, but not aggressive behavior. For life satisfaction, as country-level meritocratic beliefs increased, the positive association with family affluence strengthened, while the positive association with perceived family wealth weakened (Figure 1A). Given the generally weaker associations of family affluence compared to perceived family wealth, the more

meritocratic countries were, the more similar associations of family affluence and perceived family wealth became. A corresponding picture was found for psychosomatic complaints (Figure 1B). As country-level meritocratic beliefs increased, the association with family affluence changed in sign from positive to negative, while the negative association with perceived family wealth became less strong, and so the two associations became more similar.

Results for income inequality generally paralleled those for meritocratic beliefs: for life satisfaction there was a significant cross-level interaction between family affluence and country-level income inequality (Figure 1C), while for psychosomatic complaints there were interactions between both family affluence and perceived family wealth and country-level income inequality (Figure 1D). For these two mental health indicators, associations with family affluence were stronger, or only present, in more income unequal countries, while in contrast, associations with perceived family wealth were weaker, or unchanged, in more income unequal countries. Furthermore, national income moderated the slope of family affluence on aggressive behavior, such that as national income level increased, the association between family affluence and aggressive behavior

**Table 4**

Multilevel models for Psychosomatic complaints with unstandardized and standardized fixed effects at individual and country level (N = 131,101)

|                                  | Model 1a (FA only)   |       |       | Model 1b (PFW only)  |             |       | Model 1c (both SES variables) |       |       | Model 2 (second-level predictors) |       |       |
|----------------------------------|----------------------|-------|-------|----------------------|-------------|-------|-------------------------------|-------|-------|-----------------------------------|-------|-------|
|                                  | b (SE)               | p     | β     | b (SE)               | p           | β     | b (SE)                        | p     | β     | b (SE)                            | p     | β     |
| Fixed effects (individual level) |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Intercept                        | 8.195 (.186)         | <.001 | .001  | 8.195 (.186)         | <.001       | .001  | 8.195 (.186)                  | .000  | .001  | 8.195 (.178)                      | <.001 | .000  |
| Gender <sup>a</sup>              | <b>-2.840 (.065)</b> | <.001 | -.211 | <b>-2.736 (.066)</b> | <.001       | -.203 | <b>-2.733 (.066)</b>          | .000  | -.203 | <b>-2.732 (.066)</b>              | <.001 | -.203 |
| Age                              | <b>.728 (.034)</b>   | <.001 | .177  | <b>.642 (.038)</b>   | <.001       | .156  | <b>.639 (.038)</b>            | .000  | .155  | <b>.639 (.038)</b>                | <.001 | .155  |
| Family affluence                 | <b>-.583 (.127)</b>  | <.001 | -.025 |                      |             |       | <b>.342 (.158)</b>            | .031  | .014  | <b>.333 (.120)</b>                | .005  | .016  |
| Perceived fam. wealth            |                      |       |       | <b>-1.031 (.043)</b> | <.001       | -.128 | <b>-1.063 (.054)</b>          | .000  | -.132 | <b>-1.064 (.046)</b>              | <.001 | -.133 |
| Fixed effects (country level)    |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Meritocratic beliefs             |                      |       |       |                      |             |       |                               |       |       | -.016 (.020)                      | .431  | -.026 |
| Income inequality                |                      |       |       |                      |             |       |                               |       |       | -.070 (.060)                      | .244  | -.038 |
| National income                  |                      |       |       |                      |             |       |                               |       |       | .006 (.003)                       | .089  | .029  |
| Welfare expenditure              |                      |       |       |                      |             |       |                               |       |       | -.034 (.040)                      | .397  | -.030 |
| Cross-level interactions         |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| FA × Merit.                      |                      |       |       |                      |             |       |                               |       |       | <b>-.043 (.012)</b>               | <.001 | -.020 |
| FA × Inc. ineq.                  |                      |       |       |                      |             |       |                               |       |       | <b>-.137 (.043)</b>               | .001  | -.021 |
| FA × Ntl. inc.                   |                      |       |       |                      |             |       |                               |       |       | .000 (.003)                       | .965  | .000  |
| FA × Welfare                     |                      |       |       |                      |             |       |                               |       |       | .008 (.022)                       | .705  | .002  |
| PFW × Merit.                     |                      |       |       |                      |             |       |                               |       |       | <b>.011 (.005)</b>                | .015  | .015  |
| PFW × Inc. ineq.                 |                      |       |       |                      |             |       |                               |       |       | <b>.030 (.012)</b>                | .012  | .014  |
| PFW × Ntl. inc.                  |                      |       |       |                      |             |       |                               |       |       | -.001 (.001)                      | .513  | -.003 |
| PFW × Welfare                    |                      |       |       |                      |             |       |                               |       |       | -.005 (.007)                      | .454  | -.004 |
| Residual variance                |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Family affluence                 | <b>.372 (.119)</b>   | .002  | .001  |                      |             |       | <b>.513 (.130)</b>            | <.001 | .001  | <b>.239 (.076)</b>                | .002  | <.001 |
| Perceived fam. wealth            |                      |       |       | <b>.036 (.015)</b>   | <b>.015</b> | .001  | <b>.051 (.019)</b>            | .008  | .001  | <b>.032 (.014)</b>                | .022  | <.001 |
| Variance components              |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Individual-level                 | <b>40.802 (.831)</b> | <.001 | .901  | <b>40.069 (.854)</b> | <.001       | .885  | <b>40.018 (.857)</b>          | <.001 | .884  | <b>40.018 (.857)</b>              | <.001 | .884  |
| Country-level                    | <b>1.031 (.266)</b>  | <.001 | .023  | <b>1.031 (.266)</b>  | <.001       | .023  | <b>1.031 (.266)</b>           | <.001 | .023  | <b>.943 (.255)</b>                | <.001 | .021  |
| 95% prediction intervals (std)   |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Family affluence                 | [-.075/.026]         |       |       |                      |             |       | [-.045/.074]                  |       |       |                                   |       |       |
| Perceived fam. wealth            |                      |       |       | [-.174/-.082]        |             |       | [-.187/-.077]                 |       |       |                                   |       |       |
| Model statistics                 |                      |       |       |                      |             |       |                               |       |       |                                   |       |       |
| Free parameters                  | 7                    |       |       | 7                    |             |       | 9                             |       |       | 21                                |       |       |
| AIC                              | 858464.95            |       |       | 856084.99            |             |       | 855977.89                     |       |       | <b>855973.92</b>                  |       |       |
| BIC                              | 858533.43            |       |       | 856153.47            |             |       | <b>856065.94</b>              |       |       | 856179.38                         |       |       |

$p < .05$  and lowest AIC and BIC are shown in bold. Explained cross-country variance in family affluence slope =  $(.513...-.239...)/0.513... = .53$ . Explained cross-country variance in perceived family wealth slope =  $(.051...-.032...)/0.051... = .37$ .

AIC = Akaike information criterion; BIC = Bayesian information criterion; FA = family affluence; PFW = perceived family wealth; Merit. = meritocratic beliefs; Inc. ineq. = income inequality; Ntl. inc. = national income; SE = standard error; SES = socioeconomic status; Welfare = welfare expenditure.

<sup>a</sup> Female is the reference group.

became more negative, although negligibly small at all levels of national income (Figure 1E).

## Discussion

Associations between both family affluence and perceived family wealth and adolescent mental health vary across European countries, in line with our hypotheses and existing research [1,3,6]. There was a social gradient for family affluence (adolescents from less affluent families showed lower life satisfaction, slightly more psychosomatic complaints and slightly more aggressive behavior) in some countries, while the social gradient was absent or even slightly reversed in other countries. The association between perceived family wealth and aggressive behavior showed similar cross-country variance. In contrast, a social gradient in adolescent life satisfaction and psychosomatic complaints as assessed by perceived family wealth was found in all countries, with associations ranging from negligible to medium in size. In addition, country-level strength of meritocratic beliefs moderated the association between the two SES measures and both life satisfaction and psychosomatic complaints, independent from country-level national income, income inequality, and welfare expenditure. More specifically, in countries with

stronger meritocratic beliefs the associations between family affluence and adolescent mental health gained strength while associations with perceived family wealth weakened.

These findings were in line with our hypothesis that in countries with stronger meritocratic beliefs, the differential in perceived capability and respectful treatment according to family affluence may be more pronounced, with attendant mental health effects [13–15]. Future studies could test these proposed mechanisms, perhaps by using longitudinal studies to explore the role of adolescents' own meritocratic beliefs in the social gradient in adolescent mental health. Another explanation for this finding may be that in countries with stronger meritocratic beliefs, material assets (such as assessed with the Family Affluence Scale) are seen to be earned through merit [11,12], more salient as symbols of success and status [32,33], and thus more strongly linked to adolescent mental health.

Unexpectedly, associations between perceived family wealth and life satisfaction and psychosomatic complaints decreased when country-level meritocratic beliefs became stronger. Adolescents' perceptions of family wealth are likely to be far less visible to others than their material family affluence and may have little bearing on whether adolescents are treated respectfully or not. The finding that associations with family affluence

**Table 5**

Multilevel models for aggressive behavior with unstandardized and standardized fixed effects at individual and country level (N = 131,101)

|                                  | Model 1a (FA only)  |       |       | Model 1b (PFW only) |       |       | Model 1c (both SES variables) |       |       | Model 2 (second-level predictors) |       |       |
|----------------------------------|---------------------|-------|-------|---------------------|-------|-------|-------------------------------|-------|-------|-----------------------------------|-------|-------|
|                                  | b (SE)              | p     | β     | b (SE)              | p     | β     | b (SE)                        | p     | β     | b (SE)                            | p     | β     |
| Fixed effects (individual level) |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Intercept                        | .525 (.026)         | <.001 | .001  | .525 (.026)         | <.001 | .001  | .525 (.026)                   | <.001 | .001  | .525 (.021)                       | <.001 | .000  |
| Gender <sup>a</sup>              | <b>.408 (.019)</b>  | <.001 | .254  | <b>.411 (.019)</b>  | <.001 | .256  | <b>.411 (.019)</b>            | <.001 | .256  | <b>.411 (.019)</b>                | <.001 | .256  |
| Age                              | <b>-.016 (.004)</b> | <.001 | -.033 | <b>-.019 (.004)</b> | <.001 | -.038 | <b>-.019 (.004)</b>           | <.001 | -.039 | <b>-.019 (.004)</b>               | <.001 | -.039 |
| Family affluence                 | .001 (.012)         | .915  | .000  |                     |       |       | <b>.028 (.013)</b>            | .035  | .010  | <b>.026 (.011)</b>                | .022  | .010  |
| Perceived fam. wealth            |                     |       |       | <b>-.027 (.005)</b> | <.001 | -.028 | <b>-.030 (.006)</b>           | <.001 | -.031 | <b>-.030 (.005)</b>               | <.001 | -.032 |
| Fixed effects (country level)    |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Meritocratic beliefs             |                     |       |       |                     |       |       |                               |       |       | -.003 (.003)                      | .256  | -.041 |
| Income inequality                |                     |       |       |                     |       |       |                               |       |       | -.001 (.005)                      | .850  | -.005 |
| National income                  |                     |       |       |                     |       |       |                               |       |       | .000 (.000)                       | .400  | .011  |
| Welfare expenditure              |                     |       |       |                     |       |       |                               |       |       | <b>-.012 (.004)</b>               | .002  | -.087 |
| Cross-level interactions         |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| FA × Merit.                      |                     |       |       |                     |       |       |                               |       |       | -.001 (.001)                      | .385  | -.005 |
| FA × Inc. ineq.                  |                     |       |       |                     |       |       |                               |       |       | -.001 (.003)                      | .768  | -.001 |
| FA × Ntl. inc.                   |                     |       |       |                     |       |       |                               |       |       | <b>-.001 (.000)</b>               | .024  | -.012 |
| FA × Welfare                     |                     |       |       |                     |       |       |                               |       |       | .001 (.002)                       | .562  | .002  |
| PFW × Merit.                     |                     |       |       |                     |       |       |                               |       |       | .000 (.001)                       | .621  | .004  |
| PFW × Inc. ineq.                 |                     |       |       |                     |       |       |                               |       |       | .003 (.002)                       | .100  | .010  |
| PFW × Ntl. inc.                  |                     |       |       |                     |       |       |                               |       |       | .000 (.000)                       | .115  | .008  |
| PFW × Welfare                    |                     |       |       |                     |       |       |                               |       |       | -.001 (.001)                      | .390  | -.005 |
| Residual variance                |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Family affluence                 | <b>.002 (.001)</b>  | .020  | .000  |                     |       |       | <b>.003 (.001)</b>            | .017  | .000  | .001 (.001)                       | .130  | .000  |
| Perceived fam. wealth            |                     |       |       | <b>.001 (.000)</b>  | .004  | .001  | <b>.001 (.000)</b>            | .005  | .001  | <b>.000 (.000)</b>                | .005  | .001  |
| Variance components              |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Individual-level                 | <b>.580 (.029)</b>  | <.001 | .900  | <b>.579 (.029)</b>  | <.001 | .898  | <b>.579 (.029)</b>            | <.001 | .898  | <b>.579 (.029)</b>                | <.001 | .898  |
| Country-level                    | <b>.020 (.005)</b>  | <.001 | .031  | <b>.020 (.005)</b>  | <.001 | .031  | <b>.020 (.005)</b>            | <.001 | .031  | <b>.013 (.004)</b>                | <.001 | .021  |
| 95% prediction intervals (std)   |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Family affluence                 | [-.033/.034]        |       |       |                     |       |       | [-.028/.048]                  |       |       |                                   |       |       |
| Perceived fam. wealth            |                     |       |       | [-.076/.019]        |       |       | [-.082/.020]                  |       |       |                                   |       |       |
| Model statistics                 |                     |       |       |                     |       |       |                               |       |       |                                   |       |       |
| Free parameters                  | 7                   |       |       | 7                   |       |       | 9                             |       |       | 21                                |       |       |
| AIC                              | 300848.17           |       |       | 300667.52           |       |       | 300638.66                     |       |       | <b>300633.44</b>                  |       |       |
| BIC                              | 300916.65           |       |       | 300736.01           |       |       | <b>300726.71</b>              |       |       | 300838.89                         |       |       |

$p < .05$  and lowest AIC and BIC in bold type. Explained cross-country variance in family affluence slope =  $(.0030...-.0014...)/0.0030... = .52$ . Explained cross-country variance in perceived family wealth slope =  $(.0006...-.0005...)/0.006... = .25$ .

AIC = Akaike information criterion; BIC = Bayesian information criterion; FA = family affluence; PFW = perceived family wealth; Merit. = meritocratic beliefs; Inc. ineq. = income inequality; Ntl. inc. = national income; SE = standard error; SES = socioeconomic status; Welfare = welfare expenditure.

<sup>a</sup> Female is the reference group.

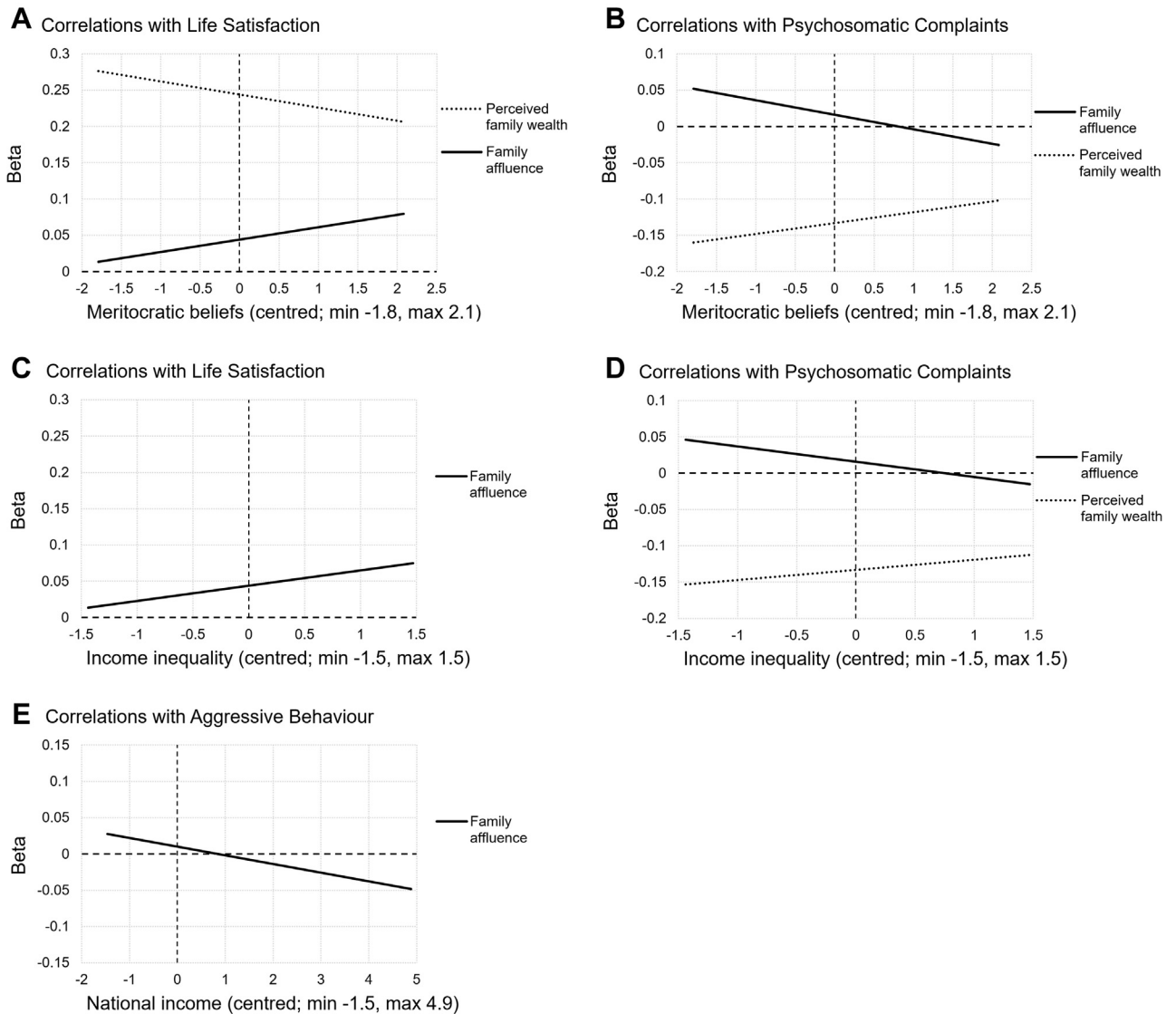
and perceived family wealth became more similar in countries with stronger meritocratic beliefs may be explained by the Muhammad Ali effect [34]. This effect suggests that subjective states are less influential when they cease to be credible in the face of objective realities. Applying this effect to the present study, it may be that in countries with stronger meritocratic beliefs, family affluence is more visibly evident in concrete outcomes such as material assets and purchasing power than in countries with weaker meritocratic beliefs, and thus perceptions of one's family wealth may have less room to influence adolescents' mental health. Perhaps in such countries, personality traits, which may be confounded with perceived family wealth, are less important to whether individuals report psychosomatic complaints. Future studies could test this mechanism, and research on alternative explanations necessary for different aspects of mental health would be promising, given the different relations we found for the indicators studied.

Two additional study findings also deserve further reflection. First, adolescent mental health was more strongly associated with perceived family wealth than with family affluence, replicating findings in single-country studies [35]. This suggests that status perceptions and social comparisons are crucially important for mental health during adolescence [36], especially

in countries with relatively high standards of living, such as those in this study. Second, and possibly relatedly, in countries with greater income inequality, there was a stronger association between family affluence and mental health. Income inequality may increase the relative importance of material factors for adolescent mental health by driving the consumption of "positional" material assets to signal higher social status [37], making material assets more salient and reducing their availability.

This study has many strengths, including its use of multiple country-level predictors and comparable individual-level data from adolescents in 30 European countries, with multiple SES measures and indicators of mental health. However, there are also some limitations. First, the cross-sectional nature of our data limits our ability to draw causal conclusions. In particular, the association between perceived family wealth and adolescent mental health may be due to either reverse causation (good mental health may cause adolescents to perceive their family status more favorably) or confounding by a third variable (personality traits may influence both adolescent mental health and their subjective SES) [38]. Second, the HBS data set has several limitations. The current instruments used neither enable us to study gender nonconforming adolescents, nor capture important





**Figure 1.** (A–E) Cross-level interactions.

facets of adolescent mental health, such as depression, anxiety, Attention-deficit/hyperactivity disorder, and trauma. Reports from other informants and diagnoses would strengthen the results. Additionally, the included sample may have overlooked vulnerable young people with missing SES data and adolescents not attending school. We encourage future research to include such adolescents and adolescents in countries with lower average living standards and greater income inequalities. Third, the single-item measure of meritocracy may mask important cultural and linguistic differences in people’s conception of “getting what is deserved.” Our indicator correlated strongly ( $r = .65$ ) with a measure devised by the World Economic Forum on social mobility [39], suggesting getting what is deserved is associated with the possibility of movement in the social order, but further work could add to our understanding of cross-country differences in conceptions of merit. Fourth, a more complete understanding of the social gradient in adolescent

mental health may require including additional adolescent characteristics, such as gender, immigrant status, or educational level, and using an intersectional approach [40].

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

and perceived family wealth emphasize the importance of studying multiple indicators of adolescent SES.

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