Biodemography and Social Biology

ISSN: 1948-5565 (Print) 1948-5573 (Online) Journal homepage: www.tandfonline.com/journals/hsbi20

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To cite this article: Eetu Soini, Kateryna Golovina, Hans Hämäläinen, Anna Rotkirch, Venla Berg, Suvi Parikka & Markus Jokela (02 Aug 2026): Regional social capital and fertility rate: Municipality-level analysis in Finland, Biodemography and Social Biology, DOI: 10.1080/19485565.2026.2712225

To link to this article: https://doi.org/10.1080/19485565.2026.2712225

BIODEMOGRAPHY AND SOCIAL BIOLOGY
https://doi.org/10.1080/19485565.2026.2712225

Regional social capital and fertility rate: Municipality-level analysis in Finland

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ABSTRACT

While many studies find that received social capital matters for childbearing on the individual level, few studies have investigated how regional social factors relate to fertility rates. In the current study, we used data from 299 municipalities in Finland to examine how different measures of social capital are associated with total fertility rates at the regional level. Data for social indicators were derived from a large national survey ($n = 100\ 750$), and data on fertility and covariates were derived from population registries. We applied spatial autoregressive error models to account for spatial autocorrelation between neighboring municipalities. Regions with higher social support and more frequent social contacts had higher total fertility rates, whereas trust, community participation, cultural activities or loneliness were not associated with fertility. These associations were particularly pronounced for fertility rates among individuals aged 20–39 than in other age groups. Moreover, no association was found for regional socioeconomic composite score. The results suggest that community-level social capital may be relevant for fertility trends.

Introduction

Rapidly declining fertility rates have been reported across the globe, and many developed countries have reached levels of "lowest-low" total fertility rates (TFR) of below 1.3 children per woman. Finland is one of these countries at the threshold of lowest-low fertility after a long decline from a TFR of 1.87 in 2010 to 1.30 in 2025 (*Slight Rise in the Birth Rate in 2025 | Statistics Finland*, 2026). Current fertility decline is mainly driven by decreasing first births among women under 30 (Hellstrand, Nisén, and Myrskylä 2020), but fertility among 30–39 year-olds is also declining. The fertility decline in Finland has been steeper than in several other Nordic countries. In addition to changes over time, Finnish fertility rates also show substantial regional variations, with lowest fertility in south-east regions (e.g., 1.13 in

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/19485565.2026.2712225

Kymenlaakso) and highest in north-west coastal regions (e.g., 1.62 in Central Ostrobothnia) in 2025.

The steep fertility decline, particularly in Finland but also in other Nordic countries since 2010, has challenged the long-held assumption that the Nordic welfare model buffers against sustained fertility decline. The reasons for this change as well as the driving forces of the recent rapid fertility decline globally are still poorly understood (Aitken and Norman 2026). Worsening economic conditions due to the economic crisis in 2008 may have triggered people to have smaller families, but in some parts of Europe, and especially in the Nordic countries, fertility trends were not related to indicators of economic recession (Comolli et al. 2021; Matysiak, Sobotka, and Vignoli 2021). Other factors besides economic conditions need to be investigated in studies of fertility trends (Comolli et al. 2021).

Social factors are likely to be involved in fertility trends as parenthood and family formation are essentially social phenomena. Such social factors are often discussed under the concept of "social capital" which refers broadly to (1) the societal structures and social networks that provide social resources to individuals and communities, and (2) the collective norms, trust, and values that uphold those structures and networks (Woolcock and Narayan 2000). Here we use social capital in this broad sense to capture social connections and the resources associated with them, and participation in activities that cultivate social connections. Earlier research on the associations between social capital and fertility has focused on individual social networks and social support, with the hypothesis that available social capital can affect intentions of childbearing or realized fertility. For example, Balbo and Mills (2011b) found that available social support from family can increase intentions to have a second or third child. Similarly, Artamonova et al. (2024) found financial support from one's social network and lack of loneliness to be positively associated with an intention to have a (next) child. A recent study from China linked offline social capital to higher fertility intentions, while regularly accessing the Internet (defined in the study as "online social capital") was negatively associated with fertility intentions (Zhao et al. 2024). A study by Asphjell and colleagues shows that women's fertility decisions are influenced by social interactions (Asphjell, Hensvik, and Nilsson 2013). Mathews and Sear (2013), in turn, examined realized fertility and observed that having a social network with a larger proportion of kin is associated with having more children.

Social capital is often conceptualized as a community-level indicator that measures the overall level of social cohesion or social participation instead of focusing on individuals with different levels of social support, although both perspectives are possible. In fact, one of the most studied issues on the topic has been the decline of social capital over time (Putnam 1995). Here the interest is whether community participation has declined throughout the society, not whether some individuals participate more than other individuals. Similarly, the fertility decline is concerned with the decline in aggregate fertility rates in societies, not whether some individuals have more children than other individuals. It may therefore be useful to complement the individual-level studies of social support and childbearing with population-level analysis of community-level measures. Regional variations provide one avenue of research for such population-level analysis (de Beer and Deerenberg 2007; Lee and Lee 2025), especially when there are substantial differences in fertility rates between regions.

Despite regional variation in fertility rates being widely acknowledged, research on community-level measures is scarce. Previous findings have showed that families tend to concentrate in suburban areas rather than city centers (Kulu 2013; Kulu and

Washbrook 2014), and even within cities some areas show higher rates of fertility than others (Meggiolaro 2011). These regional differences are often driven by economic factors, such as lower housing prices in suburban areas compared to cities, but social factors may also be relevant in regional fertility variations. A study of between-municipality differences in Denmark, Norway, Finland, and Sweden observed that unemployment rate and union dissolution rate were associated with lower fertility rates, whereas vote share for conservative political parties was associated with higher fertility rate across municipalities (Campisi et al. 2023). A study by Aassve, Le Moglie, and Mencarini (2021) links trust to a smaller fertility decline in Italian provinces. In Norway, two-child couples were more likely to have a third child if they resided in a neighborhood that had more three-child families (Bergsvik 2020). These findings suggest that regional differences in family values and norms of family formation may be influential drivers of regional fertility differences.

Present Study

Although community-level social factors may be relevant for fertility rates, most previous studies have been limited in their capability of assessing social capital indicators; regional studies often rely only on indicators that are available in population registries. We combined data from a large health survey ($n = 100\ 750$) with fertility data from population registers to examine whether different survey-based measures of social capital (social support, social interactions, trust, community participation, cultural activities, and loneliness) were associated with fertility rates. This approach provided a more comprehensive study setting than registry-based sociodemographic data alone would have provided (Jokela et al. 2025). We hypothesized that indicators of higher social capital (i.e., social support, community involvement, trust, and a lack of loneliness) are associated with higher regional fertility rates.

Finland as a Context

Finland is characterized by low population density, with an average of 18 individuals per square kilometer (*World Bank Open Data* n.d.). Most of the inhabitants reside in the southern regions of Finland. Since the 1950 s migration flows are heavily concentrated to migration from rural areas to urban centers, and migration to neighboring municipalities (Ghosh et al. 2019). The Helsinki metropolitan area, Turku and Tampere have been characterized with positive net migration, while other regions, especially in eastern and northern parts have predominantly lost inhabitants.

Finland is also part of Nordic fertility regime, characterized by high gender equality in labor markets and policies to support work–family balance. Finland has long paid parental leave, universal publicly funded and heavily subsidized childcare for all children under school age, and a child home care allowance for parents of children under age 3 who are not attending childcare. Before the economic crisis in 2008 Finland had rather stable fertility rates, but since 2010 fertility has sharply declined, despite these social policies.

Methods

Sample

The Adult Health and Service survey (ATH) is a large cross-sectional Finnish survey representative of adult population collected in the years 2012–2017. Although data were collected across multiple years, the study design is not longitudinal because different municipalities were surveyed at each wave, and most municipalities contributed data to only one wave. The analytical sample consists of 100 750 participants aged 20 years or older from 309 different municipalities. Due to anonymization, data was unavailable for 10 municipalities, resulting in a final sample of 299 municipalities.

Fertility

Municipality-specific total fertility rate (TFR) was calculated as an average from years 2018, 2019, and 2020, to allow a lag between the measures of social capital from ATH data and fertility. Municipality-specific TFR represents the number of children a woman would have if she experienced the municipality- and age-specific fertility rates (ASFRs) observed in a given year throughout her reproductive lifespan. A three-year mean was used to account for variability, especially in smaller municipalities. Additionally, we calculated age-group-specific fertility rates (ASFR) (five-year intervals from ages 15 to 49, a total of 7 age groups), to investigate whether social capital is differently associated with fertility depending on age. Fertility data was obtained from Statistics Finland's population registers.

Estimates of Social Capital

Different aspects of availability of social capital were measured in ATH between 2012 and 2017, and all available concepts were included in the current study, resulting in seven distinct conceptualizations of social capital. *(1) Social support* was measured with two questions: 1) "Who do you believe truly cares about you, whatever may happen?" and 2) "Who will provide practical help when you need it?" from individuals from following categories: spouse/partner, next of kin, close friend, close colleague, close neighbor, another person close to you, and no one. Six dichotomous variables were created for each option and coded as 1 if the participant reported expecting social support from the specified person(s), and 0 otherwise. A sum score for social support was calculated by summing all dichotomous variables measuring expected emotional and instrumental support (range = 0–12). Additionally, we included separate variables for social support (emotional support + instrumental help) from partner, next of kin, friends, and others (range = 0–2) to investigate whether the source of expected social support affected the results, as previous research has yielded mixed results (Artamonova et al. 2024; Schaffnit and Sear 2017).

(1) *Social interaction* was measured by asking the participants how often they were in contact with people they were not cohabiting with, through phone, internet, or in face-to-face interaction, using a scale from 0 to 4 (0 = never, 1 = less than once a month, 2 = 1–3 times a month, 3 = 1–2 times a week, 4 = almost daily). A sum score for social interactions (phone+email+face-to-face) was formed by summing the three scales (range = 0–12).

(2) *Community participation* was assessed by asking participants to evaluate their attendance in group activities or organizations including sports clubs, culture associations or organizations, political or trade associations, organizations for the unemployed, organizations for older people (e.g. for pensioners or front veterans, other old-age care organizations), child, youth, or family organizations, public health or patient organizations, mental health or substance abuse organizations, disability organizations (e.g. Finnish Association of People with Mobility Disabilities), organizations for care giving relatives (e.g. Association of Care Giving Relatives and Friends), informal hobby groups, or some other group/organization. The responses were rated on a scale from 0 to 4 (0 = never, 1 = less than once a month, 2 = 1–3 times a month, 3 = 1–2 times a week, and 4 = 3+ times a week). A sum score of all the aforementioned activities was formed (range = 0–48).

A separate measure of *(4) engagement in cultural events* was assessed by the frequency of participation in theater performances, concerts (one item for classical music and one item for popular music), museums, libraries, cinema, sports events, and other cultural activities. The responses were rated on a scale from 0 to 3 (0 = no participation in the last 12 months, 1 = a couple of times a year, 2 = 1–3 times a month, 3 = at least 1/wk). A sum score was calculated by summing all eight variables (range = 0–24).

Trust was assessed with six items asking about trust in healthcare, social welfare, judiciary, police, municipal decision-making, and people. The responses were rated on a scale from 0 (indicating no trust) to 4 (indicating complete trust). Two variables were formed for subsequent analyses: a trust sum score, which encompassed all six items reflecting *(5) general trust* (range of 0–24), and a separate variable for *(6) trust in people* (range of 0–4).

Lastly, level of *(7) loneliness* was assessed by the question: "Do you ever feel lonely?," with responses rated on a scale from 0 (never) to 4 (all the time).

Covariates

Covariates included regional estimates of population size (logarithm transformed), population density, proportion of residents born in and still living in the municipality, the proportion of people affiliated with the Evangelical Lutheran church (the predominant religion in Finland; to account for the known fact that religiousness is associated with childbearing behavior Kolk and Saarela 2023), and a composite score of municipality-level socioeconomic status (a sum score of standardized regional tax income, education level, and inversed unemployment rate). Data for covariates was obtained from Statistics Finland's population registers.

Statistical Analyses

We used multilevel regression with post-stratification (MRP) to obtain representative aggregate estimates for social capital for municipalities from the individual-level data (Kastellec, Lax, and Phillips 2019). Due to potential selection bias, normal aggregation can bias the regional estimates. Furthermore, as population size varies across municipalities, estimates for smaller municipalities may be inaccurate. To account

for these problems in regional estimates, we first estimated the indicators of social capital with multilevel regression using four age groups (20–34, 35–49, 50–65, 65+) and sex (male/female), and municipality. The obtained estimates for municipalities (i.e., estimates for 4 age groups ×2 sexes in each municipality) were weighted according to the population structure of each municipality. The weighted estimates were then aggregated to estimate municipality-level variables. In essence, we first estimate values for both sexes in four different age groups, and then using the census data for each municipality, weight the estimates by the actual demographics of the regions and then aggregate the weighted estimates to obtain the regional estimate. The use of MRP allows for more accurate estimates, especially for smaller regions where there are fewer observations (Lax and Phillips 2009). To aid the interpretation of the coefficients, the social capital estimates and the covariates were rescaled using the difference between their 90th and 10th percentiles. Consequently, a one-unit difference in the standardized variable corresponds to the contrast between municipalities with relatively low (10th percentile) and high (90th percentile) values. Regression coefficients can therefore be interpreted as the expected difference in the outcome between municipalities at the 10th and 90th percentiles of social capital (or the covariate), holding other variables constant.

We then examined whether the municipality-level indicators of social capital were associated with municipal total fertility rates. Data from 299 municipalities were analyzed using spatial autoregressive error models to account for the spatial nature of fertility. Neighborhood status was defined by first-order queen definition, that is, any municipalities sharing a border are defined as neighbors. Autoregressive error models take into account the nonrandom distribution of the response variable (fertility) if present (e.g., neighboring municipalities have more similar demographics, which may affect fertility). That is, accounting for spatial autocorrelation accounts for the known confounders that cluster spatially, but also spatially clustered unknown confounders. Each estimate of social capital was fitted separately using two models. Model 1 was adjusted for demographic factors: the logarithm of the population, and population density. Model 2 was additionally adjusted for the composite score of socioeconomic status, the proportion of residents born and still living in the municipality, and religiousness. We analyzed the age-specific associations by fitting the two models to the data with the age-group specific fertility categories as outcomes. All statistical analyses were conducted in R version 4.3.1 (R Core Team 2023) using packages "arm" for MRP and "spatialreg" (Bivand, Hauke, and Kossowski 2013), "geofi" (rOpenGov 2023), and "Sotkanet" (Lahti et al. 2022) for spatial regression analyses.

Sensitivity Analyses

We examined potential tempo-effects with Bongaarts-Feeney adjustment (Bongaarts and Feeney 1998). Due to some of the municipalities having noticeable fluctuations in the mean age at birth (due to small population size), we analyzed tempo-adjusted TFR using subregional units, which are clusters of municipalities with similar characteristics, intermunicipal cooperation and commuting patterns. We adjusted the tempo-effects for change in average age at birth between years 2016–2020 and 2017–2021.

Results

Descriptive statistics are presented in Table 1. Figure 1 shows the clustering of high and low fertility rates in Finland, illustrated with the Getis–Ord hotspot analysis. High values are

Table 1. Descriptive statistics of social cohesion indicators and covariates of 299 municipalities in Finland.

	Mean	SD	Range
Social capital			
Social support	3.99	0.16	0–12
Partner	1.38	0.05	0–2
Next of kin	1.32	0.05	0–2
Friend	0.7	0.07	0–2
Someone else	0.11	0.01	0–6
Social interactions	3.04	0.09	0–12
Loneliness	1.18	0.03	0–4
General trust	15.03	0.36	0–24
Trust in people	2.61	0.03	0–4
Community participation	8.76	0.27	0–48
Cultural activities	11.75	0.39	0–24
Covariates			
Population (log)	8.82	1.26	–
Population density (log)	2.53	1.48	–
Socioeconomic status (composite score)	0	2.24	–
Proportion of people residing in their region of birth	51.41	12.08	–
Affiliated to Lutheran church	82.07	5.67	–

Note. Socioeconomic status is created by summing normalized regional income, educational level and unemplyment rates.

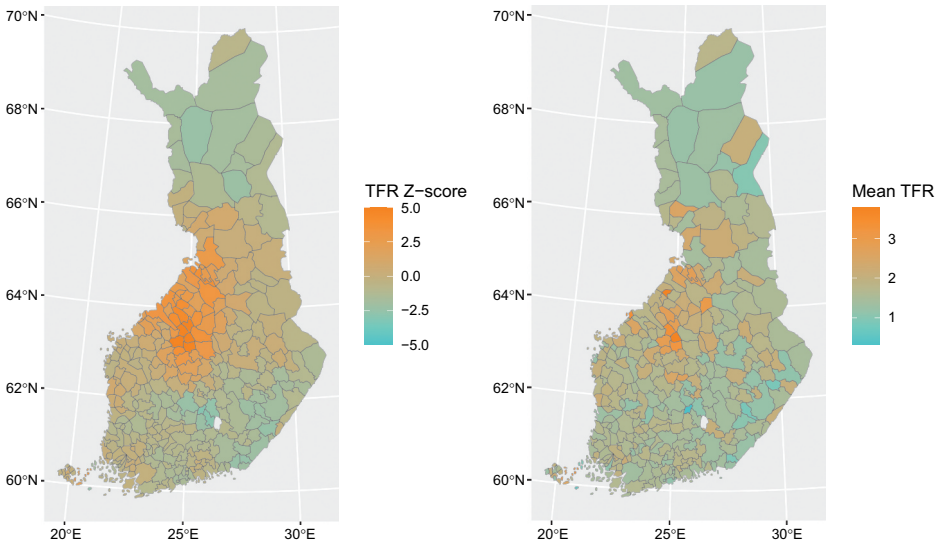

Figure 1. Maps of Finland showing fertility rates (mean of 2018–2020) as get-is-ord analysis and with raw scores. Figure 1 Clustering of high (orange) and low (teal) fertility rates in Finland 2017–2019. The values on the left side are z-scores of a Getis–Ord hotspot analysis that gives higher values to municipalities that have high TFR and that have neighboring municipalities with high TFR. Values on the right depict mean of crude birth rates between 2018 and 2020. Municipalities with missing values ($n = 10$) were imputed to the figure with the mean of all municipalities for ease of interpretation.

given for municipalities that have high total fertility rates and are surrounded by neighboring municipalities with high fertility rates.

Results of regression models are presented in Table 2. In model 1, social support and social interactions were associated with higher regional TFR, and these associations remained significant after adjusting for Model 2 covariates. No associations were observed between loneliness, general trust, trust in people, community participation or cultural activities and regional TFR in either model. With respect to the source of social support, support from partner, next of kin, friends, and others were all associated with higher TFR. Of the demographic covariates, only the logarithm of population was associated with lower TFR, in both models. In model 2, religiousness was associated with birth rate, while composite measure of SES, amount of people born and still residing in the region, and population density were not associated with TFR.

Results for age-specific fertility rates are presented in Figure 2 and in Table 3. In age-group analyses, two indicators of social capital (social support and social interactions) were robustly associated with TFR. Higher social support was associated with higher total fertility rates especially in age-groups 20–24 and 25–29 and diminished in older age groups. Specific sources of social support (from partner, relatives, friends, others) showed similar patterns, with the exception of social support from friends. The importance of social support from friends on TFR reached its peak later, among the 30–34-year and 35–39-year age categories. Associations between social interactions and fertility were weaker than those observed for social support. The magnitude of the associations was similar across the 20–24, 25–29, 30–34, and 35–39 age groups, and less pronounced in older age groups.

Tempo-adjusted analyses are reported in supplementary table S1. When adjusting for tempo-effects we noticed that social support from relatives and social interactions were

Table 2. Associations between regional social cohesion indicators and total fertility rates.

	Model1		Model2	
	B	95% CI	B	95% CI
Social support	**0,38**	(0.22,0.55)	**0,53**	(0.33,0.72)
Partner	**0,15**	(0.04,0.26)	**0,17**	(0.04,0.29)
Relative	**0,19**	(0.04,0.35)	**0,18**	(0.02,0.33)
Friend	**0,27**	(0.1,0.44)	**0,33**	(0.16,0.5)
Other	**0,21**	(0.08,0.33)	**0,23**	(0.1,0.35)
Social interactions	**0,2**	(0.03,0.38)	**0,32**	(0.14,0.5)
Loneliness	−0,03	(−0.13,0.08)	−0,01	(−0.12,0.1)
General trust	−0,03	(−0.14,0.08)	−0,03	(−0.15,0.08)
Social trust	−0,08	(−0.19,0.03)	−0,06	(−0.17,0.04)
Community groups	−0,09	(−0.19,0.01)	**-0,11**	(−0.21,-0.01)
Friend groups	−0,03	(−0.12,0.07)	−0,04	(−0.14,0.05)
Cultural activities	−0,05	(−0.2,0.1)	−0,06	(−0.21,0.09)
Covariates				
Population (logarithm)	**-0,31**	(−0.47,-0.15)	**-0,19**	(−0.37,-0.02)
Population density	−0,13	(−0.32,0.06)	−0,03	(−0.25,0.19)
SES (composite score)			−0,11	(−0.32,0.1)
Amount residing in their region of birth			−0,18	(−0.39,0.02)
Portion of evangelic lutherians			**0,31**	(0.14,0.47)

Note. Values are regression coefficients from spatial regression analysis fitted separately for each predictor variable presented as the difference between low (10th percentile) and high (90th percentile) values, meaning that 1 unit difference in the standardized score reflects the difference between low (10th) and high (90th percentile) values. Model 1 was adjusted for population and population density, and Model 2 was additionally adjusted for a composite score of socioeconomic status, a portion of people living in the municipality where they were born in, and a proportion of people belonging to the Lutheran church. Covariates are fitted in a model without social capital indicators. Bolded values reflect estimates with 95% confidence intervals not overlapping with 0.

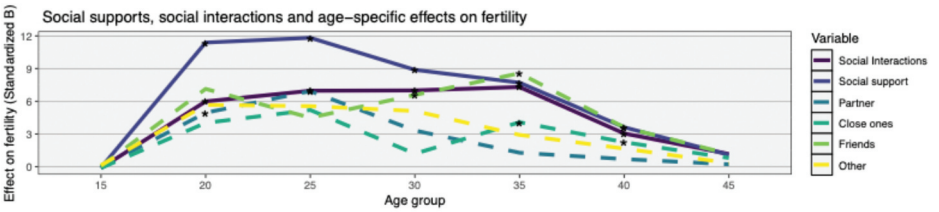

Figure 2. Associations between age-specific fertility, social support and social interactions. Note. Social support is the sum score of social support, and different sub-components are drawn with dashed lines. Variable presented as the difference between low (10th percentile) and high (90th percentile) values, meaning that 1-unit difference in the standardized score reflects the difference between low (10th) and high (90th percentile) values. Asterisk marks *p*-values < .05.

robustly associated with higher tempo-adjusted TFR in both model1 and model2. Social support from others was associated with higher TFR in Model1 but attenuated to non-significance in Model2.

Discussion

We studied how different indicators of social capital were associated with total fertility rates across 299 Finnish municipalities. Of the different social capital indicators, higher level of perceived social support and more frequent social interactions were associated with higher fertility rates, even after adjusting for sociodemographic covariates. Notably, the regional composite variable for socioeconomic status (a sum score of standardized regional tax income, education level, and inversed unemployment rate) was not associated with fertility in either model. In age-specific analyses, higher regional levels of social support and social interaction were consistently associated with higher fertility rates within corresponding age groups. The associations were particularly pronounced among individuals aged 20–39 years, with the social support sum score showing the strongest association in the 20–29-year age group. Both the age-specific analyses and the tempo-adjusted analyses suggest that the observed associations are not solely attributable to tempo effects.

Community-level social cohesion has been a topic of interest to social science ever since Émile Durkheim's studies of anomie and suicide (Durkheim, Simpson, and Spaulding 2002). Many studies of social capital have followed Durkheim's theories, showing that low neighborhood social capital is associated with various health risks, such as higher rates of mortality and mental health problems (Lochner et al. 2003; Whitley and McKenzie 2005). Our current study shows that fertility rates are higher in Finnish municipalities where the inhabitants report more social support and interact with each other more frequently, which is in line with the social benefits of community social capital. The findings support the hypothesis that higher community-level social capital may promote higher fertility rates (Aassve, Le Moglie, and Mencarini 2021; Bergsvik 2020). Given that family formation is strongly tied to social relationships and resources, it seems plausible that communities that offer more social capital are also more family friendly, which increases people's childbearing motivations.

There were no differences between sources of social support (e.g., friends as compared to relatives), which suggests that the associations between social support and fertility rates did

Table 3. Spatial regression coefficients between measures of social cohesion and age group specific fertility rates.

	15–19y		20–24y		25–29y		30–34y		35–39y		40–44y		45–49y	
	B	CI	B	CI	B	CI	B	CI	B	CI	B	CI	B	CI
Social support	−0,09	(−0.86,0.68)	**11,39**	(4.8,17.98)	**11,83**	(5.8,17.86)	**8,89**	(4,13.79)	**7,71**	(4.66,10.75)	**3,62**	(1.86,5.38)	**1,09**	(0.45,1.72)
Partner	−0,06	(−0.65,0.53)	**4,95**	(0.41,9.5)	**6,93**	(2.61,11.25)	3,32	(−0.03,6.68)	1,28	(−1.03,3.59)	0,7	(−0.57,1.97)	0,22	(−0.26,0.7)
Relative	−0,12	(−0.81,0.57)	4,02	(−1.66,9.69)	5,2	(−0.13,10.53)	1,19	(−3.02,5.41)	**4,08**	(1.32,6.85)	**2,25**	(0.7,3.8)	**0,8**	(0.23,1.37)
Friend	0,05	(−0.72,0.82)	**7,14**	(0.72,13.56)	4,49	(−1.53,10.51)	**6,59**	(1.85,11.34)	**8,57**	(5.59,11.54)	**3,61**	(1.89,5.33)	**1,17**	(0.55,1.8)
Other	0,13	(−0.41,0.67)	**5,67**	(1.05,10.29)	**5,56**	(1.3,9.82)	**5,11**	(1.69,8.52)	**2,92**	(0.68,5.15)	**1,66**	(0.4,2.93)	0,34	(−0.12,0.8)
Social interactions	−0,13	(−0.87,0.61)	5,99	(−0.35,12.34)	**6,97**	(1.12,12.81)	**7**	(2.33,11.67)	**7,31**	(4.4,10.23)	**3,05**	(1.36,4.75)	**1,17**	(0.56,1.77)
Loneliness	0,12	(−0.37,0.61)	−0,75	(−4.49,3)	−2,5	(−6.1,1.1)	1,07	(−1.7,3.84)	**1,96**	(0.07,3.86)	0,73	(−0.32,1.78)	0,1	(−0.29,0.5)
General trust	0,32	(−0.18,0.83)	−0,85	(−5.04,3.33)	−0,07	(−4.01,3.88)	0,25	(−2.85,3.35)	−0,96	(−3.04,1.11)	−0,19	(−1.35,0.97)	−0,1	(−0.53,0.32)
Trust in people	0,08	(−0.42,0.58)	−0,9	(−4.79,2.99)	−1,23	(−4.96,2.5)	−0,47	(−3.35,2.41)	−1,38	(−3.34,0.57)	−0,52	(−1.61,0.56)	−0,08	(−0.48,0.33)

Note. Values are regression coefficients from spatial regression analysis fitted separately for each predictor variable presented as the difference between low (10th percentile) and high (90th percentile) values. Results are from the fully adjusted model including regional estimates of population, population density, a composite score of socioeconomic status, a portion of people living in the same region where they were born in, and a portion of people belonging to the Lutheran church. Bolded values reflect estimates with 95% confidence intervals not overlapping with.

not represent only regional differences in the availability of kin networks even though earlier studies have reported that childcare support often comes from kin (Balbo and Mills 2011a). The mechanism by which social support and fertility are connected may not be specific to kin, but rather the expectation of available support more generally could act as a cue to encourage childbearing (Harknett, Billari, and Medalia 2014). Association between fertility rate and frequency of social interactions may represent a similar overall characteristic of social cohesion that is not limited to availability of kin members specifically. However, the rates of community participation, cultural engagement, and levels of trust in people – common measures of social capital – were not associated with fertility rates, which indicates that not all measures of social capital are equally important. Also, the rate of loneliness in the municipality was unrelated to fertility rate, which implies that the recent "loneliness epidemic" (OSG 2023) may not be connected to fertility trends.

Population-level associations with fertility rates versus individual differences in number of children may not be driven by the same factors. However, as the conceptualizations of social capital showing associations with fertility were connected to personal social networks, our results may reflect previous individual-level findings of social capital and childbearing (Artamonova et al. 2024; Balbo and Mills 2011a, 2011b; Mathews and Sear 2013). If low social capital does decrease fertility rates, then the possible decline in social capital (Besser 2009; Fuller-Rowell, Sultana, and Kawachi 2025) might have contributed to declining fertility trends, but our data did not include repeated measures that could have assessed this hypothesis. Our study did not have more detailed data that could have been used to identify the mechanisms or processes by which some measures of social capital may be more important than others, e.g. whether observed associations reflect aggregated individual-level processes, or whether there are regional-effects in play. Future research could examine whether associations differ for first versus higher-order births using e.g. register data.

In tempo-adjusted analyses using sub-regional units, we observed that higher social support from relatives, and higher levels of social interactions were associated with higher tempo-adjusted total fertility rates. Findings align with our main analyses, and in combination with age-specific analyses presented below, suggest that observed associations do not solely reflect tempo-effects.

In age-group specific analyses, we observed that the associations between social support and fertility rate were the strongest in ages 20–39, with particularly strong associations in age groups 20–29 (Table 3). The stronger associations for younger age groups could be driven by social support decreasing the uncertainty in the life situation, e.g., young people are more often in a precarious financial situation, and social capital could lessen their perceived uncertainty. Perceived uncertain life situation is reported as the strongest factor behind the decision to postpone or not to have children in Finland (Savelieva, Jokela, and Rotkirch 2023). Therefore, environment characterized by social support may be especially relevant for people's faster transition to parenthood. Previous studies have shown that social support from grandparents was related to increased fertility intentions (Tanskanen and Rotkirch 2014) and trust in people was related to higher fertility especially among 25–34-year-old people (Aassve, Le Moglie, and Mencarini 2021). For older age groups, the effects of social support and trust in people on fertility may be weaker because they have already established their careers and secured their incomes; therefore, other mechanisms may be at play.

Limitations

Our results should be interpreted with some caveats. First, our study is cross-sectional. Although there was a three-year lag between social capital estimates and regional fertility, we cannot establish causation. It is possible that higher fertility contributes to higher social capital through community activities and shared life situations, for example by facilitating social contacts at daycare, schools, or children's hobbies. Second, we did not have individual-level data on fertility or fertility intentions, which would have provided additional information. Comparing two aggregate-level measures may reflect (1) the aggregation of individual-level processes, (2) contextual or regional effects operating beyond individual-level mechanisms, or (3) spurious associations introduced by aggregation (i.e., aggregation-induced confounding). Nevertheless, the fact that our results align with individual-level studies suggests that similar social processes may be at play. Future research could benefit from assessing potential regional effects using multilevel models, which would help differentiate between individual-level and regional-level influences.

Conclusions

This study examined the associations between different components of social capital and fertility. Given the high importance of fertility to regional vitality, understanding the processes that lead to decreasing fertility rates is crucial for understanding depopulation. In our analyses, regional social capital – social support and frequency of social interactions, in particular – was associated with higher regional fertility rates, and these associations were stronger for younger age groups but attenuated in older age groups. Future studies should explore the role of social capital features at different levels and benefit from a multi-level perspective to further examine whether the association between social capital and fertility reflects individual-level phenomena or whether regional effects are at play.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Academy of Finland [grant number 345186]. KG was supported by the Helsinki Collegium for Advanced Studies, University of Helsinki. HH was funded by NetResilience consortium funded by the Strategic Research Council at the Academy of Finland [grant number 345183] and INVEST flagship funded by the Academy of Finland [grant number 320162].

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Compliance with Ethical Standards

The data collection was approved by THL ethical committee (THL/107/6.01.00/2010 & THL/637/6.02.01/2017). Study was performed in accordance with the ethical standards as set forth in the 1964 Declaration of Helsinki and its later amendments.

Data Availability Statement

The data that supports the findings of this study are available from THL (Finnish institute for Health and welfare/ Terveyden ja Hyvinvoinnin Laitos) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available.

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