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RESEARCH PAPER

Social Capital and Subjective Happiness: Which Contexts Matter?

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Abstract The aims of this study were to investigate how much variance in happiness was attributable to household and administrative-area levels and to examine the associations between social capital at the individual, household, and administrative-area levels and happiness, while adjusting for various control variables at multiple levels. Data from the Seoul Welfare Panel Study (SWPS) beginning in 2008 and conducted by the Seoul Welfare Foundation were used for this study. This study used wave 1 of the SWPS (2008). The results showed that a relatively small percentage of happiness was attributed to the administrative-area level compared to the household level, which implies that a household context is more important for understanding the variation in individual happiness. The results also showed that individual level social capital variables including perceived helpfulness and volunteer work were positively associated with happiness. Perceived helpfulness and organizational participation at the household level were positively associated with happiness. However, no significant association could be found between administrative-area level social capital variables and happiness. The results indicate that different types of social capital at different levels may operate differently to happiness. The current study contributed to the empirical social capital literature by simultaneously considering the individual, household, and administrative-area levels and examining each one's association with happiness while controlling for various control variables at multiple levels.

Keywords Social capital · Happiness · Subjective well-being · Multilevel analysis · Shrunken residuals · South Korea

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1 Introduction

There is an increasing body of research on subjective well-being, which consists of a cognitive appraisal of one's life as well as a positive and negative effect (Diener 2000) in various disciplines. Apart from well-known individual determinants of subjective well-being such as age, gender, educational level, marital status, and employment status (Di Tella et al. 2003; Leung et al. 2011; Orviska et al. 2012; Winkelmann 2009), there has been growing recognition that the characteristics of context in which individuals were nested are important for understanding individual subjective well-being (Farrell et al. 2004; Hooghe and Vanhoutte 2011). This interest has been stimulated by social capital. Some empirical studies found the association between social capital and subjective well-being (Han et al. 2012; Helliwell and Putnam 2004; Tokuda et al. 2010; Yip et al. 2007).

Social capital can be generally conceptualized as the resources available to both individuals and collectives via their social relations (Putnam 2000) although there is no consensus about the meaning of social capital, as it is a multidimensional concept (Requena 2003). However, most definitions of social capital can be categorized into two dimensions including cognitive and structural dimensions. The cognitive dimension of social capital refers to what people feel (e.g., trust), which is a subjective, psychological construct. On the other hand, the structural dimension of social capital refers to what people do (e.g., organizational participation), which can be objectively confirmed (Harpham et al. 2002). As these two dimensions may differentially link to general well-being outcomes, it is important to consider at least one variable from each dimension (De Silva 2006; Giordano et al. 2011). For example, the cognitive dimension of social capital has been suggested to link psychological well-being through the psychosocial pathways that offer affective support, self-esteem, mutual respect, and a buffer against the negative effects of stress (Giordano and Lindstrom 2010; Wilkinson 1996). On the other hand, the structural dimension of social capital may affect psychological well-being through social support pathways that provide the faster diffusion of knowledge and information about health promotion, deter deviant behaviors such as crime, provide better access to local services, amenities, and other instrumental resources such as job opportunities and decent housing (Berkman and Syme 1979; Giordano et al. 2011; Kim and Kawachi 2006; Verhaeghe et al. 2012).

Despite an increasing interest in research on social capital and subjective well-being, research is limited by the fact that there has been only a small amount of research which simultaneously considered social capital at both the individual and contextual levels in a multilevel framework (see Elgar et al. 2011; Han et al. 2012; Helliwell and Putnam 2004; Tokuda et al. 2010; Yip et al. 2007). Since social capital is defined as having both individual and collective characteristics, empirical studies of social capital should consider both individual and contextual levels of social capital (Fone et al. 2007; Poortinga 2006a; Subramanian et al. 2003). Additionally, although it has been acknowledged that social capital can be a collective characteristic, there is less agreement about in which context social capital operates best (Poortinga 2011). Usually, administrative-area, state, or country level was chosen due to data availability, which does not necessarily represent an individual's daily social interactions precisely (Giordano et al. 2011).

One context which has been overlooked in empirical social capital literature is the family or household context (Poortinga 2006b) as it has been suggested that family is important for the formation of social capital (Coleman 1988; Fukuyama 1995). It has been argued that the family and household is the place where members can generate their norms of reciprocity and trust (e.g., via interactions between parents and their children) that

creates social capital in turn (Coleman 1990). Namely, the family and household can influence members' both maintaining and forming of norms of reciprocity, trust in other people and social or political institutions, and the tendency to engage in civic and social activities (Giordano et al. 2011). Additionally, the household and family may be more important than geographical contexts because many people spend much time within this context (Bentley et al. 2011). Accordingly, it may more accurately represent an individual's daily social interactions than other geographical contexts. Since individuals are largely affected by their households, it is plausible to assume that individuals within the same household are more alike in terms of subjective well-being than individuals within the same geographical context. Additionally, one empirical study (Han et al. 2012) found that a relatively large amount of variation in subjective well-being was attributed to the household level in comparison with geographical context (i.e., administrative-area), which hints that social capital at the household level may play a role in explaining the variation of subjective well-being. However, despite the importance of the household context for operating social capital, no previous studies could be found which considered household level social capital and its association with subjective well-being.

It should also be noted, however, that local geography (in this case, administrative-area) social capital can also be important for understating psychological well-being. For example, some administrative-areas may be better able to mobilize collective resources to resolve their problems related to individual psychological well-being. Administrative-areas with higher social capital are more likely to facilitate collective action to reduce common problems and increase overall well-being (Kim et al. 2006; Veenstra 2005). An area's social capital may also influence the formation and adoption of various policies in the area. It can also affect social, economic, political, and environmental aspects of the area (Veenstra et al. 2005). Additionally, it has been suggested that social capital at a large geographical-level may influence the lower levels of social capital (Kim 2008); it is likely that a geographic area-level social capital affects the formation and maintenance of the residents' social capital of the area (Levi 1996). Accordingly, it is still necessary to consider geographic area level of social capital.

The aims of the current exploratory study were twofold: (1) comparing how much of the variation in happiness was attributed to household and administrative-area levels using intra-class correlation (ICC) and (2) examining the associations between individual, household, and administrative-area levels of social capital and happiness while controlling for various confounders at multiple levels. The current study is the first study of its kind as it simultaneously considers social capital at the individual, household, administrative-area levels while considering various factors at multiple levels. This study selected happiness, which is an affective component of well-being (Peiro 2006), as an outcome measure. Pursuing happiness is an ultimate goal of human life (Helliwell and Putnam 2004; Subramanian et al. 2005) and is considered one of the most important outcome measures in various fields (Orviska et al. 2012; Schiffrin and Nelson 2010; Tokuda et al. 2010).

2 Methods

2.1 Data

Data from the Seoul Welfare Panel Study (SWPS), an ongoing bi-annual longitudinal panel survey beginning in 2008 and conducted by the Seoul Welfare Foundation, was used for the current study. This study used wave 1 (2008) of the SWPS. The SWPS is comprised of

a representative sample of households in Seoul, South Korea. The SWPS uses a two-stage stratified cluster sampling method to select representative sample households in 25 administrative-areas, which includes the whole administrative-areas of Seoul and multiple interviews are conducted in the same households where possible. Face-to-face interviews were conducted by trained interviewers using Computer Assisted Personal Interviewing (CAPI) and only household members whose age was 15 or older were eligible to participate. A total of 7,761 individuals within 3,665 households completed the interviews in the wave 1 (2009). Further details of surveys and data can be obtained elsewhere (http://panel.welfare.seoul.kr/).

Respondents with missing values were excluded from the analysis due to missing data on variables used in the current study. Thus, the final sample included 7,671 respondents within 3,617 households.

2.2 Measures

2.2.1 Dependent Variable

Happiness was measured with one item using a 10-point scale: all things considered, which describes you the most? Responses ranged from 1 to 10, where 1 indicates "very unhappy" and 10 indicates "very happy". Although happiness is ordinal in nature, Ferrer-i-Carbonell and Frijters (2004) showed that it is relatively unimportant to assume cardinality or ordinality of the answers to subjective well-being questions to results. Thus, this study treated the dependent variable as a continuous measure. Although there were differences in coefficients between treating happiness as ordinal variable and continuous variable, the differences were not substantial, and statistically significant associations were the same (results not shown).

2.2.2 Social Capital

Three individual level social capital variables were measured. Perceived helpfulness, a cognitive dimension of social capital, was based on answers to the item rated on a 5-point Likert scale ranging from strongly agree (1) to strongly disagree (5), "There is no one from whom I can get help or lean on in times of trouble." This variable was used as a continuous measure in multilevel analysis. Organizational participation, a structural dimension of social capital, was measured. Respondents were asked about their participation level in 11 different organizations (alumni association, a group composed of people with the same family name and the same family origin on the paternal line, hobby group, an association of people from the same province, religious group, civic/community group, volunteer or charity group, education/academic organization, tenants group, political party, or professional organization) using a 5-point Likert scale ranging from very active participation (1) to no participation (5). An organizational participation index was created by summing the responses to all the items. Finally, organizational participation was reverse-coded so that a higher value reflected a higher organizational participation. Volunteer work that had been used in previous empirical studies (e.g., Giordano et al. 2011; Hurdatao et al. 2011; Schultz et al. 2008) was measured as another structural dimension of social capital by asking respondents whether they participated in any volunteer work during the past year (yes = 1, no = 0). According to Putnam (2000), civic engagement including volunteering, which is a crucial part of social capital that can facilitate collective action, is highly associated with increased political engagement such as voting and political action, which can affect the

maintenance and enhancement of community resources. Accordingly, volunteer work may enhance individual subjective well-being by facilitating the access to community resources of its members (Giordano et al. 2011). Additionally, volunteer work can be regarded as an actualization of reciprocity and norms of collaboration (De Silva et al. 2005) which can enhance one's well-being. Finally, volunteer work reflects a relatively informal-structural social capital while organizational participation measures a relatively formal-structural social capital (Hurdatao et al. 2011). In sum, it is important to distinguish different types of structural social capital as they may have different mechanism to well-being outcomes (Muennig et al. 2013; Ziersch and Baum 2004).

Household and administrative-area level social capital variables were constructed using the three individual level social capital measures. To construct household and administrative-area level social capital variables, the three-level random intercept model was fitted for organizational participation and perceived helpfulness as dependent variables, and the three-level random intercept logistic model was fitted for volunteer work as a dependent variable. The random intercept logistic model was conducted for volunteer work as it is a dichotomous variable. Then, residuals at the administrative-area and household levels were obtained from each model. Finally, each residual was multiplied by a shrinkage factor to calculate shrunken residuals (a.k.a. empirical Bayes predictions) for the administrative area and household levels of organizational participation, perceived helpfulness, and volunteer work (Merlo et al. 2005a). The shrunken residuals of household and administrative-area levels of social capital variables were used as explanatory variables in the multilevel models for happiness. This approach considers the number of observations per cluster. Residual values derived from a cluster containing fewer respondents would be shrunk towards the mean value (Rabe-Hesketh and Skrondal 2012).

2.2.3 Control Variables

Various control variables at the individual, household, and administrative-area levels were considered based on previous literature (Dolan et al. 2008; Hooghe and Vanhoutte 2011; Leung et al. 2011). At the individual level, gender (male = 1, female = 0), age, age^2, educational attainment (1 = middle school or below [reference category], 2 = high school, 3 = college, 4 = university/graduate school), marital status (married/cohabit = 1, others = 0), employment status (1 = employed, unemployed), and self-rate health (continuous) were included.

At the household level, household income: continuous (natural log transformation), housing type (1 = ownership [reference category], 2 = deposit based, 3 = monthly rent/free housing), disabled household member (1 = yes, 0 = no), and having a car (1 = no, 0 = yes) were included.

To derive a socioeconomic deprivation index at the administrative-area level, four variables were used. Median household income per area, and within-area percentages of household not having a car, were measured. In addition, within-area percentages of households receiving public assistance and single-parent households with children under the poverty line were obtained from the Seoul Statistics website (http://stat.seoul.go.kr). Median household income per area was recoded to reflect a higher value indicating a lower median household income. The principal component analysis resulted in one component with eigenvalue 2.32. Factor loadings for median household income per area, within-area percentages of household not having a car, within-area percentages of households receiving public assistance, and single-parent households with children under the poverty line were 0.80, 0.79, 0.66, and 0.68, respectively. The reliability coefficient was 0.753.

A factor score for four variables was calculated and used as representing the area-level socioeconomic deprivation with a higher value indicating higher socioeconomic deprivation, in multilevel analysis.

2.3 Statistical Analysis

Three level random intercept models were fitted where individuals (level 1) were nested within households (level 2) that in turn were nested within administrative-areas (level 3). Multilevel statistical models account for the clustering nature of datasets and enabled us to estimate the associations between various explanatory variables including social capital at the individual, household, and administrative-area levels and happiness. Bootstrapped standard errors with 2,000 iterations were calculated for multilevel analysis. The bootstrap methods are less vulnerable to violations of assumptions (e.g., normality) than asymptotic standard errors. The bootstrap methods constitute a form of cross-validations as they obtain an estimate based on multiple sub-samples (Efron and Gong 1983). All multilevel models were fitted using Stata 11 (StataCorp., College Station, TX).

The multilevel analyses consisted of a series of two models. Model 1 was an empty model without any explanatory variables included in the model to provide a baseline for the variance of happiness at the household and administrative-area levels. Model 2 simultaneously considered all explanatory variables at individual and household, and administrative-area levels including social capital.

For each model, intra-class correlation (ICC) at the household (i.e., individuals within the same household) and administrative-area (i.e., individuals within the same administrative-area but different households) levels was calculated.

Additionally, the explained proportion of variance at level one was calculated as:

$$R_1^2 = \frac{v_0 - v_1}{v_1},$$

where v_0 was the total variance in the empty model and v_1 was the total residual variance in the successive models (Snijders and Bosker 2012).

3 Results

Table 1 shows descriptive statistics of individual, household, and administrative-area level variables used in the current study. The mean score of happiness was 6.35 (SD = 1.77). The relatively low percentage of employed respondents may be due to the fact that the current study includes respondents who are students and the elderly who are retired. After excluding these cases, employed rate was 57.8 %.

Table 2 presents the results of Pearson correlation analyses among social capital variables at the individual, household, and administrative-area levels. All the social capital variables at the individual and household levels were statistically associated with each other (all $p < 0.001$), and no social capital at the administrative-area level was statistically associated. In terms of cross-level correlations, perceived helpfulness at the individual level and at the household level, organizational participation at the individual level and at the household level, and volunteer work at the individual and at the household level were significantly associated with each other (all $p < 0.001$). Additionally, perceived helpfulness at the individual level and at the administrative-area level ($p < 0.001$), organizational participation at the individual level and at the administrative-area level ($p < 0.05$) were

Table 1 Descriptive statistics for individual, household, and administrative-area level variables

Variables	No. (%)
Individual level variables (n = 7,671)	
Happiness [mean, (SD)]	6.35 (1.77)
Self-rated health [mean, (SD)]	3.47 (1.08)
Age [mean, (SD)]	46.47 (18.01)
Gender	
Male	3,506 (45.70)
Female[a]	4,165 (54.30)
Employment status	
Employed	3,185 (41.52)
Unemployed[a]	4,486 (58.48)
Educational attainment	
Middle school or below[a]	1,825 (23.79)
High school	2,451 (31.95)
College	565 (7.37)
University or graduate school	2,830 (36.89)
Marital status	
Married/cohabiting	5,010 (65.31)
Others[a]	2,661 (34.69)
Perceived helpfulness [mean, (SD)]	3.50 (0.90)
Organizational participation [mean, (SD)]	18.07 (6.60)
Volunteer work	
Yes	927 (12.08)
No[a]	6,744 (87.92)
Household level variables (n = 3,617)	
Household income [mean, (SD), KRW]	291.56 (288.86)
Housing type	
Ownership[a]	1,899 (52.50)
Deposit based	957 (26.46)
Monthly rent/free housing	761 (21.04)
Disabled household member	
Yes	375 (10.37)
No[a]	3,242 (89.63)
Having a car	
Yes[a]	1,793 (49.57)
No	1,824 (50.43)
Perceived helpfulness [mean, (SD)]	0.00 (0.32)
Organizational participation [mean, (SD)]	0.00 (2.38)
Volunteer work [mean, (SD)]	0.00 (0.45)
Administrative area level variables (n = 25)	
Socioeconomic deprivation [mean, (SD)]	0.00 (0.75)
Perceived helpfulness [mean, (SD)]	0.00 (0.21)

Table 1 continued

Variables	No. (%)
Organizational participation [mean, (SD)]	0.00 (1.43)
Volunteer work [mean, (SD)]	0.00 (0.33)

[a] Reference categories used for multilevel models

significantly associated with each other. The size of the correlation was not strong for all correlations among social capital variables as correlation coefficients showed.

Table 3 presents the results of the multilevel analyses. In Model 1, the ICC coefficients show that 51 % of respondents' variance in happiness was attributed to the household level and 7.2 % to the administrative-area level. In Model 2, all variables at the individual, household, and administrative-area levels were simultaneously included. Some of the individual level social capital variables were associated with happiness. A higher perceived helpfulness was associated with a higher happiness ($B = 0.149$, $p < 0.001$). Respondents who did volunteer work were 0.196 point higher in happiness than those who did not ($B = 0.196$, $p < 0.001$). At the household level, perceived helpfulness ($B = 0.583$, $p < 0.001$) and organizational participation ($B = 0.037$, $p < 0.01$) were associated with happiness. Thus, compared to respondents living in low perceived helpfulness, respondents living in higher perceived helpfulness were higher in happiness. Similarly, respondents living in higher organizational participation households were higher in happiness than respondents living in lower organizational participation households. However, no evidence was found as to association between volunteer work and individual happiness. No evidence was found as to associations between administrative-area level social capital variables and happiness. In this model, the ICC coefficients were 4.7 % for the administrative-areas and 41.7 % for the households, respectively. The explained percentage of variable at level one was 19.0 %.

Additionally, dominance analysis was conducted to determine the relative importance of social capital variables at three levels for explaining the total variance of individual happiness (Luo and Azen 2013). For doing this, an approach that considers the explained proportion of variance at level one, which was proposed by Snijders and Bosker (2012), was used. The results showed that the individual-level social capital generally dominated household level social capital and completely dominated administrative-area level social capital. And household level social capital completely dominated administrative-area level social capital (results not shown).

In terms of control variables, male respondents were lower in happiness than female respondents. Age and age^2 were associated with happiness. Compared to respondents with middle school or below educational attainment, respondents with university or graduate school educational attainment were higher in happiness. Marital status was associated with happiness. Finally, self-rated health status was positively associated with happiness at the individual level. At the household level, household income was associated with happiness. Compared to respondents living in households they owned, respondents living in a household with monthly rent/free housing were lower in happiness. Respondents living in a household with a disabled household member were lower in happiness compared to respondents living in a household without a disabled household member. Socioeconomic deprivation at the administrative-area level was negatively associated with happiness.

Table 2 Correlations among social capital variables at the individual, household, and administrative-area levels

Individual level	Perceived helpfulness	Organizational participation
Organizational participation	0.114**	
Volunteer work (Yes)	0.083**	0.148**
Household level		
Organizational participation	0.140**	0.211**
Volunteer work	0.090**	
Administrative-area level		
Organizational participation	0.112	0.148
Volunteer work	0.154	

Cross-level 1	Perceived helpfulness[b]	Organizational participation[b]	Volunteer work[b]
Perceived helpfulness[a]	0.464**	0.023	0.005
Organizational participation[a]	0.023	0.458**	0.015
Volunteer work[a]	0.005	0.014	0.374**
Cross-level 2	Perceived helpfulness[c]	Organizational participation[c]	Volunteer work[c]
Perceived helpfulness[a]	0.076**	0.022	0.001
Organizational participation[a]	0.012	0.044*	0.001
Volunteer work[a]	0.001	0.001	0.014
Cross-level 3	Perceived helpfulness[c]	Organizational participation[c]	Volunteer work[c]
Perceived helpfulness[b]	0.002	0.001	0.001
Organizational participation[b]	0.001	0.004	0.001
Volunteer work[b]	0.001	0.001	0.002

Cross-level 1: correlations between individual and household levels of social capital; Cross-level 2: correlations between individual and administrative-area levels of social capital; Cross-level 3: correlations between household and administrative-area levels of social capital

* $p < 0.05$; ** $p < 0.001$

[a] Individual level social capital

[b] Household level social capital

[c] Administrative-area level social capital

4 Discussion

Although literature linking social capital and subjective well-being has been increasing in recent years, there are some knowledge gaps that remain to be filled. The main purposes of this study were to investigate how much variance in happiness was attributable to household and administrative-area levels and examining the associations between social capital at the individual, household, and administrative-area levels and happiness while adjusting for an array of other control variables at multiple levels.

The results of the ICC showed that a relatively small proportion (7.2 %) of variance in happiness was attributable to administrative-area level. On the other hand, a relatively high proportion (51.1 %) of variance in happiness was attributed to the household level (see Model 1). Further analysis was conducted to check the robustness of the results by

Table 3 Multilevel models of happiness

Fixed effects	Model 1	Model 2	General dominance
Constant	6.333 (0.015)***	4.180 (0.285)***	
Individual level variables			
Gender			
Male		−0.096 (0.036)**	0.009
Age		−0.046 (0.007)***	0.009
Age^2		0.0004 (0.0001)***	
Educational attainment			0.012
High school		0.017 (0.061)	
College		0.120 (0.085)	
University or graduate school		0.252 (0.073)**	
Employment status			0.001
Employed		0.050 (0.041)	
Marital status			0.016
Married/cohabiting		0.356 (0.054)***	
Self-rated health		0.180 (0.023)***	0.019
Perceived helpfulness		0.149 (0.036)***	0.026
Organizational participation		0.006 (0.004)	0.006
Volunteer work			
Yes		0.196 (0.074)**	0.006
Household-level variables			
Household income[a]		0.163 (0.023)***	0.024
Housing type			0.009
Deposit based		−0.028 (0.036)	
Monthly rent/free housing		−0.240 (0.044)***	
Disabled household member			0.009
Yes		−0.314 (0.056)***	
Having a car			0.011
No		−0.086 (0.035)*	
Perceived helpfulness		0.583 (0.093)***	0.019
Organizational participation		0.037 (0.011)**	0.012
Volunteer work		0.008 (0.047)	0.002
Area-level variables			
Perceived helpfulness		0.516 (0.460)	0.006
Organizational participation		0.040 (0.074)	0.002
Volunteer work		0.065 (0.272)	0.001
Socioeconomic deprivation		−0.184 (0.114)	0.007
Random effects			
Intra-class correlation			
Area-level	0.072	0.047	
Household-level	0.511	0.417	
R_1^2	–	0.190	

Bootstrapped standard errors, derived from 2,000 iterations, are presented in parentheses

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

[a] Natural log transformation was used

excluding singleton households from the sample. The result of the empty model showed that 49.7 % of variance in happiness was attributable at the household level, which still accounted for a high proportion of variance in happiness (results not shown). Thus, the results implied that the household context is more important for understanding the variation in individual happiness than the administrative-area level. This also supports that the household level social capital may play an important role for explaining the variation in individual outcome measures (Giordano et al. 2011; Han et al. 2012; Poortinga 2006b). Additionally, the result that only a small portion of happiness was attributed to administrative-area has its own implication. Regardless of whether social capital at the administrative-area level is associated with individual happiness, the administrative-area context to understand individual happiness is less important compared to the household level as only a small portion of individual happiness was attributed to this context (Merlo et al. 2005b). The relatively low level of ICC found for the administrative area also suggested that that there is much less homogeneity within than between administrative areas with respondents' tendencies to happiness.

The result that the relatively high proportion of variance was attributed to household level compared to other studies (Giordano et al. 2011; Poortinga 2006b) may be explained by South Korea's unique characteristic. For example, South Korea has gone through rapid social change, including economic development, and the culture has been greatly characterized by Confucianism and patriarchy (Kim et al. 2010, 2012). Accordingly, family or household is an especially important social context in South Korea, which provides both material and emotional resources that determine one's well-being.

In terms of the associations between social capital at the individual, household, and administrative-area levels and happiness, this study found that various dimensions of social capital at individual and household levels were positively associated with happiness, and especially cognitive social capital is more consistently associated with happiness than structural social capital that is consistent with previous literature (De Silva et al. 2005). In terms of individual level social capital variables, individuals with higher perceived helpfulness were higher in happiness than individuals with lower perceived helpfulness. Individuals who participated in one or more organizations were happier than those who did not. Individuals who did volunteer work were higher in happiness than those who did not. At the household level, perceived helpfulness and organizational participation were associated with happiness. Thus, the higher the household average of perceived helpfulness and organizational participation, the higher the happiness in the household. In terms of administrative-area level social capital, no significant association at this level was found. Further analysis was conducted by entering one administrative-area level social capital variable at a time into the multilevel model. However, none of the administrative-area level social capital variables was associated with happiness in each model (results not shown). Additionally, as it has been suggested that social capital may link to subjective well-being through health (Helliwell and Putnam 2004; Yip et al. 2007), further investigation without adjusting for health was conducted. Although there were slight changes in coefficients regarding social capital variables, no substantial differences were found (results not shown). This result adds to the increasing volume of literature showing that different types of social capital may not be closely related as originally suggested (Elgar et al. 2011; Giordano and Lindstrom 2011). The results that different levels and dimensions of social capital were associated with happiness differently vindicated the decision to keep various dimensions of social capital at multiple levels, which would have been not observed otherwise.

Further analyses were conducted to check the robustness of the findings. The results of social capital variables at the administrative-area level remained the same in that no social capital variables at this level were associated with happiness when default standards errors and robust standard errors were calculated. In terms of other levels of social capital variables, organizational participation was no longer significant in addition to slight changes in coefficients of other social capital variables when default standards errors and robust standard errors were calculated. However, general results remained the same that individual-level social capital generally dominated household-level social capital and completely dominated administrative-area level social capital, and household-level social capital completely dominated administrative-area level social capital. This result implied that both individual and household level social capital are more important than administrative-area social capital, but relative importance between individual and household level social capital is not definitive (Luo and Azen 2013), although individual level social capital generally dominated household level social capital.

There are only a limited number of empirical studies that considered both individual and contextual levels (village, administrative-area, country) of social capital simultaneously and examined its associations with subjective well-being (Elgar et al. 2011; Han et al. 2012; Helliwell and Putnam 2004; Tokuda et al. 2010; Yip et al. 2007). These studies found that some dimensions of social capital at the contextual level were associated with subjective well-being. However, no previous study could be found which simultaneously considered three levels of social capital and its associations with happiness.

It is important to simultaneously consider individual and contextual levels of social capital because any effect of social capital at one level on psychological well-being may be the result of confounding due to omission of other levels of social capital (Hamano et al. 2010; Poortinga 2006a). The results of the current study are consistent with this argument. When either individual or household levels of social capital variables were separately included in the model, three measures of individual level social capital and household social capital were statistically significant (results not shown). However, once all levels of social capital measures were included in one model, the effects of volunteer work at the household level and organizational participation at the individual level were attenuated and no longer statistically significant (Model 2). The findings also support the idea that different dimensions of social capital at different levels may operate differently to general well-being outcomes (Giordano et al. 2011; Poortinga 2011). Dimensions of social capital may not mutually enhance each other (Putnam 1995), as first suggested (Giordano et al. 2011). Rather, social capital is a multidimensional concept that entails various types of phenomena which can be used for different purposes (Elgar et al. 2011). Additionally, the current study found that household context is an important social context for understanding individual happiness, and household social capital plays an important role. Further research which considers a household level social capital is needed to confirm these findings.

4.1 Strengths and Limitations

A major strength of the current study is its unique three-level design. This enabled us to estimate the amount of total variation in individual happiness attributed to the household and administrative-area levels and compare their relative importance to understand variance in happiness. Additionally, this is the first study to consider social capital at individual, household, and administrative-area levels simultaneously and their associations with happiness, which enabled us to investigate the associations between various dimensions of social capital at each level and happiness. Moreover, by adjusting for various

control variables at multiple levels, this study reduced the potential omitted variable bias. Additionally, by using shrunken residuals, the way that contextual level of social capital was measured was improved.

There are also several limitations of the current study. First, the current study is cross-sectional, and thus prevents us from making causal inferences. Reverse causality may explain the found associations. A longitudinal study would help to determine the causal direction. Second, the size the administrative-area sample ($n = 25$) may cause a potential problem. The relatively small number of the administrative-area sample provided limited statistical power, which may prevent us from detecting significant association at this level in turn. Third, information regarding social capital and happiness was based on self-reports, so it is vulnerable to common method bias and response bias. Fourth, although this study adjusted for various control variables at the individual, household, and administrative-area levels, it is still possible that the found associations may be due to residual confounding. Fifth, this study used one item to measure happiness. Although many studies (Becchetti et al. 2011; Cunado and de Gracia 2012; Tokuda et al. 2010) used one item to measure happiness, happiness is not a simple concept, so it is less likely that this single measure fully captures the complex meaning of it.

5 Conclusion

The results showed that a relatively small percentage of happiness was attributed to the administrative-area level compared to the household level, which implies that a household context is more important for understanding variation in individual happiness. This study also found that individual level social capital variables including perceived helpfulness and volunteer work were positively associated with happiness. Among the household level social capital variables, perceived helpfulness and organizational participation were positively associated with happiness. However, none of the administrative-area level social capital variables was associated with happiness, which indicates that the administrative-area level of social capital may be less important than other levels of social capital for explaining happiness. The results imply that different types of social capital at different levels may operate differently to happiness. This study contributed to the empirical social capital literature by simultaneously considering the individual, household, and administrative-area levels and examining each one's association with happiness while adjusting for various control variables at multiple levels.

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