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Article

Loneliness and Emancipation: A Multilevel Analysis of the Connection Between Gender Inequality, Loneliness, and Social Isolation in the ISSP 2017

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Abstract: The present article analyzes the connection between, on the one hand, gender equality and, on the other hand, loneliness and social isolation. It hypothesizes that modern relational institutions, that support gender equality, such as no-fault divorce laws, reduce loneliness in close relationships. This hypothesis is put to the test through a multilevel analysis of the ISSP 2017. The analysis reveals that the data agrees, to a large extent, with the theoretical arguments. The prevalence of loneliness is higher in countries with higher levels of gender inequality (as measured by the Gender Inequality Index [GII]). This can be attributed to a moderation effect: at lower levels of gender inequality, partnerships provide better protection from loneliness. These results are robust to controls for demographic composition, level of health, educational attainment, income poverty, and interview mode. Last, the analyses show that the threat of emotional isolation is more widespread in countries with low gender inequality. This finding, however, is only significant before controlling for demographic composition, level of health, educational attainment, income poverty, and interview mode, and it requires further analysis. The concluding section relates these findings to the popular tendency to argue that modern society has created a "loneliness epidemic."

Keywords: gender inequality; loneliness; couples; multilevel analysis

1. Introduction

In recent years, loneliness has become a political issue. So much is evidenced, for example, by the establishment of a Ministry for Loneliness in the UK in 2018 (Yeginsu 2018; John 2018). The British example has triggered the institutionalization of anti-isolation policies in other OECD countries. Australian, Japanese, Swedish, and German politicians have shown considerable interest in the British model (Kodama 2021; Block 2021). The political discourse is driven by the perception that the population of contemporary Western societies is becoming increasingly isolated. There is talk of an epidemic, a new widespread disease (Spitzer 2019). This hypothesis is based on known facts: individuals in modern societies increasingly have fewer children, marry less often, divorce more frequently, are more likely to live alone, and they are older on average (Cacioppo und Cacioppo 2018). Therefore, they are increasingly isolated, and their isolation means that they are lonelier. The present article contends that this argument is flawed by pointing out the positive effect that the rise of gender equality has had on the prevalence of loneliness in modern society. It focuses on female empowerment processes and argues that their influence outweighs the impact that demographic change has had on personal networks and the increase in the proportion of elderly individuals in the general population. By strengthening the autonomy of subjects to shape their relationships, the emancipation processes in modern societies have counteracted one of the primary causes of loneliness—poor close relationships. Gender equality reduces emotional isolation in relationships by improving opportunities to choose and conclude relationships. This process has been closely linked to female equality through the establishment of enforceable rights, such as

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unilateral divorce laws, and the decline of arranged marriage. At the same time, however, the social perception of loneliness has also changed because the recent developments entail a change in its typical causes. Emotional isolation in relationships is becoming less common, whereas the threat of emotional isolation due to more concentrated emotional networks is becoming more widespread, producing a contradictory dynamic whereby modern societies are not becoming more lonely but loneliness becomes more threatening for a large proportion of the population.

The remainder of this article is divided into four sections. The first develops a theoretical argument that explores the mechanism by which modern relational institutions that support gender equality reduce loneliness in close relationships. The second section presents the methodological setup of an empirical study that is based on data from the ISSP 2017. The study inquires whether the theoretical arguments that are presented in the first section agree with evidence from a varied set of cross-national representative surveys on loneliness and social isolation. The third section discusses the results. They show that the data largely coheres with the theoretical arguments. One finding is that the effect of partnerships on loneliness is moderated by the level of gender inequality in a country (as measured by the Gender Inequality Index [GII]). The higher the level of gender equality, the stronger the protective effect of partnerships against loneliness. Furthermore, the study shows that the threat of emotional isolation becomes more widespread as gender equality increases, at least before controlling for demographic composition. The concluding section relates these findings to the popular tendency to argue that modern society has created a "loneliness epidemic."

2. Theoretical Framework

2.1. Gender equality and loneliness: Is there an emancipation dividend?

Sociological theorists have often made metaphorical use of the word "loneliness" to criticize certain aspects of capitalistic consumer societies, for instance because of the predominant social character that they (supposedly) produce (Riesman 1950) or because of the consumer mentality that they (supposedly) infuse into social relationships (Slater 1971). Zygmunt Baumann, in similar fashion, has related consumer society to superficial and individualistic relationship styles that lead to a feeling of empty connectedness, which he terms "loneliness" (Bauman 2013). Here, a more concrete meaning of the term is adopted, in line with current debates in health and the human sciences, such as gerontology and social psychology: loneliness is a fundamental change signal, such as hunger or pain, that indicates that an individual's social connections are too weak or conflict ridden (Cacioppo et al. 2006). The studies that adopt this concrete definition of loneliness provide no conclusive evidence for the hypothesis that societal individualization processes lead to an increase in the prevalence of loneliness. This trend in the literature can be exemplified by the ongoing debate on the effect of individualistic cultural orientations on the prevalence of loneliness. The evidence on this idea is mixed (Mund et al. 2020). For instance, Swader (2019), in a comparison of 21 European countries, finds that individuals in societies that are more individualistic are less lonely. Other cross-country comparative studies from Western contexts come to similar conclusions (Hansen und Slagsvold 2016; Fokkema et al. 2012; Lykes und Kemmelmeier 2014), while (Barreto et al. 2021; Taniguchi und Kaufman 2021) find contrary evidence in samples from a wider selection of countries.

One reason for this inconclusiveness is that the individualism-collectivism hypothesis is based on a set of contradictory pull and push factors (Lykes und Kemmelmeier 2014) that are, for the most part, related to the structure of family relationships. For instance, it has been argued in different ways that collectivistic cultures provide more stable and reliable support from family members, a protective factor. At the same time, higher levels of family cohesion have been related to poorer perceptions of relationship quality, which are due to strong familial obligations and burdens. Thus, the same characteristics of collectivistic societies are expected to protect and to promote loneliness at the same time. Heu

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et al. (2021) dub these contradictory hypotheses and findings of the individualism-collectivism literature the "cultural loneliness paradox." They propose to remedy it by inquiring how cultural norms impact opportunities to form new relationships (i.e. relationship mobility), how they regulate the resolution of relationships (i.e. relationship stability), and how the two sets of norms interact. In particular, they find support for the hypothesis that stronger relationship mobility norms are consistently associated with lower levels of loneliness across a sample from four European countries. Weaker relationship stability norms, conversely, were not clearly related to higher levels of loneliness.

The argument that follows is strongly related to Heu et al. (2021) line of thought and applies it to one of the important modernization processes in contemporary societies, namely the advance of gender equality. As far as the proximal causes of loneliness are concerned, gender norms appear to offer a more suitable approach to understanding cultural variation in the prevalence of loneliness than collectivistic or individualistic orientations. For instance, the increases in women's labor market participation and female educational attainment are both linked to the postponement of childbearing (Adser 2004; Mills et al. 2011), which, in turn, has a decisive causal impact on family structure and thus on the availability of family and kinship relationships. Furthermore, the rise in the equality of women is related to better outcomes in health and mental health (King et al. 2020; SGB, vom 09.10.2020; Basu und Koolwal 2005), lower levels of intimate partner violence (Palma-Solis et al. 2008; Heise und Kotsadam 2015), and lower levels of poverty (Morrison und Morrison 2007; Costa et al. 2009), all of which are causally connected to experiences of loneliness and/or social isolation (Samuel et al. 2018; Gallie et al. 2003; Beneito-Montagut et al. 2018; Hawkley et al. 2008; Holt-Lunstad et al. 2015)).

Furthermore, gender equality is clearly related to the availability of opportunities for relationship mobility. The emancipation process can be reconstructed, in part, as a process of increasing individual control over close relationships. It establishes unilateral systems of relationship dissolution. This process is epitomized by the transformation of divorce law across modern societies from the 1960s onwards (Kneip und Bauer 2009): no-fault divorce laws that allow for the unilateral cancelation of marriages have become the norm across modern societies, leading to more divorces. This process has contributed to the shrinking of the group of lonely individuals because, when observed across an entire population of relationships, divorces should have a positive effect on the quality of partnerships. So much is suggested by studies on the subjective well-being and psychological stress of divorcees: before separation, psychological stress is extremely high, and relationship quality is low. After separation, the relationship is lost, but psychological distress decreases sharply and becomes similar to that observed among single individuals (Gardner und Oswald 2006; Blekesaune 2008; Brewer und Nandi 2014). At the same time, psychological distress among individuals in relationships that endure is particularly low when compared to that observed among non-partnered individuals. This observation can be attributed, in part, to the protective effects of high relationship quality and low relationship stress against loneliness. The selection processes of choosing and leaving partners ensure that, on average, relationship quality increases. In consequence, population-level loneliness decreases. The spread of unilateral divorce laws that began in the 1960s may therefore be expected to have reduced loneliness because it made unhappy marriages less likely, not necessarily in the life course of the individual but on the aggregate level of all marital relationships. A similar argument can be made in respect of the diverse and fluid new forms of partnerships and lifestyles that have been spreading in Western industrialized societies since the 1960s. In particular, the progressive acceptance of LGBTQ lifestyles may have prevented feelings of loneliness and social isolation. Several studies have shown that both internalized homophobia and experiences of discrimination on the basis of sexual orientation increase the likelihood of feelings of loneliness and reduce the protective effect of social networks against it (Mereish et al. 2017; Mereish und Poteat 2015; Kuyper und Fokkema 2010).

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Two objections can be raised against the argument that the emancipation-driven tendency toward greater unilateral control over the dissolution of partnerships has led to lower levels of loneliness. The first is that the increase in the number of lonely singles that divorces and more fluid partnership forms have precipitated outweighs the benefits of preventing loneliness in partnerships. However, this objection is not consistent with most of the evidence from demographic studies. The absolute increase in the number of single households and individuals in contemporary societies reveals little about the frequency of stable partnerships across the lifespan of the average individual. While marriage rates have been declining and divorce rates have been high in the Western world since the late 1960s, these tendencies cannot be attributed conclusively to the notion that exclusive partnerships between two individuals have lost their appeal or have become unattainable for an increasing proportion of the public. To a large extent, the loss of marriages (through divorces and foregone marriages) has been compensated by the spread of legitimate forms of non-marital partnership. In most countries, the rise of cohabitation alone has offset the loss of marriages (Bumpass und Sweet 1989; Kiernan 2002). It has even been disputed that, in the course of the decline of marriage, the prevalence of partnerships has decreased substantially beyond what demographic factors can explain (Castro-Martin et al. 2008; Lengerer und Klein 2007). For example, it must be considered that women are often partnerless in old age because their partners die before them. If a population contains more aged individuals, the prevalence of singledom increases without a decrease in the lifetime probability of biographical phases of long-term partnerships. This proposition suggests that the increase in loneliness due to greater relationship instability and the consequent failure of the relationship market is marginal in comparison to the increase in the quality of marriages and partnerships around the world that has been precipitated by no-fault divorces and new, more inclusive, and legitimate forms of coupledom.

The second objection is more difficult to dismiss. It concerns the collateral damage of separation. How do parent-child relationships and the psychosocial resources of children change as a result of divorce or separation? A comprehensive meta-study (Auersperg et al. 2019) indicates that divorce has long-term negative effects on the mental health of children. This finding suggests that parental separation is conducive to the development of feelings of loneliness on the population level. While this hypothesis has some merit, it must also be noted that the majority of the studies that the meta-analyses cover do not employ methods that are suitable for isolating the causal effect of divorce on children's mental health. They usually compare the children of divorced parents with the children of non-divorced parents. Since it can be assumed that parents who divorce differ from parents who do not divorce in respect of the background variables that impact children's mental health (such as personality traits, mental health, conflict behavior, and attachment style), whether divorce has a negative impact on the mental health of children on average remains open to question. In consequence, the argument for an increase in loneliness is weaker than the statistical associations suggest. Furthermore, Auersperg et al. (2019) show that the adverse mental health effects in question tended to decrease in studies between 1990 and 2017. This observation suggests that, to some extent, the negative effects of divorces can be attributed to a fading divorce culture that impairs children's relationships to divorced parents, especially fathers (Kunz 2001; Ahrons 2007). This inference, however, would support rather than disprove the hypothesis that advances in gender equality lead to a decline in the prevalence of loneliness. All in all, the literature points to the hypothesis that gender equality and female empowerment should imply a reduction in population-level loneliness because they strengthen the protective effect of average partnerships against loneliness.

2.2. Gender equality and social isolation: the dynamics of high-quality, low-size personal networks

Most researchers of loneliness agree that it has to be differentiated from social isolation (Luhmann und Bücker 2019; Pohlmann 2011; Hawkley et al. 2008), which is understood conceptually as a theoretical analogue to prolonged, intense, and non-self-determined aloneness: an individual is socially isolated if the frequency of contact in their close relationships falls below a certain threshold permanently. It should be noted, however, that there is no scientific consensus on the means of determining this threshold. Various measures have been proposed and see use in current research (Lubben 1988; Lubben et al. 2006; Hawthorne 2006; Samuel et al. 2018; Berkman 1978). Furthermore, similarly to the concept of poverty, social isolation is often differentiated into types of 'contact poverty.' The classic distinction is that made by Weiss (1973), who distinguishes between emotional and social isolation (to evade the confusion that the homonymy might produce, we call Weiss' (1973) social isolation "community isolation" hereafter). Accordingly, individuals are emotionally isolated if the frequency of their contact with primary-group members (such as partners, relatives, and close friends) is severely limited. Individuals suffer from community isolation when their opportunities for socializing in secondary groups (such as clubs, voluntary associations, leisure activity groups, and church congregations) are severely limited.

The question, thus, is how gender equality is related to social isolation in theory. This question can be framed theoretically, that is, one may inquire how the advance of women's equality has impacted the availability and structure of personal emotional support networks and social participation in the wider community. One initial observation is that female educational attainment and labor market participation have contributed significantly to the postponement of childbirth and the fall in overall fertility (Kim 2016). This effect of female empowerment has causal implications for the typical network structure. In a low-fertility setting, individuals have fewer siblings and, in consequence, fewer kinship ties (Dykstra 2010; Dykstra und Komter 2012). The effect on kinship network structures depends strongly on specificities, such as whether a one- or two-or-none child norm becomes dominant (Dykstra 2010; Dykstra und Komter 2012). This said, a common overall structural effect of low fertility is that the ties that individuals choose, especially ties to partners and, to a smaller extent, to close friends, tend to increase in relative importance in the individual's core network (McPherson et al. 2006; Schobin 2013). Moreover, chosen ties in contexts of high gender equality are usually dependent on reciprocal acceptance and are often terminated if the quality of the relationship drops below a threshold that is not acceptable for either party to relationship. This line of reasoning suggests that progress in achieving female equality, which is a process of shrinking kin networks and increasing individual control over close relationships, manifests as a concentration of close ties in a smaller number of high-quality relationships. The soft optimization of the core emotional network promotes smaller higher-quality networks.

It is unclear how to assess the impact of the rise of female equality on community isolation, that is, isolation from secondary groups such as religious communities or political, voluntary, neighborhood, and leisure associations. The comparative empirical findings on this topic are notoriously varied. For the USA, for instance, (Putnam 2000) argues prominently that societal modernization processes have led to the long-running decline in participation in voluntary civil associations. In Germany, conversely, an increase in participation, accompanied by a shift to more issue-driven and time-limited commitments, has been observed from the 1980s onwards (Burkhardt und Schupp 2019). Religious affiliation has been decreasing for decades in Europe, but it has remained stable in the USA. That secularization is a necessary effect of social modernization processes, such as gains in female equality, was a popular idea in the 1960s and 1970s, but it has since been disproven by empirical facts (Berger 2012). Moreover, the evidence about the contradictory notions of "community lost" (modernization processes lead to a reduction in community relations) and "community transformed" (modernization processes lead to new

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types of community relations that compensate for the loss of traditional community ties) is extremely mixed (White und Guest 2003). These observations, as well as others that are omitted here for brevity, indicate that the social sciences have so far failed to establish a clear link between community isolation and the advance of female equality in society.

3. Hypotheses and Methods

3.1. Hypotheses

The present chapter tries to show that the theoretical arguments about the emancipation dividend and the concentration of emotional networks into higher-quality relationships have empirical merits by examining comparative cross-national data on loneliness and emotional isolation. In the third section, three empirical hypotheses that can be derived from the theoretical discussion are tested. It is posited, first, that countries with a higher level of gender equality exhibit lower levels of loneliness (Hypothesis 1). The second hypothesis is that the loneliness-reducing effect of having a partner is larger in societies that are more gender equal (Hypothesis 2). This is so because stress in close relationship networks should be lower on average in societies that permit greater relationship mobility, which, as argued above, results from the rise of gender equality (Hypotheses 3). However, gender equality also leads to the contraction of emotional networks because it entails lower birthrates and a stronger emphasis on chosen social ties, such as ties to partners (Hypothesis 4), which leaves a higher number of individuals vulnerable to emotional isolation in more gender-equal societies (Hypothesis 5). The final question that is analyzed concerns the impact of gender equality on community isolation. Significant country-level variation is expected, while the direction of the effect of gender equality is only explored.

3.2. Data

The ISSP 2017 (v2.0.0) was a series of international, comparative, and representative population surveys that were conducted in 30 countries in Europe, North America, South America, Africa, Asia, and Oceania (see the sub-section “Sample description” for more details). The surveys attracted a total of 44,492 respondents.

3.3. Measures

Gender Inequality Index: The GII is an index that varies between 0 ("perfect equality between men and women") to 1 ("perfect inequality between men and women"). It attempts to capture the degree to which women enjoy social, economic, and political equality in a society through a single measure. It takes into account women's reproductive health (adolescent births and maternal mortality), their level of education, their labor market participation, and their representation in parliaments (UNDP 2019). The index was logarithmized and then taken at its absolute value for the purpose of the analyses that are presented. This approach has advantages for the statistical treatments because, the GII is strongly left skewed. This can cause problems with outliers in regression models. The absolute value of the logarithm is 1 at 0 and ∞ at 0, meaning that higher values on the absolute log(GII) indicate higher levels of gender equality.

Loneliness: The ISSP 2017 used a short three-item scale to measure the frequency of feelings of loneliness (Joye et al. 2019). The items were measured on a five-point frequency scale (1 = “never”; 2 = “rarely”; 3 = “sometimes”; 4 = “often”; 5 = “very often”). The procedure suggested by (Taniguchi und Kaufman 2021) was applied to derive a scale from the items. First, the levels “never” and “rarely” were recoded to 0, and the levels “sometimes,” “often,” and “very often” were recoded to 1. In the second step, the respondents were assigned a value of 0 if their total score on the recoded items was 0 (= “not lonely”) and 1 (= “lonely”) otherwise. This procedure yielded an acceptable level of reliability for the total scale (Cronbach’s $\alpha = 0.77$)

Close-network stress: Close-network stress conceptually refers to the perception of strain, conflict, and burdens that arise in close relationships. It was measured by two

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items. The first item seeks to capture perceptions of strain due to exigencies that originate from family members, relatives, and friends: "Do you feel that your family, relatives and/or friends make too many demands on you?" (1 = "No, never."; 2 = "Yes, but rarely."; 3 = "Yes, sometimes."; 4 = "Yes, often."; 5 = "Yes, very often."). The second item refers to perceptions of emotional stress in a respondent's close network. The question that was asked was as follows: "Thinking about the important people in your life, such as your spouse or partner, your family members, or close friends, how often in the past 4 weeks did any of these people act angry or upset with you? (1 = "never"; 2 = "rarely"; 3 = "sometimes"; 4 = "often"; 5 = "very often"). The total scale had a Cronbach's α of 0.57, which is poor but still acceptable given the small number of items. The means of both items were taken to build the close-network stress index CNI_{stress}.

Emotional isolation: The ISSP 2017 used two types of measures to assess the inclusion of a participant into a network of primary relationships. The presence of a partner or spouse (0 = "no partner/spouse"; 1 = "has partner/spouse") and the number of children in a household were measured in discrete units, while the presences of adult children, parents, siblings, more distant family members, and close friends were measured by the frequency of contact with the respondent (1 = "daily or lives in the same household"; 2 = "several times a week"; 3 = "once a week"; 4 = "two or three times a month"; 5 = "once a month"; 6 = "several times a year"; 7 = "less often"; 8 = "never, is not alive, or does not apply"). These variables were first grouped into four segments: parents, children (children in household (HH) and adult children), kin (siblings and more distant family members), and close friends. To ensure their comparability, the variables were recoded using the following scheme: the variable "number of children in HH" was dichotomized (0 = "no children in HH"; 1 = "children in HH"). The frequency scales were dichotomized at the value "several times a week" (1 = "smaller"; 3, else 0). This approach amounts to considering a set of close relationships to be present in a respondent's core emotional network if the contact that they provided was at a comparable level to social contact with someone living in the same household. The following social network index was thus calculated: $SNI_{emo} = 2 * Partner + Parents + Children + Kinship + Close\ Friendship$. The scale ranges from 0 ("complete emotional isolation") to 6 ("strong emotional inclusion"). An individual is considered at risk of emotional isolation if their SNI_{emo} was greater than 1 but smaller than 3, that is, when losing contact with one additional element of their close relationship network would produce emotional isolation. Likewise, an individual was considered emotionally isolated if their SNI_{emo} was smaller than 2.[1]

Community isolation: The ISSP 2017 used three items to measure the inclusion of a participant into a network of secondary relationships. It measured inclusion in leisure, sportive and cultural activities, and political associations as well as participation in voluntary work, religious organizations, and charities. The following questions were asked: "In the past 12 months, how often, if at all, have you taken part in activities... a) of groups or associations for leisure, sports or culture?; b) of political parties, political groups or political associations?; and c) of charitable or religious organisations that do voluntary work?". The items were measured on a five-point frequency scale (1 = "once a week or more"; 2 = "one to three times a month"; 3 = "several times in the past year"; 4 = "once in the past year"; 5 = "never"). The frequency scales were dichotomized at the value of "once a week or more" (i.e., "once a week or more" = 1, 0 otherwise). This approach amounts to considering a community relationship to be present if it provides a similar level of contact as a close emotional relationship. The following social network index was calculated from

[1] The SNI_{emo} has to be considered as a formative index, because it is composed of components that by theoretic construction should contribute independently to the construct we want to measure, and represent a symptom thereof. Reliability measures for reflective scales, such as Cronbach's α therefore, do not apply

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the three items: $SNI_{community} = Leisure + Politcs + Charity$. The scale ranges from 0 ("community isolation") to 3 ("strong community inclusion").

Control variables: The ISSP 2017 included a variety of control variables that have been connected causally to loneliness and social isolation, such as age, gender, subjective health, depressiveness, educational attainment, income poverty, employment status, and interview mode (Beller und Wagner 2018, 2020; Cacioppo und Hawkley 2003; Samuel et al. 2018; Savikko et al. 2005; van Tilburg und Leeuw 1991; Leeuw 1993; Erzen und Çikrikci 2018; Risk factors for loneliness in adulthood and old age--a meta-analysis 2003; Pinquart und Sörensen 2003). Age was measured in full years. The "age" variable was transformed by cubic orthogonal polynomials (Narula 1979) to accommodate the multimodal shapes of age dependency that are often found in the literature on cross-sectional surveys, loneliness, and social isolation (Luhmann und Hawkley 2016; Yang und Victor 2011). Gender was measured by two categories (0 = "male"; 1 = "female"). Subjective health was captured on a five-point scale (1 = "excellent"; 2 = "very good"; 3 = "good"; 4 = "fair"; 5 = "poor"), which is intended to capture the general state of the respondent's health. Depressiveness was assessed through the question, "During the past 4 weeks how often have you felt unhappy and depressed?". The ordinal format of the responses includes five frequencies (1 = "never"; 2 = "rarely"; 3 = "sometimes"; 4 = "often"; 5 = "very often"). Subjective health and depressiveness were interpreted as continuous predictors and normalized for the purpose of statistical analysis. The highest educational degree that a respondent had attained was used to measure their level of education. The responses were homogenized to seven ordinal levels to facilitate cross-national comparability (0= "no formal education"; 1 = "primary school"; 2 = "lower secondary"; 3 = "upper secondary"; 4 = "post-secondary, non-tertiary"; 5 = "lower-level tertiary"; 6 = "upper-level tertiary (Master, Doctor)"). The following question was used to assess income poverty: "Thinking of your household's total income, including all the sources of income of all the members who contribute to it, how difficult or easy is it currently for your household to make ends meet?". The original response format had five levels, which were recoded into a binary variable that indicates whether a respondent found it difficult to cope at their current level of household income (1 = "very difficult or fairly difficult"; 0 = "neither easy nor difficult, fairly easy, or very easy"). Finally, employment status was captured by three categories (0 = "employed"; 1 = "unemployed"; 2 = "not working"), and interview mode was captured by five (1 = "paper and pencil face to face interview (PAPI)"; 2 = "computer aided face to face interview (CAPI)"; 3 = "self-administered paper and pencil questionnaire (SC)"; 4 = "computer assisted web interview/computer assisted self-interview (CASI/CAWI)"; 5 = "telephone and other").

3.4. Sample description

The sample contains data from 30 countries that vary substantially in their level of gender inequality, the prevalence of loneliness (*Loneliness*), close-network stress (CNI_{stress}), emotional network integration (SNI_{emo}), emotional isolation or risk thereof (fraction of individuals with SNI_{emo} lower or equal to 2 points), and community network integration ($SNI_{community}$). In terms of gender equality, the values on the GII ranged from very low gender inequality (0.040) in Denmark (DK) to very high levels of gender inequality (0.524) in India (IN). The average country displayed a medium level of gender inequality ($M = 0.172$). The prevalence of loneliness varied from 0.065 points (or 6.5%) in Thailand (TH) to 0.275 (or 27.5%) in South Africa (ZA). The country-level average was 0.175 (or 17.5%). The level of close-network stress, as measured by CNI_{stress}, ranged from 1.564 points in Austria (AT) to 2.623 points in Slovakia (SK). The average level of 1.920 on the country level points to medium-to-low average levels of close-network stress. The average of the country averages on the SNI_{emo} was 3.280. The average fraction of individuals who were emotionally isolated or at risk was 30.0%, pointing towards a normality of stable emotional network inclusion for a large majority of the individuals in most of the coun-

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tries in the sample. In contrast, $SNI_{community}$ only ranged between 0.064 points in Lithuania (LT) and 0.449 points in India, averaging 0.251 across all countries. Community integration, as measured here, appears to have been rather weak across the countries in the sample.

Table 1. Country Level Descriptive Statistics.

Country	*GII*	*|log(GII)|*	*Lonely (Frac.)*	*CNI_{stress}*	*SNI_{emo}*	*Emotionaly isolated or at risk (Frac.)*	*$SNI_{community}$*
AT	0.071	2.645	0.107	1.564	3.134	0.354	0.275
AU	0.109	2.216	0.263	1.943	2.88	0.378	0.372
CH	0.039	3.244	0.079	1.615	3.341	0.26	0.411
CN	0.152	1.884	0.155	1.596	3.159	0.312	0.072
CZ	0.124	2.087	0.186	2.082	2.988	0.382	0.176
DE	0.072	2.631	0.122	1.62	3.284	0.288	0.349
DK	0.04	3.219	0.151	1.79	3.022	0.331	0.385
ES	0.08	2.526	0.145	1.661	3.837	0.181	0.213
FI	0.058	2.847	0.235	2.15	2.966	0.35	0.243
FR	0.083	2.489	0.206	1.792	3.012	0.345	0.347
GB-GBN	0.116	2.154	0.245	1.864	2.697	0.44	0.334
HR	0.124	2.087	0.208	2.159	2.715	0.363	0.267
HU	0.259	1.351	0.214	1.864	3.095	0.376	0.088
IL	0.098	2.323	0.153	1.898	4.002	0.159	0.35
IN	0.524	0.646	0.258	2.142	4.142	0.113	0.449
IS	0.062	2.781	0.19	1.736	3.757	0.196	0.326
JP	0.103	2.273	0.134	1.994	2.506	0.516	0.117
LT	0.123	2.096	0.149	1.787	2.925	0.421	0.064
MX	0.343	1.07	0.142	2.347	3.633	0.212	0.251
NZ	0.136	1.995	0.25	1.927	3.186	0.303	0.439
PH	0.427	0.851	0.222	1.858	3.82	0.188	0.122
RU	0.257	1.359	0.13	2.033	3.478	0.274	0.114
SE	0.044	3.124	0.173	1.778	3.283	0.268	0.289
SI	0.054	2.919	0.069	1.732	3.589	0.23	0.277
SK	0.18	1.715	0.197	2.623	3.098	0.344	0.193
SR	0.441	0.819	0.206	2.284	3.605	0.238	0.229
TH	0.393	0.934	0.065	2.504	3.997	0.164	0.261
TW	0.056	2.882	0.11	1.705	2.911	0.395	0.126
US	0.189	1.666	0.222	1.803	3.216	0.314	0.238
ZA	0.389	0.944	0.275	1.875	3.244	0.314	0.145

3.5. Missing data imputation

From the initial 44,492 respondents of the ISSP 2017, 3.00% (3.80%, 4.77% , 5.21%) had at least one missing value for an item from the *Loneliness* scale ($CNI_{stress}, SNI_{emo}, SNI_{community}$), and 1.23% (1.30%, 0.34%, 1.47%) were missing all values for those items. To reduce the biases (Janssen et al. 2010) that would be associated with dropping a substantial number of missing cases, which is associated with selective item non-response, the following procedure was adopted: cases that had missing values for all items of a dependent variable were eliminated. In cases that exhibited selective item non-response, the corresponding items were imputed multiple times. Furthermore, the non-response rate for control-variable items was moderate (2.44% on average across all eight control covariates that were considered). However, in two cases, the non-response rate was associated with individual countries. In the case of Denmark, all information on income poverty was missing, and information on employment status in South Africa was

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wholly absent. In order to avoid dropping information from whole countries, all missing data on the control covariates was imputed jointly with the selectively missing data on the dependent variables. Accordingly, 20 imputations by chained equation, using random forests, were calculated following the procedure proposed by (Stekhoven und Bühlmann 2012) in order to impute the missing data. All imputations were carried out using the R package *miceRanger* v.1.5.0 (Wilson 2021). This procedure yielded a total of 43,269 complete cases in each of the 20 imputed data sets.

3.6. Analytical strategy

Three nested multilevel general linear models were considered and compared for each dependent variable (*Loneliness*, $CNI_{stress}, SNI_{emo}, Emotional\ Isolation, SNI_{community}$), and the type of link function (identity or logit) was chosen depending on the type of the dependent variable (continuous or binary). The first step of the modelling involved a baseline model. It consisted of random intercept models that account for the country-level variation of the dependent variable. The second step assessed whether between-country variation was attributable, in part, to variations in gender equality, that is, it includes the absolute value of the logarithm of the GII (|logGII|) as a country-level predictor. The third group of models extends the second model through individual-level controls for age, gender, subjective health, depressiveness, employment status, income poverty, educational attainment, and interview mode to ascertain whether the country-level association of the dependent variable with gender inequality is attributable to individual-level factors that are known to be linked causally to the dependent variable. In the case of *Loneliness*, a fourth model was estimated. It includes the effect of partnerships on loneliness and the cross-level interaction of partnerships with gender equality in order to evaluate Hypothesis 2, which proposes that the protective effects of partnerships increase in more gender-equal societies. The nested models were estimated by Resticted Maximum Likelihoof (REML) and compared to the baseline model through likelihood ratio tests after being refitted using Maximum Likelihood (ML). The estimations that are based on the 20 imputation datasets were combined in accordance with Rubin's rules (Royston 2004).

4. Findings

4.1. Loneliness, partners and close-network stress

The prevalence of loneliness, as measured here, varies substantially between countries. The (adjusted) intra-class correlation (ICC) of the base model (only country-level random intercepts) shows that approximately 5.9% of the total variance can be attributed to the country level. Introducing the absolute log of the GII into the base model as a fixed effect reduces this figure significantly to 5.1% (see Model 1).[2] Moreover, the analyses of the (discrete) marginal effects of the base model at representative values (MERVs) show that an increase in the value of |logGII| from 1 (low gender equality, corresponding approximately to a GII of 0.37, roughly the level of gender inequality in countries like Thailand or South Africa) to 2 (middle gender equality, corresponding approximately to a GII of 0.14, roughly the level of gender inequality in countries like New Zealand or Lithuania) entails a decrease in the fraction of lonely respondents of 0.034 points (or 3.4%). A further one-point increase in |logGII|, to a value of 3 (high gender equality, corresponding approximately to a GII of 0.05, roughly the level of gender inequality in countries like Finland or Denmark), predicts a decrease in the fraction of lonely individuals of 0.030 points (or 3%). These general findings are robust to fixed effect controls for age, gender, educational attainment, poverty, employment status, depressiveness, subjective health, and interview mode (see Model 2). In the model that includes controls (Model 2), the variance that is attributable to the country level decreases substantially to about 3.8% (adjusted) or

[2] Models containing the fixed effects parameters of all control variables are included in the Appendix A.

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2.8% (conditional, i.e., when the variation that is attributable to the fixed effects is taken into account). The controls also reduce the MERV estimates for changes from low to medium gender equality (0.027 points, or a 2.7% reduction) and from medium to high gender equality (0.023 points, or a 2.3% reduction). While this finding shows that the correlation between gender equality and the prevalence of loneliness is attributable to differences in the country-level prevalence of the proximal causes of loneliness to a certain extent, it also lends support to the hypothesis that the level of loneliness decreases with an increase in the gender equality of a country (Hypothesis 2). Moreover, Model 3 reveals that the level of gender equality moderates the loneliness-reducing effects of partnerships significantly, which is concordant with the predictions of Hypothesis 3: the higher the level of gender equality, the stronger the protection that partnerships provide against loneliness.

Table 2. Multilevel Logistic Regressions of the Effect of GII on Loneliness.

	Model 3			*Model 2*			*Model 1*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	-1.438	0.276	***	-1.108	0.267	***	-1.115	0.221	***
|logGII|	-0.055	0.109		-0.222	0.104	**	-0.223	0.101	**
|logGII|*Partner	-0.263	0.04	***						
Partner	0.006	0.082		-0.497	0.031	***			
Controls	Yes			Yes			No		
SD Country	0.369	0.005		0.36	0.005		0.421	0.002	
ICC adjusted	0.04			0.038			0.051		
ICC conditional	0.029			0.028			0.051		
LRT-Test	Chisq = 7129.69 DF = 22 Pr(>Chisq) < 0.001			Chisq = 7084.16 DF = 21 Pr(>Chisq) < 0.001			Chisq = 4.34 DF = 1 Pr(>Chisq) < 0.0372		

Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05

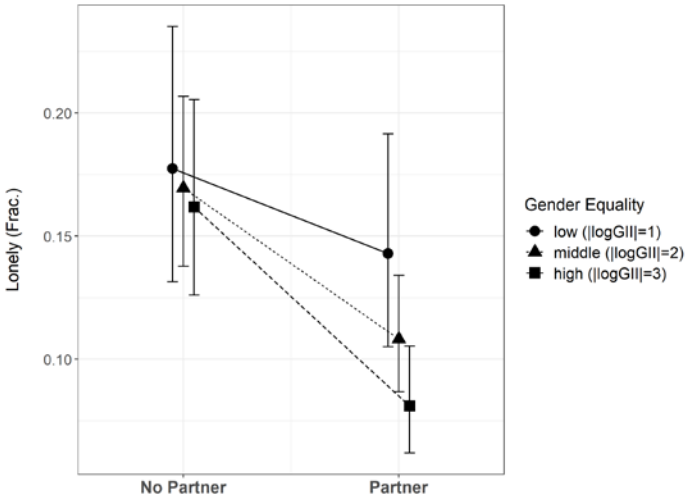

Figure 1. Marginal Effects of Partnership on Loneliness at Representative Levels of Gender Equality (Based on Model 3).

Figure 1 compares three scenarios to illustrate the results from Model 3. In a low gender equality context (|logGII|=1), having a partner is associated with a decrease in the prevalence of loneliness of 0.034 points (or 3.4%). In contrast, in medium (|logGII|=2) and high (|logGII|=3) gender equality contexts, having a partner reduces the probability of feeling lonely by 0.061 (or 6.1%) and 0.080 (or 8.0%), respectively. In conclusion, the

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higher the level of gender equality, the stronger the protection that partnerships afford against loneliness. This conclusion must be analyzed in the light of close-network stress. Here, the base model attributes about 10.1% of the variation in CNI_{stress} to the country level. This proportion is reduced substantially by introducing gender equality as a country-level fixed effect, by 7.3% (ICC adjusted) or 7% (ICC conditional), suggesting that the country-level variance of close-network stress is associated significantly with gender equality. The linear-regression Model 4 shows that a one-unit increase in the absolute logarithm of the GII corresponds to a reduction in the level of close-network stress, as measured by the CNI_{stress} scale, of 0.197. This result is robust to controls for age, gender, educational attainment, poverty, employment status, depressiveness, subjective health, and interview mode (see Model 5). All in all, these results support the hypothesis that the level of close-network stress decreases as gender equality in a country increases (Hypothesis 3).

Table 3. Multilevel Linear Models of Effect of GII on SNI_{stress}.

	Model 5			*Model 4*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	2.343	0.136	***	2.336	0.117	***
|logGII|	-0.215	0.057	***	-0.197	0.053	***
Controls		Yes			No	
SD Country	0.225	0.001		0.222	< 0.001	
SD Observation	0.745	< 0.001		0.794	< 0.001	
ICC adjusted	0.084			0.073		
ICC conditional	0.071			0.07		
LRT-Test		Chisq = 5563.27 DF = 20 Pr(>Chisq) < 0.001			Chisq = 11.91 DF = 1 Pr(>Chisq) < 0.001	

Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05

4.2. Emotional and community isolation

As far as the diversity of an emotional network and its size are concerned, the base model shows that approximately 7.4% of the variation in SNI_{emo} is attributable to the country level. This proportion is reduced significantly, to 6.6% (ICC adjusted) or 6.5% (ICC conditional), by introducing gender equality as a country-level fixed effect. The multilevel linear regression (Model A) shows that a one-unit increase in the absolute logarithm of the GII corresponds to a significant 0.210-point fall in SNI_{emo}. This result is robust to controls for age, gender, educational attainment, poverty, employment status, depressiveness, subjective health, and interview mode (see Model B). The finding is congruent with Hypothesis 3, which states that progress in gender equality leads to smaller emotional networks of higher quality. However, the concentration of emotional networks does not automatically prove that there is an increase in the number of individuals who are emotionally isolated (or at risk) in more gender-equal societies. For instance, it is possible that the concentration of the emotional network is primarily a product of the elimination of highly redundant sources of emotional support, such as kin or family relationships, which would lead to an increase in the proportion in the middle levels of the SNI_{emo} (values between 3 and 5) but not in the lower levels (values between 0 and 2). In this case, no increase in emotional isolation would result from a fall in the number of ties.

In order to investigate this possibility further, a multilevel logistical model was estimated to determine whether the proportion of individuals with low values of emotional network inclusion (SNI_{emo} <3) increases with gender equality. An analysis of the MERVs of a model that only includes country-level random effects and country-level fixed effects

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for gender equality (Model C) suggests that this is the case, which would be consistent with Hypothesis 4: an increase from low (middle) to middle (high) gender equality entails an increase of 4.0% (4.4%) in the fraction of individuals who are emotionally isolated or at risk of isolation. However, the evidence that the ISSP 2017 provides is not robust to controls for age, gender, educational attainment, income poverty, employment status, depressiveness, subjective health, and interview mode. The statistical association between country-level gender equality and individual emotional isolation (or risk thereof) ceases to be significant. It should be noted that the predictions of the model with controls (Model D) are not qualitatively different from the results of the simpler model. Therefore, while the data provides some support for Hypothesis 4, the finding should not be considered conclusive. The suggestion is that the observed positive correlation between emotional isolation and gender equality is mediated by changes in demographic composition that are caused by ageing (lower fertility, higher age, etc.). These changes, however, can in part be attributed causally to increases in gender equality on the societal level (Kim 2016; Adser 2004), so that the controls in this case would be masking the indirect effect of gender equality. Disentangling this issue through causal analysis techniques would require more than cross-sectional data (e.g., panel data or data that contains suitable instrumental variables).

Table 4. Multilevel Linear Models of Effect of GII on $SNI_{emo.}$

	Model B			*Model A*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	3.342	0.235	***	3.71	0.208	***
|logGII|	-0.191	0.098	**	-0.21	0.095	**
Controls		Yes			No	
SD Country	0.38	0.004		0.394	0.001	
SD Observation	1.404	< 0.001		1.485	< 0.001	
ICC adjusted	0.068			0.066		
ICC conditional	0.061			0.065		
LRT-Test	Chisq = 4874.42 DF = 20 Pr(>Chisq) < 0.001			Chisq = 4.81 DF = 1 Pr(>Chisq) < 0.0283		
Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05						

Table 5. Multilevel Logistic Models of Effect of GII on the Probability of Emotional Isolation (SNI_{emo} <3).

	Model D			*Model C*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	-0.958	0.303	***	-1.3	0.231	***
|logGII|	0.193	0.122		0.205	0.105	*
Controls		Yes			No	
SD Country	0.448	0.005		0.439	0.001	
ICC adjusted	0.058			0.055		
ICC conditional	0.052			0.055		
LRT-Test	Chisq = 3168.91 DF = 20 Pr(>Chisq) < 0.001			Chisq = 3.43 DF = 1 Pr(>Chisq) < 0.064		
Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05						

Last, the exploratory results on the connection between community isolation and gender equality do provide some tentative guidance for further research. The base model shows that a significant proportion (5.3%) of the variation in $SNI_{community}$ can be attributed to the country level. This outcome reflects expectations from the literature review.

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Introducing gender equality into this model as a country-level fixed effect yields the observation that community isolation seems to diminish when gender equality increases. A one-unit increase in |logGII| entails an increase of approximately 0.045 points in $SNI_{community}$ (see Model I). Thus, in general, it seems that more gender-equal societies exhibit higher levels of community integration in the ISSP 2017. However, this finding is not robust to controls for age, gender, educational attainment, poverty, employment status, depressiveness, subjective health, and interview mode (see Model II). This said, the predictive results are essentially equivalent to the results from the constrained model (Model I). All in all, the ISSP 2017 appears to indicate that the hypothesis that there is a negative relationship between community isolation and gender equality is more likely to hold than its negation. However, as with the fraction of emotionally isolated individuals, the data suggests that the connection is mediated by individual-level traits, and further investigation through more complex data and analytical techniques would be warranted.

Table 6. Multilevel Linear Models of the Effect of GII on $SNI_{community}$.

	Model II			*Model I*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	0.037	0.066		0.163	0.058	***
|logGII|	0.041	0.027		0.045	0.027	*
Controls		Yes			No	
SD Country	0.102	0.001		0.11	<0.001	
SD Observation	0.475	<0.001		0.479	<0.001	
ICC adjusted	0.044			0.05		
ICC conditional	0.043			0.05		
LRT Test	*Chisq* = 839.05 *DF* = 20 *Pr*(>*Chisq*) < 0.001			*Chisq* = 2.98 *DF* = 1 *Pr*(>*Chisq*) < 0.084		
Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05						

5. Discussion and Concluding Remarks

In contrast to the literature on collectivistic and individualistic orientations, the present paper focused on the idea that between-country variance in the prevalence of loneliness and social isolation can be explained by differences in the level of gender (in)equality. For the most part, the analyses that were presented confirm the hypotheses that derive from this approach: more gender-equal societies tend to exhibit a lower incidence of loneliness. This tendency can be attributed to lower levels of close-network stress and, accordingly, to the stronger protective effect of partnerships against loneliness. Conversely, societies with higher levels of gender equality exhibit more concentrated emotional networks and higher proportions of individuals who are emotionally isolated or at risk of emotional isolation. However, the statistical significance of the latter association is not robust to controls for the individual-level proximal causes of social isolation, such as social status variables (educational attainment, income poverty, and employment status), sociodemographics (age and gender), health outcomes (subjective health and depressiveness), and interview mode. Lastly, the analyses of the data from the ISSP 2017 suggest that it would be desirable to explore the hypothesis that gender equality is likely to be related to increases in community embeddedness through frequent participation in voluntary work, leisure activities, and religious communities.

This complete set of findings suggests that gender equality has contributed to a shift in the kind of loneliness that is observed in modern societies. Psychological studies draw an important distinction between loneliness that is caused by the absence of relationships and loneliness that is caused by poor relationship quality. The analyses presented here suggest that in more gender-equal societies, loneliness is caused more frequently by the

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absence of close relationships and less frequently by poor relationship quality. This trend implies a shift from close-network-included loneliness to close-network-excluded loneliness. Such a development should have two effects on the social level. First, negative relationship quality has generally been found to be a stronger predictor of loneliness than relationship quantity, which supports the hypothesis of an emancipation dividend because a higher quantity of relationships cannot offset deficits in relationship quality. This proposition is reflected in the decrease in the prevalence of loneliness across more gender-equal societies. Second, in more gender-equal societies, the threat of emotional isolation should cause it to be feared more widely, which would, in part, explain why loneliness has suddenly become an important social policy issue in modern societies without any evidence of an increase in its incidence. This subjective sensation of being at risk of emotional isolation has not been studied extensively, and it merits scholarly attention. Research along those lines should seek to improve the understanding of the impact of social isolation and loneliness on modern societies.

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Appendix A

Full Table 2. Multilevel Logistic Regressions of the Effect of GII on Loneliness.

	Model 3			*Model 2*			*Model 1*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	-1.438	0.276	***	-1.108	0.267	***	-1.115	0.221	***
logGII	-0.055	0.109		-0.222	0.104	**	-0.223	0.101	**
logGII*Partner	-0.263	0.04	***						
Partner	0.006	0.082		-0.497	0.031	***			
Age1	-13.152	4.146	***	-13.847	3.92	***			
Age2	4.149	3.885		4.161	3.789				
Age3	15	3.22	***	15.926	3.143	***			
Gender	-0.022	0.029		-0.023	0.029				
Primary school	-0.035	0.073		-0.037	0.073				
Lower secondary	-0.121	0.062	*	-0.124	0.062	**			
Upper secondary	-0.109	0.065	*	-0.113	0.065	*			
Post secondary, non-tertiary	-0.237	0.073	***	-0.249	0.073	***			
Lower level tertiary	-0.182	0.068	***	-0.194	0.068	***			
Upper level tertiary (Master, Doctor)	-0.177	0.08	**	-0.194	0.08	**			
Income Poverty	0.252	0.031	***	0.254	0.031	***			
Not Working	0.066	0.037	*	0.071	0.037	*			
Unemployed	0.181	0.064	***	0.178	0.064	***			
Health	0.178	0.017	***	0.178	0.016	***			
Depressivness	0.957	0.015	***	0.957	0.015	***			
CASI/CAWI	0.426	0.144	***	0.421	0.142	***			
PAPI	-0.035	0.162		-0.061	0.16				
SC	0.126	0.142		0.131	0.14				

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Telephone or Other	0.496	0.261	*	0.504	0.261	*		
SD Country	0.369	0.005		0.36	0.005		0.421	0.002
ICC adjusted	0.04			0.038			0.051	
ICC conditional	0.029			0.028			0.051	
LRT-Test	Chisq = 7129.69 DF = 22 Pr(>Chisq) < 0.001			Chisq = 7084.16 DF = 21 Pr(>Chisq) < 0.001			Chisq = 4.34 DF = 1 Pr(>Chisq) < 0.0372	
Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05								

Full Table 3. Multilevel Linear Regressions of the Effect of GII on SNI_{stress}.

	Model 5			*Model 4*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	2.343	0.136	***	2.336	0.117	***
logGII	-0.215	0.057	***	-0.197	0.053	***
Age1	-27.879	0.944	***			
Age2	-3.662	0.884	***			
Age3	-3.057	0.8	***			
Gender	-0.029	0.007	***			
Primary school	-0.011	0.02				
Lower secondary	0.019	0.017				
Upper secondary	0.062	0.017	***			
Post secondary, non-tertiary	0.055	0.019	***			
Lower level tertiary	0.069	0.018	***			
Upper level tertiary (Master, Doctor)	0.091	0.021	***			
Income Poverty	0.02	0.008	**			
Not Working	-0.041	0.009	***			
Unemployed	0.005	0.018				
Health	0.017	0.004	***			
Depressivness	0.229	0.004	***			
CASI/CAWI	0.097	0.045	**			
PAPI	-0.036	0.061				
SC	0.171	0.05	***			
Telephone or Other	-0.044	0.075				
SD Country	0.225	0.001		0.222	< 0.001	
SD Observation	0.745	< 0.001		0.794	< 0.001	
ICC adjusted	0.084			0.073		
ICC conditional	0.071			0.07		
LRT-Test	Chisq = 5563.27 DF = 20 Pr(>Chisq) < 0.001			Chisq = 11.91 DF = 1 Pr(>Chisq) < 0.001		
Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05						

Full Table 4. Multilevel Linear Regressions of the Effect of GII on SNI_{emo}.

	Model B			*Model A*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	3.342	0.235	***	3.71	0.208	***
logGII	-0.191	0.098	**	-0.21	0.095	**
Age1	-39.257	1.818	***			
Age2	-70.604	1.703	***			
Age3	36.568	1.543	***			
Gender	0.147	0.014	***			
Primary school	0.144	0.037	***			

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Lower secondary	0.156	0.031	***		
Upper secondary	0.141	0.033	***		
Post secondary, non-tertiary	0.175	0.036	***		
Lower level tertiary	0.025	0.034			
Upper level tertiary (Master, Doctor)	0.01	0.039			
Income Poverty	-0.082	0.016	***		
Not Working	-0.013	0.018			
Unemployed	-0.235	0.034	***		
Health	-0.122	0.008	***		
Depressivness	-0.133	0.007	***		
CASI/CAWI	0.042	0.082			
PAPI	0.017	0.113			
SC	0.104	0.091			
Telephone or Other	-0.009	0.141			
SD Country	0.38	0.004		0.394	0.001
SD Observation	1.404	< 0.001		1.485	< 0.001
ICC adjusted	0.068			0.066	
ICC conditional	0.061			0.065	
LRT-Test		Chisq = 4874.42 DF = 20 Pr(>Chisq) < 0.001			Chisq = 4.81 DF = 1 Pr(>Chisq) < 0.0283

Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05

Full Table 5. Multilevel Logistic Models of Effect of GII on the Probability of Emotional Isolation (SNI_{emo} <3).

	Model D			*Model C*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	-0.958	0.303	***	-1.3	0.231	***
logGII	0.193	0.122		0.205	0.105	*
Age1	43.913	3.236	***			
Age2	93.072	3.023	***			
Age3	-42.497	2.709	***			
Gender	-0.148	0.023	***			
Primary school	-0.247	0.063	***			
Lower secondary	-0.234	0.052	***			
Upper secondary	-0.189	0.054	***			
Post secondary, non-tertiary	-0.241	0.059	***			
Lower level tertiary	-0.01	0.056				
Upper level tertiary (Master, Doctor)	-0.078	0.064				
Income Poverty	0.118	0.026	***			
Not Working	0.011	0.03				
Unemployed	0.345	0.054	***			
Health	0.141	0.013	***			
Depressivness	0.188	0.012	***			
CASI/CAWI	-0.05	0.119				
PAPI	-0.036	0.169				
SC	-0.138	0.13				
Telephone or Other	0.221	0.224				
SD Country	0.448	0.005		0.439	0.001	
ICC adjusted	0.058			0.055		
ICC conditional	0.052			0.055		

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LRT-Test	Chisq = 3168.91 DF = 20 Pr(>Chisq) < 0.001	Chisq = 3.43 DF = 1 Pr(>Chisq) < 0.064

Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05

Full Table 6. Multilevel Linear Regressions of the Effect of GII on $SNI_{community}$.

	Model II			*Model I*		
Predictor	*Estimate*	*SE*	*Sig.*	*Estimate*	*SE*	*Sig.*
Intercept	0.037	0.066		0.163	0.058	***
logGII	0.041	0.027		0.045	0.027	*
Age1	2.794	0.598	***			
Age2	3.181	0.563	***			
Age3	-4.42	0.512	***			
Gender	0.005	0.005				
Primary school	0.011	0.013				
Lower secondary	0.008	0.011				
Upper secondary	0.053	0.011	***			
Post secondary, non-tertiary	0.067	0.012	***			
Lower level tertiary	0.096	0.011	***			
Upper level tertiary (Master, Doctor)	0.131	0.013	***			
Income Poverty	-0.009	0.005	*			
Not Working	0.006	0.006				
Unemployed	-0.013	0.011				
Health	-0.045	0.003	***			
Depressivness	-0.004	0.002	*			
CASI/CAWI	0.107	0.026	***			
PAPI	0.121	0.035	***			
SC	0.115	0.028	***			
Telephone or Other	0.086	0.047	*			
SD Country	0.102	0.001		0.11	<0.001	
SD Observation	0.475	<0.001		0.479	<0.001	
ICC adjusted	0.044			0.05		
ICC conditional	0.043			0.05		
LRT-Test	Chisq = 839.05 DF = 20 Pr(>Chisq) < 0.001			Chisq = 2.98 DF = 1 Pr(>Chisq) < 0.084		

Signif. codes: '***' p < 0.001, '**' p < 0.01, '*' p < 0.05

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