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Degree of benefit? The interconnection among social capital, well-being, and education

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Abstract

Social capital is instrumental to personal well-being; yet, this relationship may differ by educational level. Using data from the European Social Survey (ESS), the present study explores the interconnection between tertiary education, social capital, and subjective well-being. Examining the nature of these relationships, we test the hypothesis that tertiary education moderates the relationship between two broad forms of social capital, social trust and social relatedness, and well-being. We predict a ‘trade-off’ between individual human capital and interpersonal social capital, where either one or the other comes to play a dominant role. Furthermore, we test if overall levels of tertiary education at the national level change the strength of the relationship among individual-level forms of social capital and well-being. Although connected occupation and employment factors are also important, we find that tertiary education functions as a non-pecuniary moderator changing the nature of the relationship between social capital and well-being. Respondents with tertiary education have higher levels of well-being regardless of their self-reported level of social capital, and—what is more—the extent to which social trust and social relatedness are associated with well-being is weaker among this highly educated group. In contrast, respondents without tertiary education experience greater well-being enhancement through social capital, ‘catching up’ in self-reported well-being at higher social capital levels. This study provides preliminary evidence that social factors predicting well-being differ across the educational spectrum.

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Introduction & purpose

Overall levels of educational attainment, and in particular tertiary credentials, are a common measure of national development, one of “the best readily available indicators” (Inglehart, 2008, p. 132) of modernization. Education is also central to individual and societal well-being beyond its impact on national and individual economic outcomes. In particular, higher levels of education are associated with greater levels of social trust and improved social relatedness, two forms of individual social capital (Huang, Maassen van den Brink, & Groot, 2009) and well-being (Woessmann & Schuetz, 2006). Given the employment and life-course outcomes associated with tertiary education—from improved earnings to greater employment stability (Pallas, 2000)—the correlation between rising levels of social capital and well-being among this highly educated group may be due to a range of confounding effects. In turn, the association between social capital and well-being may differ between individuals with and without tertiary education.

Rising levels of overall education at the state level are also linked to higher levels of social capital (Helliwell & Putnam, 2007) and well-being (Vila, 2000, 2005) within societies. Yet how increased levels of tertiary education at the state level change the interrelations between social capital and subjective well-being is unclear. Just as rising overall income at the country-level is not necessarily associated with greater well-being on average (Easterlin, 1995), an increased proportion of individuals with tertiary education may not actually improve individual-level social capital and well-being. When framed as a positional good (Ma del Mar Salinas-Jiménez, Artés, & Salinas-Jiménez, 2011), tertiary education may have a relative rather than an absolute relationship with both social capital and well-being. In contrast, some researchers have found that there is a significant positive association between national performances on PISA tests and overall happiness scores (Kirkcaldy, Furnham, & Siefen, 2004). Thus, along with providing insight on the moderating effect of individual-level tertiary education on the relationship between social capital and well-being, the following study also seeks to understand how overall levels of tertiary education at the country-level change the nature of the relationship between social capital and well-being.

Social capital is not a single attribute; rather, the term social capital captures a variety of entities that have two important characteristics in common: “they all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure” (Coleman, 1990, p. 302). Building upon prior research, we assess two elements of social capital: generalized social trust (Beilmann, Kööts-Ausmees, & Realo, 2017) and social relatedness (Carmo & Nunes, 2013; Conzo et al., 2016). It is important not to assume that tertiary education

has the same relationship with different forms of social capital, both at the individual and state level. Notably, Inglehart (2008) and Marks (1997) argue that higher levels of tertiary attainment support the development of post-materialist values. With an emphasis on individual autonomy and self-expression (Inglehart & Welzel, 2007; Zagórski, 2011), this value shift may influence the association between certain forms of social capital and well-being.

More specifically, tertiary education may improve civic engagement (e.g., Brand, 2010; Burden, 2009) but has “little effect on *schmoozing*—informal social connectedness” (Putnam, 2000, p. 186). Huang et al. (2009) theorize that this discrepancy is due to a “trade off” between education and different forms of social capital in which “the emphasis on the role of schooling as a source of human capital could be detrimental to the contribution of schooling on cultivating social capital for collective welfare” (p. 461). In contrast, patterns of modernization are associated with shifts towards “rational, tolerant, trusting, and participatory” values (Inglehart & Baker, 2000, p. 19), which align with forms of social capital related to generalized trust. In this sense, improved social trust signals the ability of tertiary education to impact values, which may or may not actually improve social relatedness.

This chapter uses the European Social Survey (ESS) to examine the relationships among tertiary education, social capital, and subjective well-being in 27 countries. Prior studies suggest that tertiary education is significantly associated with social trust and that social trust is similarly associated with self-reported well-being. For its part, social relatedness is intricately tied to well-being and is even conceptualized as one part of the well-being construct in ‘self-determination’ and ‘flourishing’ understandings of well-being (Ryan & Deci, 2000). However, given its theorized influence on individual autonomy and self-expression (Inglehart & Welzel, 2007), the relationship between social relatedness and well-being is not as clearly linked to tertiary education.

As shown in Figure 1, we hypothesize that the relationship between social capital—in this case, social trust and social relatedness—and subjective well-being is moderated in different ways by tertiary attainment. Specifically, we predict a ‘trade-off’ between individual human capital and interpersonal social capital, where either one or the other plays a dominant role. Furthermore, we expand on a modernization perspective by studying how overall levels of tertiary education within a country affect the relationships between different forms of social capital and well-being. Based on these aims, our research questions are as follows:

- (1) How do individual levels of social capital, as defined by both social trust and social relatedness, and subjective well-being descriptively differ by individual tertiary educational attainment within 27 European countries?

- (2) Does tertiary education influence the relationship between social capital and subjective well-being? In other words, does education at the individual level moderate the relationships between social trust and well-being and social relatedness and well-being?
- (3) Does the inclusion of an indicator measuring overall societal levels of tertiary educational attainment have an influence on the relationship between social capital and well-being? In other words, does education at the country level moderate the relationships between social trust and well-being and social relatedness and well-being?

In order to answer these research questions, the next section provides an overview of prior research on the relationships among well-being, social capital, and education. Following, the data and methods section details how key concepts within this study are operationalized and our quantitative approach. After providing an overview of the main findings, the discussion and conclusion section details answers to the original research questions, as well as future areas of research and overall limitations.

[Insert Figure 1 here]

Literature review

The relationship between social capital and subjective well-being

A multi-dimensional construct of ‘subjective well-being’ captures both individual-level feeling and functioning and is defined as an individual’s cognitive and affective evaluation of his or her life (Diener, Suh, Lucas, & Smith, 1999; Klein, 2011). High subjective well-being involves feeling “many pleasant and few unpleasant emotions,” and being satisfied with one’s life (Diener, 2000, p. 34). Although this concept is used extensively across many studies, it does not cover the entire spectrum of the definition of a ‘good life’ or of good mental health; however, it does allow for important insights into whether or not individuals give mainly positive or negative evaluations of their lives.

Prior research has examined how different forms of social capital relate to subjective well-being (Haller & Hadler, 2006; Huang & Wang, 2014; Portela, Neira, & del Mar Salinas-Jiménez, 2013; Puntscher et al., 2015). Both ‘bonding’ (e.g., strong ties) and ‘bridging’ (e.g., weak ties) forms of social capital are compared, the first concerning “relationships with family and close friends, who tend to be quite homogeneous,” and the second surrounding social trust and “relationships with distant others, including friends, colleagues and associates, who tend to have varied backgrounds, values and experiences” (Pereira, 2016, p. 385). In this sense, social

capital entails both structural and cognitive components, one “associated with group membership,” and the other “linked with the expectations, obligations, and trust embedded in relationships” (Pereira, 2016, p. 384).

Both social trust (Rodríguez-Pose & Von Berlepsch, 2014) and social relatedness, as measured by feeling appreciated (Adler & Fagley, 2005) and level of social support (Siedlecki, Salthouse, Oishi, & Jeswani, 2014), are significantly related to subjective well-being; yet, social context plays an important role (Diener, 2012; Yamaoka, 2008). As measured by both social trust and social support, there may be stronger associations between social capital and well-being in high-income countries (Calvo, Zheng, Kumar, Olgiati, & Berkman, 2012), especially those in Western Europe (Sarracino, 2012). Lesser known is if education level within a country moderates the relationship between social capital and well-being. Nevertheless, the Human Development Index (HDI)—which includes a measure of education level—is significantly associated with greater well-being cross-nationally, a model that also finds no association in terms of overall levels social capital, as measured by overall level of press freedom, when modelled simultaneously with the HDI (Vemuri & Costanza, 2006).

The relationship between education and subjective well-being

Tertiary credentials are associated with a range of individual life outcomes, including enhanced physical and mental health (Delhey, 2010; Field, 2009; Tuijnman, 1990; Groot & Maassen van den Brink, 2007; Lynch & Hippel, 2016), and benefits inside and outside of the labour market (Grossman, 2005; Haveman & Wolfe, 1984; McMahon & Oketch, 2013; Oreopoulos & Salvanes, 2011; Vila, 2000). Although the link between education and life satisfaction and/or personal happiness is well established (Woessmann & Schuetz, 2006), the exact nature of this relationship is unclear. Education is often included as a control variable within well-being research and is not discussed in depth (Barrington-Leigh, 2013; Bonikowska, Helliwell, & Hou, 2013; Hou, 2014). Depending on the analysis and other factor considered within these studies, tertiary credentials may appear to directly or indirectly influence subjective well-being.

Although differing by the conception of well-being employed (Jongbloed, 2018a; Nikolaev, 2018), research examining the direct relationship between tertiary education and certain forms of well-being is somewhat dubious and suggests that “educational attainment is not strongly or consistently related to life satisfaction” (Fahey & Smyth, 2004, p. 17). There is often little to no direct association, or even a significant *negative* association, between education and life satisfaction (Nikolaev, 2018). Contrastingly, research examining the indirect relationship between education and well-being highlights biases within these results. By accounting for

indirect effects—for example, through income—the magnitude and even the sign of the education coefficient may change (Powdthavee, Lekfuangfu, & Wooden, 2015).

Research investigating the association between education and broader conceptions of well-being suggest that individuals with high attainment report greater eudaimonic well-being, more meaning in their lives, and fewer negative emotions (Jongbloed, 2018a; Nikolaev, 2018). Other attributes, such as self-efficacy, autonomy, mental health, and confidence, are also positively associated with education (Chevalier & Feinstein, 2006; Field, 2009; Galton & Page, 2015). In terms of psychological health, individuals with more education report lower psychological distress, increased emotional health, and lower rates of depression, anxiety, anger, and malaise (Pallas, 2000). These studies lend support to the contention that education not only shapes “preferences, expectations, feelings, and emotional states” but also “perceptions of self and society” (Tuijnman, 1990, p. 286).

The relationship between education and social capital

Tertiary-level credentials also link to social capital, both at the individual and societal levels (Helliwell & Putnam, 2007). Besides income, education level is one of the most influential socio-demographic factors associated with social capital in Europe (Kaasa, & Parts, 2008). Individuals with tertiary education report higher levels of social capital in terms of: social trust and tolerance; membership in voluntary organizations, community involvement and political participation; and access to social support from relatives and friends (Borgonovi & Burns, 2015; Kingston et al. 2003; Nieminen et al., 2008). Prior studies suggest that tertiary education improves social capital by changing individual perceptions of cultural and social structures (Huang, van den Brink, & Groot, 2011). Particularly relevant to our study, individuals with tertiary credentials report greater levels of social trust (Easterbrook, Kuppens, & Manstead, 2016; Helliwell & Putnam, 2007; Huang et al., 2012).

Although meta-analyses have confirmed the robustness of the relationship between education and social capital across studies (Huang et al., 2009), the causal nature of this association is contested in three ways: (1) the direction of the relationship; (2) the extent to which it exists for all forms of social capital; and (3) the influence of often omitted variables. As is also argued concerning the education-health gradient (Lynch & Hippel, 2016), there is evidence that individuals with high levels of social capital at a young age are more likely to have greater levels of educational attainment (Roth, 2013). Additionally, while education is a “strong and robust correlate” of individual social capital, social relatedness shows a weaker association compared to social trust (Huang et al., 2009, p. 454). As discussed in the introduction, there is weak evidence that education improves “informal social connectedness” (Putnam, 2000, p. 186).

Rather the nature of social capital may change for highly educated individuals, such as increased social connectedness via technology (Fischer, 2005). Finally, the relationship between education and social trust may appear stronger when other correlates are omitted, such as increased optimism among tertiary graduates (Uslaner, 2002) and environmental factors early in the life course (Oskarsson et al., 2017).

Past research is mixed in regards to the relationship between how overall levels of tertiary education within a country are associated with social capital. Borgonovi and Burns (2015) argue that, although there is little to no association between country-level social trust and tertiary education, overall levels of assessed cognitive skills are positively associated with trust. Additionally, the relationship between social capital and education becomes more complicated when considering well-being. Although education has a positive association with individual-level social capital (e.g., Helliwell & Putnam, 2007) and subjective well-being (e.g., Rodríguez-Pose & Von Berlepsch, 2014), once a model also includes social capital variables, education may have a significant *negative* impact on subjective well-being (e.g., Portela et al., 2013). Furthermore, the multiple associations covered in this literature review highlight that tertiary education is likely associated with subjective well-being directly, while also moderating the relationship between social capital and well-being. That is, the association between social trust and social relatedness and well-being may differ for those with higher levels of education.

Analytical approach

Data and sample selection

Initiated by the European Science Foundation in 2002, the aim of the ESS is to capture cross-national attitudes, values, and beliefs within the European Union every two years. This study uses the sixth wave (2012/2013) of the ESS, a face-to-face survey that focuses specifically on personal and social well-being and includes several measures of social trust and social relatedness, along with socio-demographic information, including level of education. The sampling strategy uses a strict random probability design in 29 separate countries,³ a universe that aims to represent non-institutionalized individuals age 15 and over regardless of their legal status, nationality, and language.

³ Participating countries include: Albania, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Israel, Italy, Kosovo, Lithuania, Netherlands, Norway, Poland, Portugal, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

To study a comparable group of respondents cross-nationally, we limit our analysis to respondents age 25 to 65 who were active in the labour market during the survey period. We exclude Albania and Kosovo due to the small number of respondents with tertiary education within the ESS data. Following ESS guidelines, we apply post-stratification and population size weights in all analyses (ESS, 2014b). The post-stratification weight corrects for within-country non-response bias due to age, gender, education, and region, while the population size weight corrects for differing population sizes in a cross-national analysis. For further information on the ESS wave six survey design, see the ESS documentation freely available online (ESS, 2012, 2014a, 2014b).

Dependent variable

Beyond only a consideration of an individual's evaluation of his or her life satisfaction, the dependent variable representing well-being includes three ESS items measuring both positive and negative emotions—that is, self-reported life satisfaction and levels of happiness and depression—and aligns with the concept of 'subjective well-being' outlined above (Diener et al., 2010). We first standardize responses to each question (i.e., to have a mean of zero and a standard deviation of one) and then use polychoric factor analysis to construct the measure of well-being and Bartlett's factor scores to scale responses. As shown in Table 1, the coefficient of reliability is 0.70.

[Insert Table 1 here]

Independent variables

The main independent variables of interest are tertiary attainment and two measures of social capital: social trust and social relatedness. Building on the conception that university is a "critical stage" (Huang et al., 2009, p. 462) influencing social capital, an ESS item measuring self-reported highest education level captures tertiary attainment. We transform this ordinal scale into a dichotomous variable categorizing ESS respondents with and without university-level credentials (i.e., a degree at the undergraduate or graduate level). Aligning with 'bridging' forms of social capital, three ESS questions measure 'social trust' and capture beliefs that other people can be trusted, are fair, and are helpful, a composite measure used within prior research (e.g., Poortinga, 2006). Following Conzo, Aassve, Fuochi, and Mencarini (2017), four ESS items operationalize a 'bonding' form of capital termed 'social relatedness.' These questions ask respondents to report the extent to which they feel appreciated and respected by others and provide and receive help. We use polychoric factor analysis and Bartlett's factor scores to

construct both social capital scales, which are grand-mean centered in the analyses.⁴ As shown in Table 1, the coefficients of reliability range from 0.79 to 0.70.

Analyses also include several control variables known to be influential on well-being, social capital, and time use—the latter of which may influence social relatedness. Dummy variables measure: gender, if the respondent reported being married or in a common-law relationship, the presence of children in the home, and if the respondent was in school during the survey period. Continuous variables measure age/age² and the number of hours typically worked in a respondent’s main job, including overtime. Categorical variables measure income group and professional status. See the Appendix for an overview of the variables, scale construction, and levels of missing values.

Modelling approach

As part one of the findings section will illustrate, overall levels of social capital and well-being differ by country. Thus, we use linear multi-level modelling with random country intercepts and an unstructured covariance matrix to examine the relationship between the dependent variable—self-reported well-being—and our main independent variables of interest. Multi-level modelling allows us to correct for country-level clustering, a violation of the assumptions of ordinary least squares regression, through a two-level modelling structure with the addition of a composite residual term in the mixed model (Raudenbush & Bryk, 2002). While level one assesses country-variant terms, level two examines how country-invariant covariates explain variance within the level-one model.

After describing country differences in how overall levels of social capital and well-being differ for ESS participants with and without tertiary education, part two of our analysis graphically represents how tertiary education at the individual level moderates both forms of social capital. Separate multi-level models without level-two covariates operationalize these moderated relationships through two-way fixed interaction terms; that is, we separately model one interaction term between individual-level tertiary education and social trust and another interaction term between education and social relatedness. Given the influence of additional socio-demographic and employment factors, section two also assesses how tertiary education functions as a moderator with and without the

⁴ Grand mean centering subtracts the overall mean (i.e., across all countries) from each score, a procedure that changes the mean of all scores to zero. In contrast, group mean centering subtracts the mean of each cluster (i.e., individual countries) from each score within it. Both aim to produce “meaningful zero points” and improve interpretability (Enders & Tofighi, 2007). Because the derived social capital variables are constructed using responses across all countries, sensitivity analysis (available upon request) showed that grand and group mean centering produce almost identical estimates. Our choice to use grand mean centering is based on the recommendation that it is best suited in analysis involving a level-two variable (Peugh, 2010).

inclusion of additional fixed control variables. Following best practice, the interaction model includes all constitutive terms (Brambor, Park, & Golder, 2006).

Part three further refines the multi-level models by introducing a level-two country-invariant variable measuring the overall level of tertiary education. We derive the country-level indicator from the ESS data as the percentage of respondents within each country with tertiary education, a measure that correlates at 0.62 with 2012 attainment data from the United Nations Statistics Division. To assess how average levels of tertiary education at the country level change the individual-level relationship between both measures of social capital and well-being, fixed cross-level interaction terms are introduced into the model. These indicators measure two-way interactions between social trust indicators at level one and overall country-level tertiary education at level two.

Importantly, the multiplicative interaction models in parts two and three of our findings are symmetric. Therefore, these models cannot differentiate between a hypothesis asserting that education at the individual or country level modifies the effect of social capital on well-being from its opposite where social capital modifies the effect of education on well-being (Brambor et al., 2006). Although the direction of causality cannot be determined empirically, theoretical argumentation in combination with the empirical results provide strong evidence for a particular interpretation, a point that will be further developed in the discussion and conclusion.

Model development included running an unconditional means model with no predictors at level one or two to understand within- and between-country variation that covariates in later models may explain. This initial model generated an inter-class correlation of 0.16. Thus, only an estimated 16% of the total score variation in subjective well-being is attributable to differences among countries. We further evaluate each multi-level model through pseudo R^2 and goodness-of-fit measures, assessing the deviance and how the proportional reduction in the level-1 variance component (R^2_{τ}) and the variance reduction on the intercept ($R^2_{\omega_0}$) changes in reference to a means-only model.

Results

Descriptive overview

Figures 2, 3, and 4 illustrate that social trust, social relatedness, and subjective well-being differ between ESS respondents with and without tertiary degrees on average and across most national contexts. As illustrated in Figure 2, among all countries modelled, respondents without tertiary education report levels of subjective well-being that are 5.9% lower on average. Nevertheless, the difference in well-being by education level ranges considerably amongst countries, from little to no difference by education level in Finland and Denmark, to approximately 21% lower

self-reported subjective well-being among non-tertiary graduates in Hungary. Notably, there is a less pronounced difference among respondents with and without tertiary education at high ends of the well-being index.

[Insert Figure 2]

Shown in Figures 3 and 4, on average, ESS respondents with tertiary education report higher index levels across both social capital measures. Nonetheless, respondents with and without tertiary education report similar levels of social trust in some Eastern (e.g., Slovakia, Ukraine, Czech Republic, Russia, and Lithuania) and Northern (e.g., Norway and Finland) European countries. There is also little to no difference in social relatedness by education level in several countries, including Italy, Finland, Netherlands, Norway, Germany, and Cyprus. In contrast, there is a sizable difference in social relatedness index scores between tertiary and non-tertiary holders in the Czech Republic, Slovenia, and Hungary.

[Insert Figures 3 and 4 here]

The moderating role of education

Adding control variables and interaction terms consecutively, Tables 2 and 3 show the results of multilevel models examining the associations among education, social capital (i.e., social trust and social relatedness), and well-being. Both social capital coefficients are significant and positive across all models, a trend that suggests that they both enhance well-being. The larger coefficient for social relatedness highlights a more prominent association with well-being compared to social trust. In Models 2, 3 and 4, the interaction terms between individual-level tertiary education and both forms of social capital are statistically significant and *negative*.⁵ This suggests that the relationship between social capital and well-being is weaker for those with tertiary education. Although there is less of a social capital gradient in well-being for those with advanced credentials, the individual-level interaction terms only modestly contribute to the overall explanatory power of the models.

Looking at the results for social trust more specifically, Figure 5 illustrates the conditional marginal effects of an individual-level interaction term between tertiary education and social trust both with and without additional control variables. The top graph demonstrates how overall levels of well-being differ on average between respondents with and without tertiary

⁵ In robustness checks, the significance of the main variables and interaction terms does not change in models incorporating both forms of social capital in the same model. The results of these models are available upon request.

education across different levels of social trust, as estimated by an individual-level interaction term in Model 2 in Table 2 without additional demographic or employment control variables. It demonstrates that the relationship between tertiary education and well-being is stronger among individuals with lower social trust index scores; however, at high ends of the scale (i.e., scores greater than 4), there is no significant difference in well-being among individuals with and without tertiary education. However, as shown in the bottom of the graph, the conditional marginal effect comparing respondents with and without tertiary education is less pronounced when Model 4 in Table 2 accounts for employment and demographic controls. Although a small difference may exist at the lowest end of the social trust index, the 95 percent confidence interval passes zero at most levels of social trust once controls are included in the model.

Taking these results together, Figure 5 demonstrates that average levels of well-being are more strongly impacted by social trust for those *without* tertiary education. Although other influential factors attenuate this finding in Model 4, differences in well-being between respondents with and without tertiary education are only significant at mid-to-lower levels of social trust in Model 2. That is, respondents who self-report high levels of social trust have similar levels of well-being regardless of their education level.⁶ Thus, the negative individual-level interaction term indicates that the impact of social trust on well-being is smaller overall for those with tertiary education, while on the other hand, the conditional marginal effects suggest that highly educated respondents have greater well-being regardless of their level of social trust. This moderation effect suggests a ‘trade-off’ between individual human capital and interpersonal social capital, where one has a greater effect where the other is weaker, and vice versa.

[Insert Table 2 and Figure 5 here]

Next, we turn to equivalent models examining social capital in the form of social relatedness. The top portion of Figure 6 graphically represents the results of Model 2 in Table 3 through the conditional marginal effect of the difference in the level of well-being between respondents with and without tertiary education by level of social relatedness. As the slope never passes zero (i.e., the dotted line), respondents with tertiary education have higher levels of well-being regardless of their self-reported level of social relatedness. However, like the results for social trust, the negative slope suggests that high levels of social relatedness have a weaker relationship with well-being for individuals with tertiary education compared to individuals without tertiary education. In other words, the results show that the difference in well-being by

⁶ As emphasized earlier in the chapter, these models cannot differentiate between a hypothesis asserting that education at the individual or country level modifies the effect of social capital on well-being from its opposite where social capital modifies the effect of education on well-being (Brambor et al., 2006). However, our theoretically based argument is that education is the moderating variable.

education level is smaller for respondents with high self-reported social relatedness. Although those with tertiary education have higher levels of well-being overall, respondents without tertiary education ‘catch up’ in overall levels of well-being when they report high levels of social relatedness. The bottom portion of Figure 6 demonstrates how this relationship changes once all control variables are included in Model 4. Unlike social trust, the results of Model 4 are similar to Model 2, as the 95 percent confidence interval passes zero only at very high social relatedness index scores.

[Insert Table 3 and Figure 6 here]

The role of national context

Model 5 in Tables 2 and 3 further explores the association between overall levels of tertiary education and individual levels of well-being in each country using multi-level modeling with cross-level interaction terms. As neither the constitutive nor the interaction term are significant, we find that overall national levels of tertiary education *do not* moderate the relationship between individual-level social relatedness or trust and well-being. This suggests that as overall levels of tertiary education increase at the country-level in Europe, respondents do not report greater well-being and the relationship between social capital and well-being is unchanged. In part, these results likely connect to the low level of variance in subjective well-being amongst countries. As the baseline inter-class correlation reported above (i.e., 0.16) demonstrates, differences in well-being are more variable within than between countries. However, as we discuss next, it is important to consider why education at an individual level changes the relationship between social capital and well-being but has no effect at a national level.

Discussion

This chapter focused on two forms of social capital and their associations with individual well-being, testing if individual tertiary educational attainment moderates these relationships. Social capital, as defined by both social trust and social relatedness, and subjective well-being descriptively differ between respondents with and without tertiary education across contexts and within the majority of the 27 European countries under study. Notably, there is a less pronounced difference by education level at high ends of the well-being index, a finding that is consistent with previous research demonstrating that overall inequality in well-being is lowest in countries with high levels overall (Ovaska & Takashima, 2010). Further, educational inequalities in well-being are also minimized in these contexts (Jongbloed, 2018b). The results also indicate other important country differences in terms of social capital; although an education gradient exists for both social capital measures, the distribution is more or less pronounced in certain country contexts. Countries with the lowest and

highest levels of social trust in Europe—generally Eastern versus Northern countries—show a weaker education gradient in social trust, while this is only true among countries with the highest social relatedness average index scores.

Concerning the moderating effect of education, tertiary education significantly influences the relationship between both forms of social capital and subjective well-being. Our findings illustrate that social capital in the form of generalized social trust correlates more strongly with subjective well-being for respondents without tertiary education—well-being is therefore more variable by level of trust among this group. Likewise, social capital in the form of social relatedness has a stronger association with subjective well-being for those without tertiary education. Contrastingly, the association between both forms of social capital and well-being is weaker for respondents with tertiary education, a relationship that is more pronounced in the case of social relatedness than social trust. Notably, these findings relate to prior research which highlights that low-income families and individuals may report higher access to social capital due to greater reliance on informal networks (Boisjoly, Duncan, & Hofferth, 1995; Zhang, Anderson & Zhan, 2011). The negative moderation effect in our research supports the suggestion of a ‘trade-off’ between individual human capital and interpersonal social capital, where either one or the other comes to play a more important role in determining individual well-being, depending on comparative levels of these two factors.

Finally, the models presented here briefly take into consideration how educational context shapes the association between social capital and well-being. The inclusion of an indicator measuring overall societal levels of tertiary educational attainment did not have an influence on either personal well-being or the relationship between both forms of social capital and well-being. Insofar as these relationships remain unchanged, the influence of tertiary education on the relationship between social capital and well-being appears to be ‘absolute’ rather than ‘relative.’ This contrasts prior research by Ma del Mar Salinas-Jiménez, Artés, and Salinas-Jiménez (2011), who find that education has a larger association with well-being when fewer people attain higher levels. Preliminary analyses into how a country’s educational context impacts the influence of tertiary education on well-being suggests that tertiary degree holders self-report higher levels of well-being in contexts where a greater percentage of the population holds a tertiary credential. Of note, an individual- and society-level tertiary education attainment interaction term (results not shown here) is significant and positive when controlling for social trust, but not significant when controlling for social relatedness. This provides some suggestion that tertiary education has a stronger association with well-being in societies where overall levels of tertiary education are higher, further supporting an interpretation of an absolute rather than a relative effect of education (Helliwell & Putnam, 2004), although further investigation into how social relatedness influences this relationship is necessary.

As these empirical models cannot disentangle if education or social capital functions as the moderator (Brambor et al., 2006), theoretical guidance is necessary for interpretation. Treating education as a background factor, prior research largely focuses on how tertiary education is associated with higher levels of social capital—that is, impacting the chance for higher levels on average—and provides support for a causal story in which education plays the moderating role (e.g., Huang et al., 2009). However, this argument, like that concerning education and health (Lynch & Von Hippel, 2016), could also function in the opposite direction. Social capital might also moderate the association between tertiary education and well-being. That is, the line of causality may function from tertiary education to well-being, with social capital modifying this relationship. In this case, reduced social capital in the form of generalized social trust or social relatedness may cause subjective well-being to be more strongly associated with tertiary education levels.

A second limitation concerns variable selection. One might argue that the analyses should also include personal values. This variable, as well as a three-way interaction with social capital and tertiary education, would examine to what extent differences in the effects of social capital on well-being by educational category are indeed due to varying value sets, and not another third variable. Our aim was to first clearly delineate the relationships among education, well-being, and social capital before adding complexity into the models with further variables tapping into personal values. As a new field of research, further theorization and empirical investigation are necessary to understand how shifts in value orientations may also be associated with the relationships we study.

A final limitation is our choice to focus on only two forms of social capital and only two educational groups. Evidently, further nuance can be added to our findings in future research, extending these models to more detailed categories of educational attainment, in particular comparing vocational education and training and academic streams of post-secondary education across countries. What is more, a third type of social capital—‘linking’ capital, which measures social participation in a civic sense—might show quite different patterns. Because this type of social capital captures “membership in groups wherein members with varying amounts of power join together to undertake civic action or promote social change” (Ioakimidis & Heijke, 2016, p. 217), tertiary education may enhance, rather than trade off with, this form of social capital. This is an important avenue for future research.

Conclusion

We began this chapter by summarizing previous research that illustrates both how social capital is associated with personal well-being and how this relationship may differ by educational level.

These relationships are important and highly relevant because both education and social capital are integral to personal well-being and societal functioning. Indeed, in terms of non-market outcomes, social capital advantages for individual well-being may be equivalent to extremely large increases in economic rewards in the workplace (Helliwell & Huang, 2010). To further investigate the relationship among tertiary education, social capital, and subjective well-being, we test the hypothesis that tertiary education moderates the relationship between two broad forms of social capital, social trust and social relatedness, and well-being. Our results indicate a ‘trade-off’ between individual human capital and interpersonal social capital, with social capital being more instrumental in predicting subjective well-being for those without tertiary education. Beyond this, the analysis also highlights that overall levels of tertiary education at the national level does not change the strength of the relationship between individual-level social capital and well-being.

In sum, only tertiary education at the individual level operates as a non-pecuniary moderator, shaping the social capital-well-being association. Individual-level tertiary education plays a significant role both in predicting well-being and the slope of the relationship between social capital and subjective well-being. Although respondents with tertiary education exhibit higher levels of well-being across self-reported levels of social capital, the extent to which increased social trust and social relatedness are associated with greater well-being is weaker for these highly educated respondents. In contrast, those with less education report greater well-being benefits through social capital, thus ‘catching up’ to the more educated when they have higher social capital levels. Through these findings, this study provides new evidence that social capital in the form of generalized social trust, and—even more so—social relatedness, impacts well-being in different ways across educational groups within societies.

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Appendix: Description of key variables

Dependent variable: Subjective well-being

Variable	ESS variables	Level of missing	Scale
Subjective well-being	stflife, happy, fltsd	less than 1%	A single measure of well-being was constructed using polychoric factor analysis and scaled using Bartlett's factor scores. The coefficient of reliability is 0.70

Main independent variables

Variable	ESS variables	Level of missing	Scale
Tertiary education	eiscd	0.64%	1= undergraduate or graduate degree 0=no degree
Social trust	<p>1) ppltrst: generalized social trust “Would you say that most people can be trusted, or that you can’t be too careful in dealing with people?” (range 0-10)</p> <p>2) pplfair: “do you think that most people would try to take advantage³ of you if they got the chance, or would they try to be fair?” (range 0-10)</p> <p>3) pplhlp: “Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?” (range 0-10)</p>	<p>1) .31%</p> <p>2) .83%</p> <p>3) .44%</p>	A single measure of social trust was constructed using polychoric factor analysis, scaled using Bartlett's factor scores, and is grand-mean centered within analyses. The coefficient of reliability is 0.79.
Social networks	<p>1) flapppl: Feel appreciated by people you are close to (range 0-10)</p> <p>2) rehlpppl: Receive help and support from people you are close to (range 0-10)</p> <p>3) prhlpppl: Provide help and support to people you are close to (range 0-10)</p> <p>4) trtrsp: Feel people treat you with respect (range 0-6)</p>	<p>1) .74%</p> <p>2) .79%</p> <p>3) .73%</p> <p>4) .09%</p>	A single measure of informal social networks was constructed using polychoric factor analysis, scaled using Bartlett's factor scores, and is grand-mean centered within analyses. The coefficient of reliability is 0.71.

Level-two variable

Variable	Variable description	Source
Percent with tertiary ed.	% of individuals aged 25-65 working at least one hour a week who have a tertiary education credential (ISCED5) in 2012	ESS

Level-one control variables

Variable	ESS Variable Name	Coding
Gender	gndr	1=Male 0= Female
Marital status	maritalb	1=partnered 0=non-partnered
Work hours	wkhtot	Continuous Grand-mean centered
Currently in education	edctn	1 "In School" 0 "Not in school"
Professional status	isco08	1 "Professional" 0 "Not professional"
Missing professional status	isco08	1 "Occupation mission" 0 "Not missing"
Middle income	hinctnta (4th to 7 th decile) <i>comparison group=income low (1st to 3rd decile)</i>	1=yes 0=no
High income	hinctnta (8th to 10 th decile) <i>comparison group=income low (1st to 3rd decile)</i>	1=yes 0=no
Income missing	hinctnta (missing=17.67%) <i>comparison group=income low (1st to 3rd decile)</i>	1=yes 0=no
Children	chldhm	1 "has children" 0 "no children"
Age	agea	Continuous Grand-mean centered
Age-squared	agea	Continuous Grand-mean centered

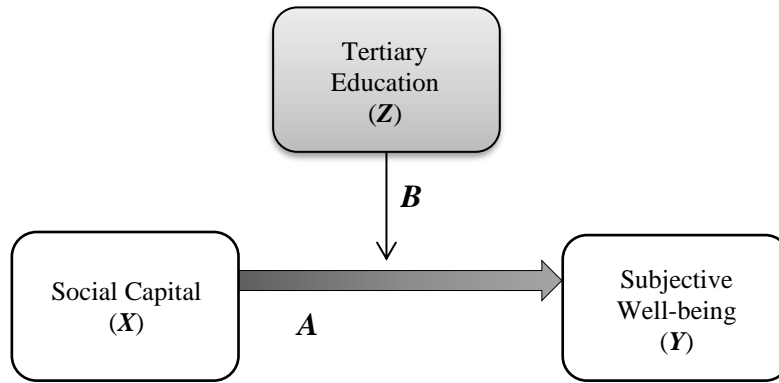


Fig. 1 Schema illustrating the proposed relationship between social capital and subjective well-being as moderated by tertiary education in individual- and cross-level interactions

Table 1 Reliability and correlation table of main individual-level variables

	Well-being	Tertiary education	Social trust	Social relatedness
Well-being	(0.70)			
Tertiary education	0.11	(NA)		
Social trust	0.31	0.15	(0.79)	
Social relatedness	0.40	0.07	0.19	(0.70)

Note: Correlations with tertiary education calculated using the point-biserial correlation coefficient. Coefficients of reliability shown in parentheses

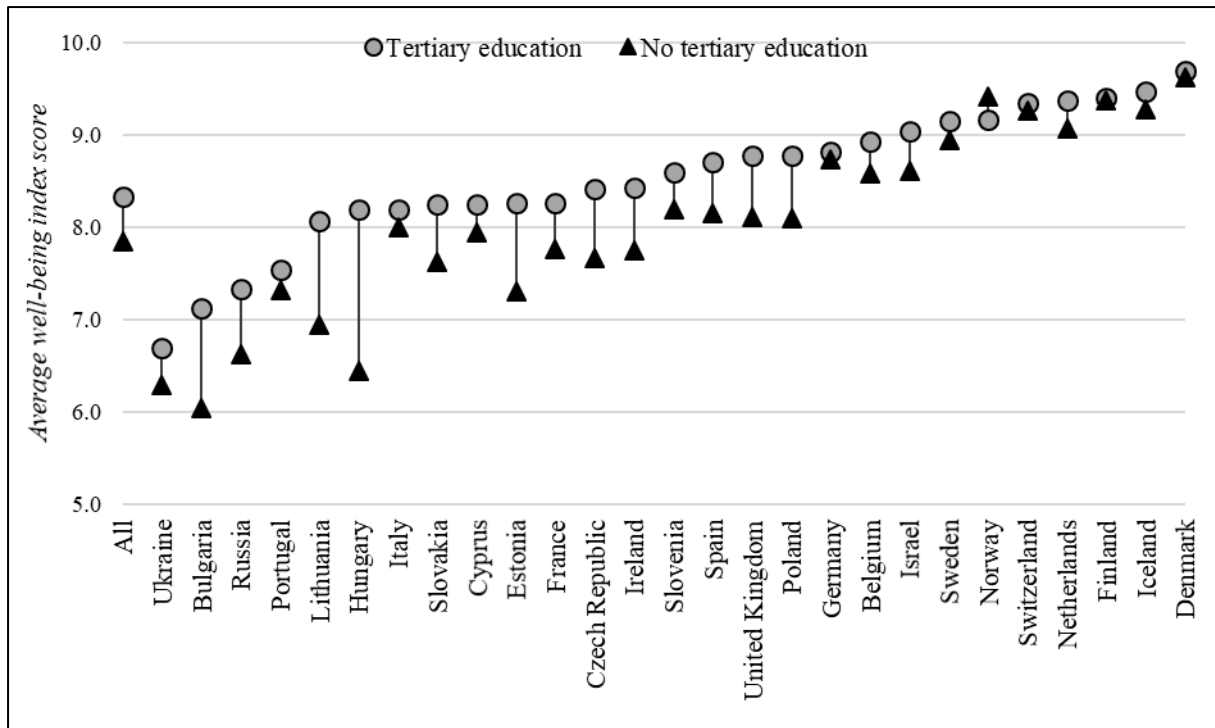


Fig. 2 Weighted average subjective well-being index score by country

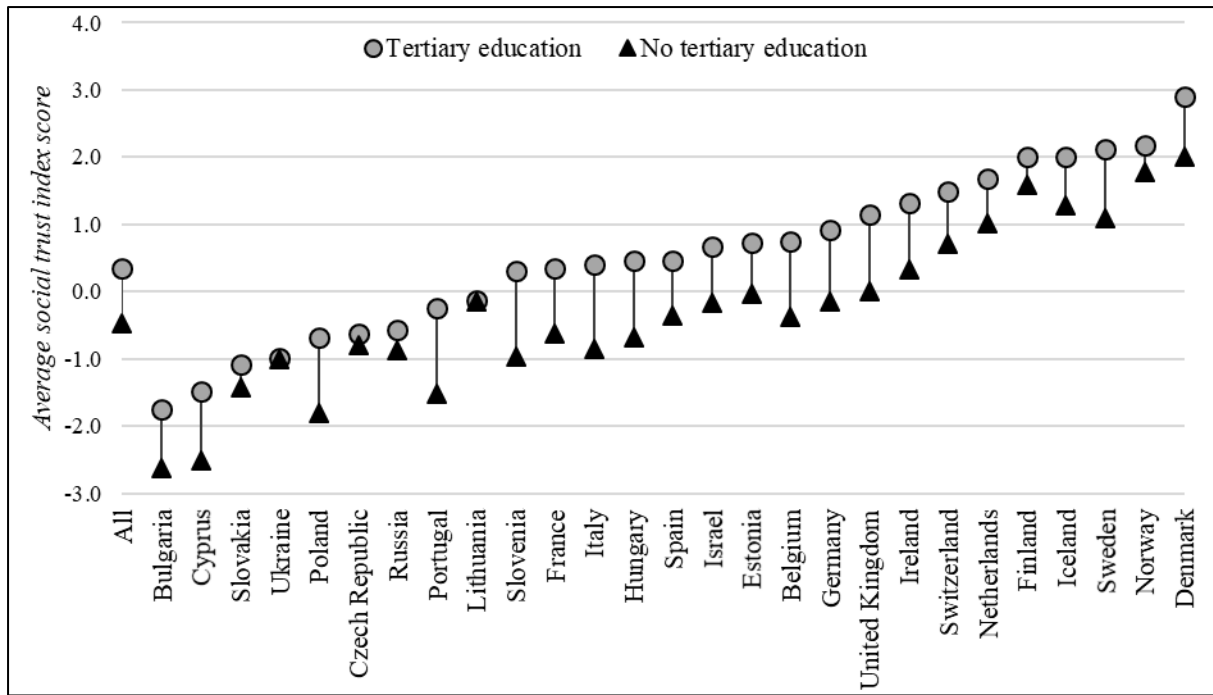


Fig. 3 Weighted average social trust index score by country

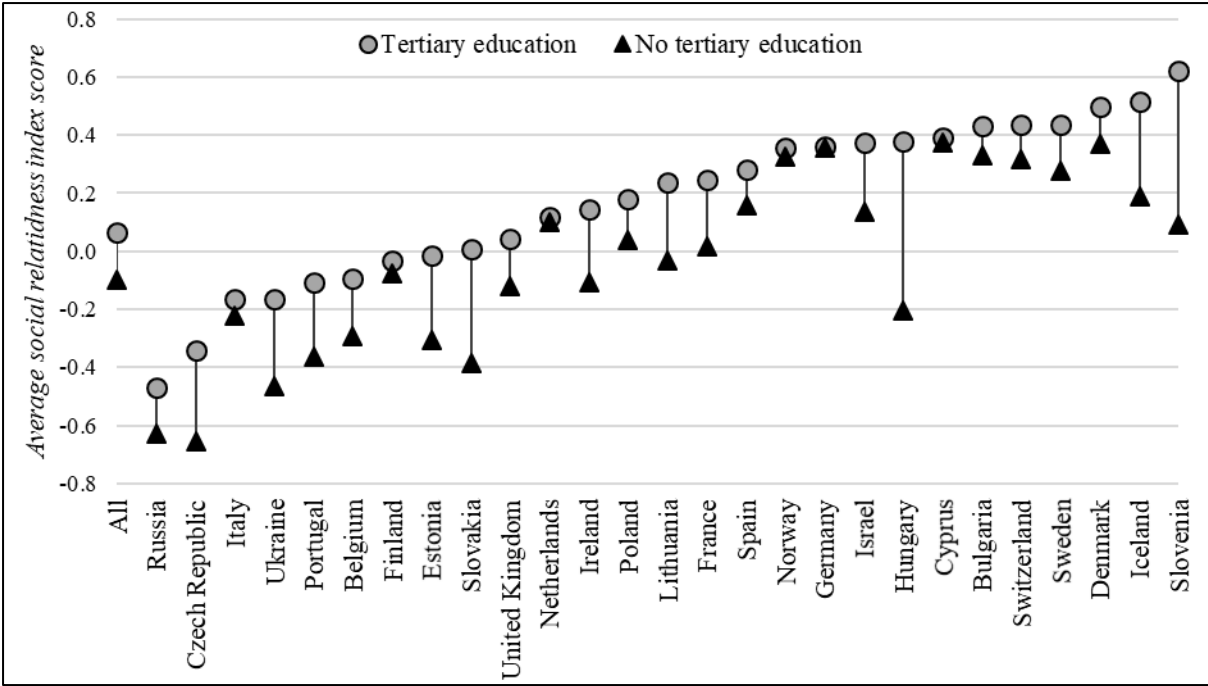


Fig. 4 Weighted average social relatedness index score by country

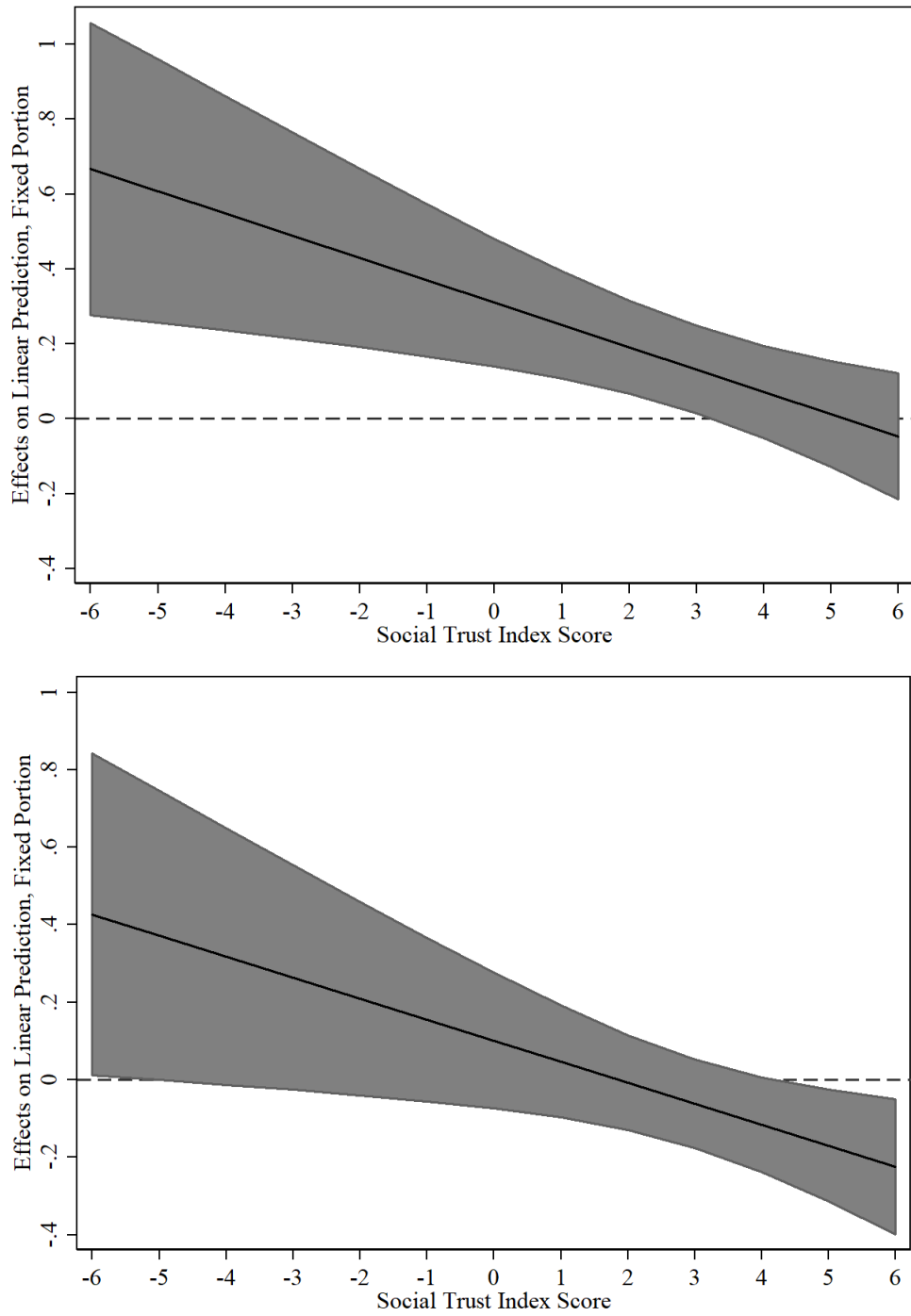


Fig. 5 Conditional marginal effects illustrating the moderation effect of tertiary education attainment on the association between social trust and well-being at the individual level, without (top) and with (bottom) control variables

Note: 95% confidence interval in grey

Table 2 Multilevel model regressing well-being on tertiary education and social trust

	Model 1	Model 2	Model 3	Model 4	Model 5
Level 1					
Tertiary education	0.301*** (0.093)	0.310*** (0.087)	0.273*** (0.070)	0.101 (0.089)	0.092 (0.094)
Social trust	0.212*** (0.011)	0.226*** (0.009)	0.224*** (0.009)	0.216*** (0.010)	0.198*** (0.017)
Tertiary*social trust interaction		-0.060** (0.021)	-0.056** (0.022)	-0.054* (0.023)	
Demographic controls			<i>included</i>	<i>included</i>	<i>included</i>
Employment controls				<i>included</i>	<i>included</i>
Level 2					
% of pop. with tertiary education					-0.007 (0.017)
<i>Cross-level interaction with social trust</i>					0.000 (0.000)
Constant	8.091*** (0.160)	8.099*** (0.158)	7.540*** (0.154)	7.106*** (0.171)	7.316*** (0.553)
Variance Components					
Constant variance	0.525 (0.123)	0.530 (0.125)	0.549 (0.131)	0.572 (0.134)	0.559 (0.124)
Residual variance	3.998 (0.200)	3.994 (0.198)	3.881 (0.202)	3.804 (0.212)	3.807 (0.214)
Pseudo R² & Goodness-of-fit					
R ² _T	0.068	0.069	0.095	0.113	0.113
R ² _{u0}	0.354	0.347	0.324	0.296	0.313
Deviance	98,982	98,958	98,288	97,816	97,837
<i>N</i>			23,133		

Note: Robust standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

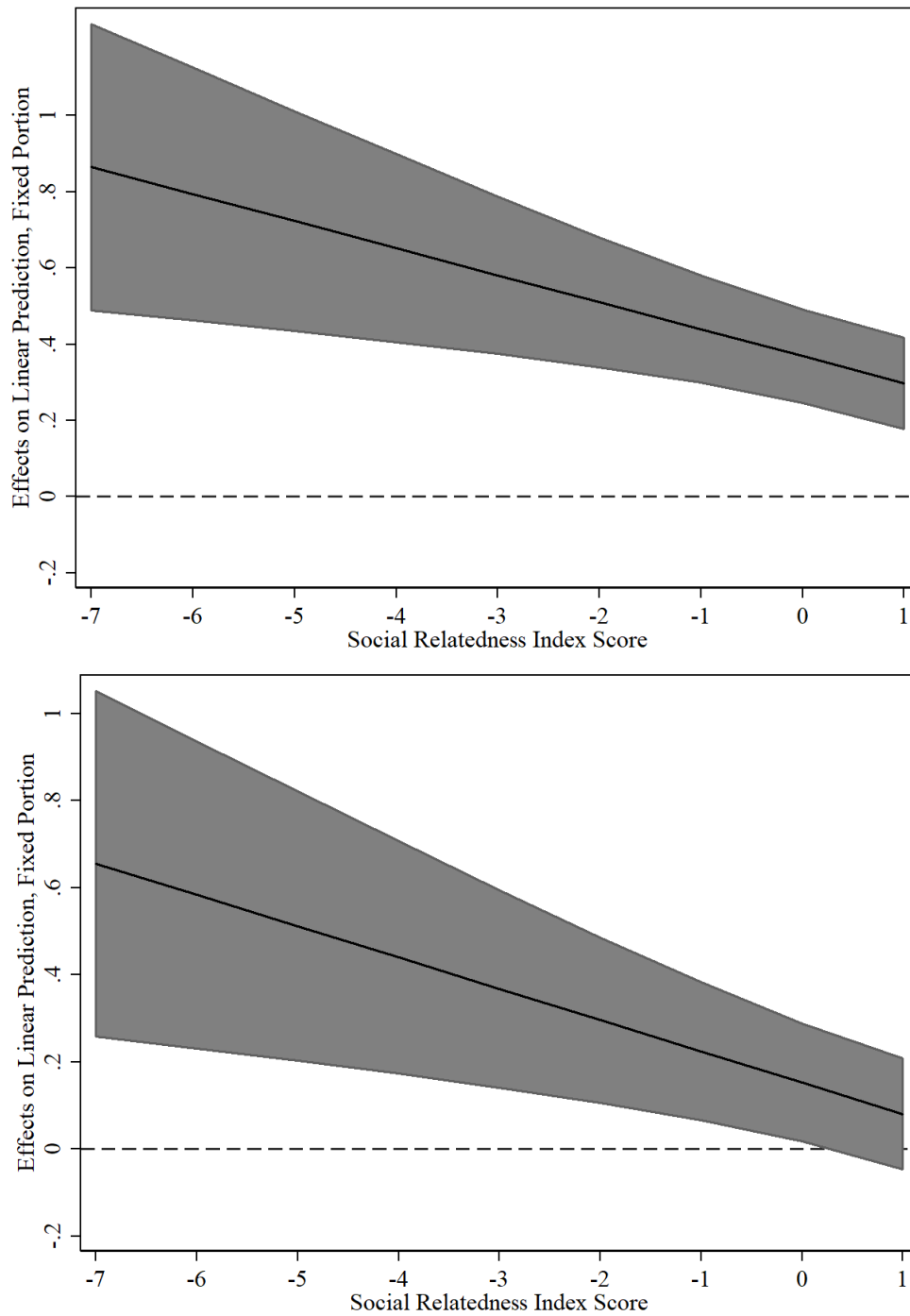


Fig. 6 Conditional marginal effects illustrating the moderation effect of tertiary education attainment on the association between social relatedness and well-being at the individual level, without (top) and with (bottom) control variables

Note: 95% confidence interval in grey

Table 3 Multi-level model regressing well-being on tertiary education and social relatedness

	Model 1	Model 2	Model 3	Model 4	Model 5
Level 1					
Tertiary education	0.366*** (0.066)	0.368*** (0.062)	0.344*** (0.050)	0.153* (0.069)	0.150* (0.075)
Social relatedness	0.582*** (0.027)	0.597*** (0.030)	0.581*** (0.029)	0.562*** (0.029)	0.560*** (0.056)
Tertiary*s. relatedness interaction		-0.071** (0.024)	-0.074*** (0.023)	-0.072** (0.024)	
Demographic controls			<i>included</i>	<i>included</i>	<i>included</i>
Employment controls				<i>included</i>	<i>included</i>
Level 2					
% of pop. with tertiary education					-0.000 (0.018)
<i>Cross-level interaction with s. relatedness</i>					-0.000 (0.001)
Constant	8.055*** (0.171)	8.058*** (0.170)	7.577*** (0.169)	7.200*** (0.192)	7.204*** (0.602)
Variance Components					
Constant variance	0.675 (0.181)	0.674 (0.181)	0.703 (0.185)	0.700 (0.188)	0.700 (0.188)
Residual variance	3.717 (0.182)	3.715 (0.181)	3.632 (0.189)	3.571 (0.201)	3.573 (0.201)
Pseudo R2 & Goodness-of-fit					
R ² _T	0.134	0.134	0.153	0.167	0.167
R ² _{u0}	0.169	0.170	0.134	0.138	0.138
Deviance	95,345	95,336	94,816	94,435	94,444
N			22,688		

Note: Robust standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$