

Components of Social Capital and Socio-Psychological Factors That Worsen the Perceived Health of Japanese Males and Females

HIROKO TSUNODA,¹ RYOZO YOSHINO² and KAZUHITO YOKOYAMA¹

¹Department of Public Health and Occupational Medicine, Mie University Graduate School of Medicine, Tsu, Japan

²Department of Data Science, The Institute of Statistical Mathematics, Tokyo, Japan

Social capital refers to the quantity and quality of social relationships, such as formal and informal social connections as well as norms of reciprocity and trust that exist in a place or a community. This article analyzed the data from Japan 2004 B Survey in order to elucidate the effects of social capital and socio-psychological factors on the health of Japanese males and females. The Survey was a part of a nationwide random study on Japanese national character, which has been conducted by the Institute of Statistical Mathematics since 1953. A total of 785 (372 males and 413 females) valid data from 1,200 adult samples were used. Logistic regression analysis showed that the self-reported symptoms were increased by negative attitude to generalized trust in males, and by negative attitude to norm of reciprocity in females. Moreover, in females, health dissatisfaction was enhanced by low perceptions of support. In both genders, self-reported symptoms and health dissatisfaction were worsened by anxiety. The self-reported symptoms were increased by an adherence to religion and spirituality in males, whereas in females, the health dissatisfaction increased with low income and a concern about superstitions. Thus, from a viewpoint of social capital, perceived health is susceptible to personal relationships in females and to distrust in males. Anxiety seems a key factor affecting perceived health. In addition, females are influenced by economic status and superstitions, whereas males are more concerned about religion or the mind in relation to health. These findings are useful in developing health policies for Japanese. ——— health dissatisfaction; self-reported symptom; social capital; socio-psychological factors; gender difference.

Tohoku J. Exp. Med., 2008, **216** (2), 173-185.

© 2008 Tohoku University Medical Press

The concept of social capital has attracted broad interest in economics, politics, psychology, sociology, and their interdisciplinary fields in the last decades (Hawe and Shiell 2000). Despite the fact that there are number of definitions advocated (Coleman 1990; Putnam 1993, 2000), social capital, as it is commonly used in the public health

literature, refers to the quantity and quality of social relationships, such as formal and informal social connections as well as norms of reciprocity and trust, that exist in a place or a community (Kawachi and Berkman 2000; Putnam 2000; Subramanian et al. 2003).

Evidence has been given that social capital

Received January 4, 2008; revision accepted for publication September 4, 2008.

Correspondence: Kazuhito Yokoyama, MD, Department of Public Health and Occupational Medicine, Mie University Graduate School of Medicine, 2-174 Edo-bashi, Tsu-shi, Mie 514-8507, Japan.
e-mail: kazuhito@doc.medic.mie-u.ac.jp

has a positive influence on various aspects of people's physical and psychological health (Kawachi et al. 1997b). For example, social capital is shown to reduce total mortality (Kawachi and Kennedy 1997a), smoking habits (Lindström et al. 2003) and violent crime rates (Kawachi et al. 1999b). Studies on the Japanese have shown that social capital could decrease the rates of illness (Fujisawa et al. 2005; Ichida et al. 2005; Kondo 2005; Motohashi et al. 2005; Kawakami et al. 2006; Bassani 2008; Yamaoka 2008). However, even after a decade of intensive research, there is still considerable disagreement about specific social processes underling this relationship; various mechanisms have been proposed to link social capital and health status (Pooringa 2006a, b).

Recently, Harpham (2007) pointed out that the structural and cognitive components of social capital should be distinguished in health research because they have different relationships with health outcomes. The structural component is the extent and intensity of associational links or activity, while the cognitive component consists of perceptions of support, norm of reciprocity, sharing and trust. At the simplest level, these two components can be characterized as what people do and what people feel, respectively, in terms of social relationships (Harpham et al. 2002). The first purpose of the present study is, therefore, to investigate the relationships of structural and cognitive social capital to health among the Japanese, respectively, to clarify the effects of different aspects of social capital on health in population. Structural social capital is assessed by civic participation while cognitive social capital is by generalized trust, norm of reciprocity and perceptions of support.

During the past several decades, potential gender differences in health have been examined, e.g. whether women experience more health problems than men (Hunt and Annandale 1999). Also, gender differences in relationships between social capital and health have been pointed out in Western nations. For example, perceived help from civic participations proved to be protective in health among males, whereas in females such effect was associated with reciprocity and trust

(Skrabski et al. 2003; Hyypä et al. 2007). Also, Bassani (2008) pointed out that social capital developed domestically in females, whereas in males much of their social capital developed in the work place. In Japan, the nationally representative sample survey indicated that self-reported health was worsened by civic participation in females but not in males (Yamaoka 2008). Therefore, the present study is also focused on the differences between genders in the ways in which social capital affects the health, based on the conceptual framework of social capital described above.

The relationship between spirituality and health has recently become one of the focal points of scientific inquiry (Ellison and Levin 1998; Matthews et al. 1998). The World Health Organization (WHO) (1990) dealt with spirituality in its Committee of Terminal Care of Cancer Patients, publishing the committee's report "Cancer Pain Relief and Palliative Care." Thus, it is possible that there is a significant link between spiritual or religious engagement and health in Japan. However, the Japanese concept or function of religion may differ from that of the West. Indeed, Hayashi (2006) compared the Japanese with Westerners in regards to response patterns of religious faith and religious heart/mind, suggesting that the measure of religious faith and spirituality conceived in the West may not be universally applicable. In the present study, relationships among religious heart/mind, spirituality to health are examined using religious heart/mind rather than faith, in addition to social capital.

Public opinion surveys are usually conducted to solicit people's opinions using only straightforward questioning. In contrast, some researchers focused on deeper recesses of the Japanese mind (Yoshino 2005). For example, superstitions (unreasonable divination such as augury or horoscope) represent the next step toward exploring such depths of the Japanese mind. Furthermore, our previous studies (Hayashi et al. 1998; Yamaoka 2005; Yoshino 2006) demonstrated significant relationships between anxiety and self-reported symptoms. Thus, superstitions and anxiety are also considered to be factors related to

perceived health in the present study.

To achieve the above purposes, the present study analyzes the data from the Japan 2004 B Survey, which was a general social survey that covers various aspects of people's opinions about their culture and daily life, focusing on health, social capital, religious heart/mind and spirituality (Yoshino 2005). The Japan 2004 B Survey was part of the study conducted by a group of researchers at the Institute of Statistical Mathematics (ISM), including one of the authors (YR), i.e. the longitudinal nationwide face-to-face interview surveys on the Japanese national character, which have been going on since 1953, as well as the cross-national comparative surveys, since 1971, use the same questionnaire items (Hayashi et al. 1998; Yoshino and Hayashi 2002; Yoshino 2005, 2006). The outline of the surveys is reported on a website (Data archive of Cross-National Comparative Survey of National Character, ISM). Analysis on the random sampling data from the Japanese population could yield information regarding the social capital and health, which can contribute to policy recommendations, in a way similar to those in Western countries.

DATA AND ANALYSIS

Population and Sample

The nature of the procedure was fully explained to all subjects, and the study was conducted with their informed consent during the period of November 18 to December 7, 2004. Twelve thousand Japanese adults (≥ 20 years old) were chosen using a stratified two-stage probability sampling method that considered statistical randomness (Yoshino 2005, 2006). Primary sampling units (large administrative units) were stratified by population size and district based on official census data. The 120 sampling areas were chosen in proportion to the population size of adult residents throughout Japan. Respondents were chosen by means of systematic random sampling from resident (or voter) registration lists (10 residents were chosen at each sampling point).

A face-to-face interview was conducted by

well-trained interviewers, using a questionnaire specifically developed for the study as well as a standardized answer sheet. The number of valid answers was 785 (372 males and 413 females), resulting in a valid return rate of 65.4%. The full questionnaire consisted of over 50 items, including social and cultural attitudes. Details of the procedures and response distributions have been reported elsewhere (Yoshino 2005). In the present study, part of the full questionnaire was used (see the Appendix); a brief explanation of each item is described below. Answers to the questionnaires were divided into two categories as shown in Table 1.

Evaluation of perceived health

Perceived health (subjective or self-rated health) measures how individuals rate their own health status. Despite its simplicity, intrinsic subjectivity and flexibility of interpretation to individuals are possible (Krause and Jay 1994; Manderbacka 1998). In the present study, health dissatisfaction was determined based on answers to the question "How satisfied are you with your health?" Four alternatives were provided for answers: "very satisfied," "fairly satisfied," "fairly dissatisfied," or "very dissatisfied." The two former alternatives were categorized as "satisfied" while the two latter as "dissatisfied." Meanwhile, following the work of the Centre de Recherche pour l'Étude et l'Observation des Conditions de Vie (CRÉDOC 1982) currently Institut de recherche et de documentation en économie de la santé (IRDES) in France, subject in the current study were also asked to indicate how many symptoms they had suffered during the previous few weeks from a list that included headaches, backaches, nervousness, depression and insomnia (i.e., self-reported symptoms).

Health dissatisfaction tends to reflect the subjective aspect of perceived health, whereas self-reported symptoms are more objective as they count the number of symptoms evident. Thus, these two items were included to assess different aspects of perceived health of subjects.

TABLE 1. Factors possibly affecting perceived health and answer category to questionnaires

Items	Category		
<i>Generalized trust</i>			
Most people can be trusted /can't be too careful in dealing with people (Q1) ^a	Can't be too careful	Can be trusted	
<i>Norm of reciprocity</i>			
People try to be helpful, or are just looking out for themselves (Q2)	Looking out for themselves	Try to be helpful	
<i>Civic participation</i>			
Belonging to associations/ organizations (Q3)	Not belong	Belong	
<i>Civic trust</i>			
Institutions / systems with very or somewhat confidence (Q4)	Less than three	Three or more	
<i>Material support</i>			
Person who lends things or money and helps (Q5)	Almost no one	Many, some, or only one	
<i>Sympathy</i>			
Person who understands present feeling and condition (Q5)	Almost no one	Many, some, or only one	
<i>Confidant</i>			
Person who willingly calls or meet each other to consult with (Q5)	Almost no one	Many, some, or only one	
<i>Appreciation</i>			
Person who gives high evaluation and respect (Q5)	Almost no one	Many, some, or only one	
<i>Anxiety</i>			
Worry about serious illness, car accident, unemployment, or war (Very much, somewhat, or slightly) (Q6)	Very much, somewhat or slightly	Not at all	
<i>Superstitions</i>			
Usually care about lucky or unlucky number, jinxes, nightmare, or unlucky direction (very much or somewhat) (Q7)	All	Three or less	
<i>Religious heart/mind</i>			
A religious mind is important, or not important (Q8)	Important	Not important	
<i>Spirituality</i>			
Agreement on six statements related to spirituality (Q9)	Four or more statements	Less than four statements	

^a Question No. in Appendix

Factors Affecting Perceived Health

Social capital

Generalized trust was assessed by asking respondents to indicate which they agreed with: “most people can be trusted” or “you can’t be too careful in dealing with people” (Q1) (Hayashi et al. 1992). Norm of reciprocity was evaluated by asking whether “most of the time people try to be helpful or they are mostly looking out for themselves” (Q2) (Yoshino 2002, 2006). To assess civic participation, subjects were asked to name as many voluntary associations to which they belong, such as political groups, industrial associations, volunteer groups, civic movement groups, religious organizations, sports clubs, cultural clubs, and computer network groups (Q3). Civic trust was assessed using a modified version of the World Value Survey (1995) on social institutions; subjects were asked to indicate how much confidence they had in social institutions or systems, judges/lawyers, newspaper/TV reporters, governmental officials, statesmen, fortune-tellers, medical doctors, and scientists (Q4). Finally, to assess perceptions of support, subjects were asked to report the number of persons (1) who lend them things or money and help them (material support), (2) who understand them and their present feelings and condition (sympathy), (3) who willingly call or meet them for consultations (confidant), and (4) who highly evaluate them and respect them (appreciation) (Q5).

Anxiety

Subjects were asked to what extent they worried about serious illnesses, car accidents, unemployment, and war (Q6). This question was taken from the cross-national comparison of seven nations (Hayashi et al. 1998).

Superstitions

Items related to superstitions (unreasonable divination such as augury or horoscopes) were used from a previous spirituality survey (Hayashi 1979). Subjects were asked to answer whether they usually cared about lucky or unlucky numbers, superstitions, nightmares, and unlucky directions (aspects) (Q7).

Religious heart/mind (adherence to religion)

Subjects were asked whether they thought having a religious heart/mind was important (Q8). This item seemed adequate for a study of Japanese religiosity (Hayashi et al. 1992; Hayashi 2006).

Spirituality

Three items from a previous spirituality survey (Hayashi 1979) and three items from a survey conducted by WHOQOL-SRPB (Department of Mental Health & Substance Dependence, WHO 2002) were used. Subjects were asked to answer whether they agreed or disagreed with the following six statements (Q9): (1) They had a feeling that some invisible power controls their life; (2) Destiny beyond the human power is manifest to when and where they are to be born and die; (3) After death, they are reborn repeatedly; (4) They keep living as a part of the nature even after they die; (5) They will try everything they can do for the progress and happiness of all humanity; and (6) They have ever thought that they could devote themselves to someone else.

Statistical analysis

Logistic regression analysis was performed using health dissatisfaction (“satisfied” vs. “dissatisfied”) and self-reported symptoms (“one or more symptoms” vs. “no symptoms”) as the dependent variable and social capital, anxiety, superstitions, religious heart/mind, spirituality, and demographic variables as independent variables. Demographic variables used in the analysis included age, education and household income. Age was used as a continuous variable. Education (educational level) was classified into “lower (primary or junior high school),” “middle (senior high school),” and “higher (college, university, or graduate school).” Household income (self-reported) was classified into “lower (two million yen per year or less),” “high (more than two million yen per year),” or “DK (do not know) or NA (no answer).” All other variables were dichotomized as answer categories, as shown in Table 1.

The stepwise method was utilized in the logistic regression model, with age being included

in all steps; in each step, dependent variables were entered and removed at $p < 0.05$. The results were presented as odds ratios (OR) at 95% confidence intervals. The SAS version 9.1 statistical package for Windows (SAS Institute, Cary, NY) was used.

RESULTS

Subjects' ages ranged from 20 to 89 (mean = 53.9, s.d. = 16.1) and 20 to 86 (mean = 50.2, s.d. = 15.3) years, for males ($n = 327$) and females ($n = 416$), respectively ($p > 0.05$). A total of 92 males (24.7%) and 122 females (29.5%) indicated they were dissatisfied or fairly dissatisfied with their health status, respectively ($p < 0.05$). The number of subjects reporting one or more symptoms was 184 (49.5%) for males and 271 (65.6%)

for females ($p < 0.001$). Table 2 shows the number of responses to each question by gender. Civic participation was significantly lower in females than in males. Perceptions of support as indicated by material support and confidant was significantly lower in males than in females. Concern about superstitions and inclinations toward spirituality were observed more in females than in males.

Tables 3 and 4 show the results of the logistic regression analysis. Health dissatisfaction and self-reported symptoms were significantly increased by anxiety both in males and females. Health dissatisfaction was also significantly increased by lower household income and lower appreciation (perceptions of support), and a concern about superstitions in females. Self-reported

TABLE 2. Number of responses to questionnaires by gender: percentage in parenthesis.

		Males (<i>n</i> = 372)	Females (<i>n</i> = 413)	Differences (<i>p</i>) ^b
Education	High	130 (35.0)	122 (29.5)	N.S
	Middle	172 (46.2)	224 (54.2)	
	Low	66 (17.7)	62 (15.0)	
Household income	High	260 (69.9)	269 (65.1)	N.S
	Low	34 (9.1)	31 (7.5)	
	Don't Know / No Answer	78 (21.0)	113 (27.4)	
Social capital ^a				
<i>Generalized trust</i>	Can't be too careful	228 (61.3)	253 (61.3)	N.S
<i>Norm of reciprocity</i>	Looking out for themselves	235 (63.2)	262 (63.4)	N.S
<i>Civic participation</i>	Not belong	204 (54.8)	263 (63.7)	< 0.01
<i>Civic trust</i>	Less than three	95 (25.5)	109 (26.4)	N.S
<i>Material support</i>	Almost no one	139 (37.3)	122 (29.5)	< 0.05
<i>Sympathy</i>	Almost no one	42 (11.3)	33 (8.0)	N.S
<i>Confidant</i>	Almost no one	47 (12.6)	27 (6.5)	< 0.01
<i>Appreciation</i>	Almost no one	151 (40.6)	159 (38.5)	N.S
Anxiety ^a	Very much, somewhat, or slightly	225 (60.5)	275 (66.6)	N.S
Superstitions ^a	All	70 (18.8)	158 (38.3)	< .0001
Religious heart/mind ^a	Important	232 (62.4)	261 (63.2)	N.S
Spirituality ^a	Four or more statements	64 (17.2)	110 (26.6)	< 0.01

^aSee Table 1.

^b χ^2 -test; N.S = $p > 0.05$

symptoms were increased by negative attitude to generalized trust, and positive attitude to religious heart/mind and spirituality in males; it was

increased by negative attitude to norm of reciprocity, and decreased by less civic participation.

TABLE 3. Odds ratios (OR) and 95% confidence intervals (CI) for health dissatisfaction ^a: stepwise logistic regression analysis

Items	Category	Males		Females	
		OR	95% CI	OR	95% CI
Household Incomes	High	-		1	
	Low	-		4.09	(1.71-9.81)
	Don't know	-		0.88	(0.51-1.51)
Appreciation	Many, some, or only one	-		1	
	Almost no one	-		2.30	(1.40-3.67)
Anxiety	Not at all	1		1	
	Very much, somewhat, or slightly	2.05	(1.16-3.63)	2.42	(1.36-4.30)
Superstitions	Three or less	-		1	
	Four	-		1.86	(1.15-3.01)

^a Dissatisfied or fairly dissatisfied with own health.

— = $p > 0.05$ (not included into the logistic regression model).

TABLE 4. Odds ratios (OR) and 95% confidence intervals (CI) for self-reported symptoms ^a: stepwise logistic regression analysis

Items	Category	Males		Females	
		OR	95% CI	OR	95% CI
Generalized trust	Can be trusted	1		-	
	Can't be too careful	1.69	(1.07-2.66)	-	
Norm of reciprocity	Try to be helpful	-		1	
	Looking out for themselves	-		1.87	(1.20-2.91)
Civic participation	Belong	-		1	
	Not belong	-		0.57	(0.36-0.91)
Anxiety	Not at all	1		1	
	Very much, somewhat, or slightly	2.25	(1.40-3.63)	2.10	(1.32-3.34)
Religious heart / mind	Not important	1		-	
	Important	1.74	(1.08-2.81)	-	
Spirituality	Less than four statements	1		-	
	Four or more statements	1.92	(1.03-3.56)	-	

^a One or more symptoms with own health.

— = $p > 0.05$ (not included into the logistic regression model).

DISCUSSION

Anxiety was significantly related both to health dissatisfaction and to self-reported symptoms both in males and females. This is consistent with our previous observation that anxiety was associated with several health problems for both males and females (Yamaoka 2005). Although Japan has been considered to have a high level of security, people may begin to experience increased anxiety due to new risks related to issues such as infectious disease, natural disasters, crime, and war (terrorism) (Cabinet Office, Government of Japan 2004). Moreover, people who tend to be anxious about daily problems complain more about their health and feel malaise (Borkovec et al. 1983; Mathews 1990; Freeston et al. 1994). Thus, anxiety might be significantly linked to perceived health in the present study.

In contrast, the present study revealed gender differences in perceived health and its relation to social capital and socio-psychological factors. First, females reported higher health dissatisfaction and more self-reported symptoms than males. This finding concurs with previous observations in the seven national surveys (France, Italy, Japan, Netherlands, the United Kingdom, the United States, and West Germany) from 1987 to 1993 as well as the East Asian Value Survey (involving Japan, South Korea, Singapore, Taiwan, and five cities in Mainland China) from 2002 to 2004 that females are more likely to report health problems than males (Hayashi et al. 1998; Yoshino 2006; Yamaoka 2008). Although the life expectancy of females exceeds that of males by almost eight years, females consistently have higher rates of morbidity than males (Verbrugge 1976; Cleary et al. 1982; Verbrugge 1985, 1989). In addition, gender differences are found in self-reported health (Cleary et al. 1982). Females may report more symptoms; and possibly have more illness in the aggregate than do males.

Denton et al. (2004) reported that socioeconomic status affects female health directly through access to resources and indirectly through psychological factors and social roles, where access to resources means that age, family structure, prima-

ry activity, education, occupation, income and social support. As observed in American society, females work part-time, participate in unwaged labor, and receive unequal wages, all of which contribute to their lower socioeconomic position (Read and Gorman 2006). These facts may underlay the observation in the present study that household income affected health dissatisfaction only in females. In order to assess the social determinants of differences in health status between males and females, it is necessary for further studies to clarify socioeconomic stressors.

Okamoto and Tanaka (2004) showed that females provide and receive more support from members of their informal connection than males. Moreover, if females gain appreciation from their friends, it may improve their self-esteem (Carmel et al. 2001). Therefore, females disclosed health dissatisfaction if they did not receive appropriate appreciation.

Superstitions have a significant effect on health dissatisfaction in females. Carmel et al. (1991) suggested that, due to more extensive exposure than males to chronic stress, females in Western societies are more vulnerable to additional stressors such as life events. In particular, females may experience health dissatisfaction when they are concerned about superstitions related to life events.

In regards to social capital, previous studies have reported that social capital is related to self-rated health in the United States (Kawachi et al. 1999a; Subramanian et al. 2002). Previous surveys in Hungary found that help from civic participation was protective in males; in females this effect was associated with reciprocity (Skrabski et al. 2003). In the present study, generalized trust in males and norm of reciprocity in females significantly affected self-reported symptoms. These gender differences related interactions of the measures of individual level social capital had divergent effects on self-reported symptoms in males and females.

In a reliability and validity assessment of social networks in Sweden, gender differences were found in the civic participation items (Hanson et al. 1997). Factor analysis showed that

males and females had different patterns of leisure participation regarding place of public entertainment (e.g., night clubs and dance clubs) and attendance at public sports events. In the Western world, males seem to devote less time to building friendship networks than do females who tend to invest more time in domestic social connections (Lin 2000). In the present study, however, civic participation was found less in females (Table 2). It is possible that females find informal connection of friends and relatives with whom they discuss their social and emotional needs (Okamoto and Tanaka 2004), and therefore, females have succeeded in organizing substantial support. In addition, the present study indicated that, among females, less civic participation was related to a decrease in self-reported symptoms (Table 4). It may be thus assumed that females in better health can find support from their informal connections easily because of their vigorous activity; further study is necessary to confirm it.

Religious heart/mind and spirituality were not significantly related with self-reported symptoms in females, but in males. A number of studies in Western countries suggest the beneficial effects of religiosity and spirituality on health (Benson 1997; Kim and Seidlitz 2002; Torosian and Biddle 2005). In addition, according to Pargament (2002), a growing number of studies support the hypothesis that general forms of religiousness are associated with fewer psychological problems. Females are generally more religious than males, and some evidence from studies in the United States indicate that the association between religiosity/spirituality and health is not the same across genders (Levin and Taylor 1993; McCullough et al. 2000). In contrast, males who considered having a religious heart/mind to be important and were concerned with spirituality reported symptoms more often in the present study. Researchers might believe that males are not interested in seeking psychological support for health problems (Bird and Rieker 1999). Moreover, it is harder to find support even when Japanese males have psychological problems, such as depression, insomnia or nervousness (Krause et al. 1999; Okabayashi et al. 2004).

Thus, the observations in the present study may reflect the fact that Japanese males turn to religion and spirituality to cope with their health problems.

In conclusion, the most important findings of the present study point to gender differences in the relationship between social capital, socio-psychological factors and perceived health among the Japanese, as the results suggest that self-reported symptoms were increased by negative attitude to generalized trust in males, and by negative attitude to norm of reciprocity in females; also, in females, health dissatisfaction was enhanced by low perceptions of support. In both genders, self-reported symptoms and health dissatisfaction were worsened by anxiety. The former was increased by an adherence to religion and spirituality in males, whereas in females, the latter increased by low income and a concern about superstitions. This underlines the need for a gender-specific approach to future research on this subject.

As for Japanese response tendencies, many of the respondents who did not provide information on household incomes may have fallen into one of the lower income groups. Moreover, the Japanese tend to avoid polar categories such as "very satisfied" or "very dissatisfied," instead choosing equivocal or ambiguous categories for their responses in public opinion surveys. Such a tendency might result in outcomes that point to no significant associations of social capital with health dissatisfaction, as in the present study (except for perceptions of support in females). In contrast, self-reported symptoms were rather objective and probably related significantly to both social capital and socio-psychological factors. It is thus suggested that differences between health dissatisfaction and self-reported symptoms must be considered in studies assessing perceived health.

These circumstances could have affected the results. In analyzing the results, we should be careful in concluding what are the substantive differences or what are the compound effects with the general response tendency. At the same time, it might be simply the case that the sampled

respondents of the young group were unusual or biased; the return rate of statistical sampling surveys is usually remarkably lower for younger groups than for older groups.

The present study indicated that health risks differed among males and females. In consequence, this assumption shapes the understanding of males' and females' health needs as well as their health risks. The relationships between social capital and health should be considered in the contexts from which they emerge (Lin 2000; Kunitz 2004). Further analysis of longitudinal data should be conducted to clarify gender differences in the relationship between social capital and socio-psychological factors in perceived health.

Acknowledgment

This study was financially supported by the Ministry of Education, Culture, Sports, Science & Technology, Grant in Scientific Research A (2), No.14252013 (2002-2005 fiscal years) and No.18252001 (2006-2009 fiscal years)

Reference

- Bassani, C. (2008) The influence of financial, human and social capital on Japanese men's and women's health in single- and two-parent family structures. *Soc. Indic. Res.*, **85**, 191-209.
- Benson, H. (1997) *Timeless healing*. Simon & Schuster, New York, NY.
- Bird, C.E. & Rieker, P.P. (1999) Gender matters: an integrated model for understanding men's and women's health. *Soc. Sci. Med.*, **48**, 745-755.
- Borkovec, T.D., Robinson, E., Pruzinsky, T. & DePree, J.A. (1983) Preliminary exploration of worry: some characteristics and processes. *Behav. Res. Ther.*, **21**, 9-16.
- Cabinet Office, Government of Japan. (2004) *Special public opinion poll concerning safety and security*. <http://www8.cao.go.jp/survey/tokubetu/h16-anzen.pdf> (Accessed on October 05, 2007).
- Carmel, S. (2001) The will to live: gender differences among elderly persons. *Soc. Sci. Med.*, **52**, 949-958.
- Carmel, S., Anson, O., Levenson, A., Bonneh, D.Y. & Maoz, B. (1991) Life events, sense of coherence and health: gender differences on the kibbutz. *Soc. Sci. Med.*, **32**, 1089-1096.
- Cleary, P.D., Mechanic, D. & Greenley, J.R. (1982) Sex differences in medical care utilization: an empirical investigation. *J. Health Soc. Behav.*, **23**, 106-119.
- Coleman, J.S. (1990) *Foundations of social theory*. Harvard University Press, Cambridge, MA.
- CRÉDOC (Centre de Recherche pour l'Étude et l'Observation des Conditions de Vie). (1982) *Situation et perception des conditions de vie et qualité de la des Français*, Paris.
- Data archive of Cross-National Comparative Survey of National Character (web site). <http://www.ism.ac.jp/~yoshino/> (Accessed on July 14, 2008).
- Denton, M., Prus, S. & Walters, V. (2004) Gender differences in health: a Canadian study of the psychosocial, structural and behavioral determinants of health. *Soc. Sci. Med.*, **58**, 2585-2600.
- Ellison, C.G. & Levin, J.S. (1998) The religion-health connection: evidence, theory, and future directions. *Health Educ. Behav.*, **25**, 700-720.
- Freeston, M.H., Rhéume, J., Letarte, H., Dugas, M.J. & Ladouceur, R. (1994) Why do people worry? *Pers. Individ. Dif.*, **17**, 791-802.
- Fujisawa, Y., Hamano, T., Nam, E.W., Edirippulige, S. & Koyabu, A. (2005) Preliminary study for relationship between social capital and health status. *Niigata journal of health and welfare*, **14**, 82-89 (in Japanese).
- Hanson, B.S., Ostergren, P.O., Elmståhl, S., Isacsson, S.O. & Ranstam, J. (1997) Reliability and validity assessments of measures of social networks, social support and control-results from the Malmö Shoulder and Neck Study. *Scand. J. Soc. Med.*, **25**, 249-257.
- Harpham, T. (2007) The measurement community social capital through surveys. In *Social Capital and Health* edited by Kawachi, I., Subramanian, S.V. & Kim, D. Springer, New York, NY, pp. 51-62.
- Harpham, T., Grant, E. & Thomas, E. (2002) Measuring social capital within health surveys: key issues. *Health Policy Plan.*, **17**, 106-111.
- Hawe, P. & Shiell, A. (2000) Social capital and health promotion: a review. *Soc. Sci. Med.*, **51**, 871-885.
- Hayashi, C. (1979) *Statistical approach for multidimensional analysis-theory and application*. Research Report No. 44. The Institute of Statistical Mathematics, Tokyo.
- Hayashi, C., Suzuki, T. & Sasaki, M. (1992) *Data analysis for comparative social research: International perspectives*. North-Holland, Amsterdam.
- Hayashi, C., Yoshino, R., Suzuki, T., Hayashi, F., Kamano, S., Miyake, I., Murakami, M. & Sasaki, M. (1998) *Cross-national comparison of seven nations*. Idemitsu shoten, Tokyo (in Japanese).
- Hayashi, F. (2006) A Study of Religious Faith and Religious Feelings. *The Japanese Journal of Behaviormetrics*, **33**, 13-24 (in Japanese).
- Hunt, K. & Annandale, E. (1999) Relocating gender and morbidity: examining men's and women's health in contemporary Western societies. Introduction to Special Issue on Gender and Health. *Soc. Sci. Med.*, **48**, 1-5.
- Hyypä, M.T., Mäki, J., Impivaara, O. & Aromaa, A. (2007) Individual-level measures of social capital as predictors of all-cause and cardiovascular mortality: a population-based prospective study of men and women in Finland. *Eur. J. Epidemiol.*, **22**, 589-597.
- Ichida, Y., Yoshikawa, G., Matsuda, R., Kondo, K., Hirai, H., Saitou, Y., Murata, C., Takeda, T., Ishii, K. & Nakade, M. (2005) Social Capital and Health, *Journal of Public Health Practice*, **69**, 914-919 (in Japanese).
- Kawachi, I. & Berkman, L.F. (2000) Social cohesion, social capital, and health. In *Social epidemiology* edited by Berkman, L.F. & Kawachi, I. Oxford University Press, New York, NY, pp. 174-190.
- Kawachi, I. & Kennedy, B.P. (1997a) The relationship of income inequality to mortality: does the choice of indicator matter? *Soc. Sci. Med.*, **45**, 1121-1127.
- Kawachi, I., Kennedy, B.P. & Glass, R. (1999a) Social capital and self-rated health: a contextual analysis. *Am. J. Public Health*, **89**, 1187-1193.

- Kawachi, I., Kennedy, B.P., Lochner, K. & Prothrow-Stith, D. (1997b) Social capital, income inequality, and mortality. *Am. J. Public Health*, **87**, 1491-1498.
- Kawachi, I., Kennedy, B.P. & Wilkinson, R.G. (1999b) Crime: social disorganization and relative deprivation. *Soc. Sci. Med.*, **48**, 719-731.
- Kawakami, N., Kobayashi, Y. & Hashimoto, H. (2006) *Social disparity and health: the perspective of social epidemiology*, University of Tokyo Press, Tokyo (in Japanese).
- Kim, Y. & Seidlitz, L. (2002) Spirituality moderates the effect of stress on emotional and physical adjustment. *Pers. Individ. Dif.*, **32**, 1377-1390.
- Kondo, K. (2005) *Health Inequality Society*. Igakusyo, Tokyo (in Japanese).
- Krause, N.M. & Jay, G.M. (1994) What do global self-rated health items measure? *Med. Care*, **32**, 930-942.
- Krause, N., Ingersoll-Dayton, B., Liang, J., Sugisawa, H. (1999) Religion, social support, and health among the Japanese elderly. *J. Health Soc. Behav.*, **40**, 405-421.
- Kunitz, S.J. (2004) Social capital and health. *Br. Med. Bull.*, **69**, 61-73.
- Levin, J.S. & Taylor, R.J. (1993) Gender and age differences in religiosity among black Americans. *Gerontologist*, **33**, 16-23.
- Lin, Nan. (2000) Inequality in Social Capital. *Contemp. Sociol.*, **29**, 785-795.
- Lindström, M., Moghaddassi, M., Bolin, K., Lindgren, B. & Merlo, J. (2003) Social participation, social capital and daily tobacco smoking: a population-based multilevel analysis in Malmö, Sweden. *Scand. J. Public Health*, **31**, 444-450.
- Manderbacka, K. (1998) Examining what self-rated health question is understood to mean by respondents. *Scand. J. Soc. Med.*, **26**, 145-153.
- Mathews, A. (1990) Why worry? The cognitive function of anxiety. *Behav. Res. Ther.*, **28**, 455-468.
- Matthews, D.A., McCullough, M.E., Larson, D.B., Koenig, H.G., Swyers, J.P. & Milano, M.G. (1998) Religious commitment and health status: a review of the research and implications for family medicine. *Arch. Fam. Med.*, **7**, 118-124.
- McCullough, M.E., Hoyt, W.T., Larson, D.B., Koenig, H.G. & Thoresen, C. (2000) Religious involvement and mortality: a meta-analytic review. *Health Psychol.*, **19**, 211-222.
- Motohashi, Y., Kaneko, Y. & Yamaji, M. (2005) Social capital and suicide prevention. *Akita Journal of Public Health*, **3**, 21-31 (in Japanese).
- Okabayashi, H., Liang, J., Krause, N., Akiyama, H. & Sugisawa, H. (2004) Mental health among older adults in Japan: do sources of social support and negative interaction make a difference? *Soc. Sci. Med.*, **59**, 2259-2270.
- Okamoto, K. & Tanaka, Y. (2004) Gender differences in the relationship between social support and subjective health among elderly persons in Japan. *Prev. Med.*, **38**, 318-322.
- Pargament, K.L. (2002) The bitter and the sweet: An evaluation of the costs and benefits of religiousness. *Psychol. Inq.*, **13**, 168-181.
- Poortinga, W. (2006a) Social capital: an individual or collective resource for health? *Soc. Sci. Med.*, **62**, 292-302.
- Poortinga, W. (2006b) Social relations or social capital? Individual and community health effects of bonding social capital. *Soc. Sci. Med.*, **63**, 255-270.
- Putnam, R.D. (1993) *Making democracy work. Civic traditions in modern Italy*. Princeton University Press, Princeton, NJ.
- Putnam, R.D. (2000) *Bowling alone. The collapse and revival of American community*. Simon & Schuster, London.
- Read, J.G. & Gorman, B.K. (2006) Gender inequalities in US adult health: The interplay of race and ethnicity. *Soc. Sci. Med.*, **62**, 1045-1065.
- Skrabski, A., Kopp, M. & Kawachi, I. (2003) Social capital in a changing society: cross sectional associations with middle aged female and male mortality rates. *J. Epidemiol. Community Health*, **57**, 114-119.
- Subramanian, S.V., Kim, D.J. & Kawachi, I. (2002) Social trust and self-rated health in US communities: a multilevel analysis. *J. Urban Health*, **79** (4 Suppl 1), S21-34.
- Subramanian, S.V., Lochner, K.A. & Kawachi, I. (2003) Neighborhood differences in social capital: a compositional artifact or a contextual construct? *Health Place*, **9**, 33-44.
- Torossian, M.H. & Biddle, V.R. (2005) Spirituality and healing. *Semin. Oncol.*, **32**, 232-236.
- Verbrugge, L.M. (1976) Females and illness: Recent trends in sex differences in the United States. *J. Health Soc. Behav.*, **17**, 387-403.
- Verbrugge, L.M. (1985) Gender and health: An update on hypotheses and evidence. *J. Health Soc. Behav.*, **26**, 156-182.
- Verbrugge, L.M. (1989) The twain meet: Empirical explanations of sex differences in health and mortality. *J. Health Soc. Behav.*, **30**, 282-304.
- World Health Organization. (1990) *Cancer pain relief & Palliative care*. (Report of a Who Expert Committee) World Health Organization, Geneva.
- World Health Organization. (2002) *WHOQOL-SRPB: Field-Test Instrument-WHQOL Spirituality, Religiousness and Personal beliefs (SRPB) Field -Test Instrument: The WHQOL-100 Questions plus 32 SRPB Questions*. http://www.who.int/mental_health/media/en/622.pdf (Accessed on October 12, 2006)
- World Value Survey. (1995) World value survey codebook. http://margaux.grandvinum.se/SebTest/wvs/articles/folder_published/survey_1995 (Accessed on August 06, 2005)
- Yamaoka, K. (2005) Health and social and cultural factors in East Asia - Analysis of the East Asia value survey and the health and culture survey. *The Japanese Journal of Behaviormetrics*, **32**, 191-199 (in Japanese).
- Yamaoka, K. (2008) Social capital and health and well-being in East Asia: A population-based study. *Soc. Sci. Med.*, **66**, 885-899.
- Yoshino, R. (2002) A time to trust - a study on peoples' sense of trust from viewpoint of cross-national and longitudinal survey on national character-. *Behaviormetrika*, **29**, 231-260.
- Yoshino, R. (2005) *The East Asia value survey -Japan 2004B Survey-*. The Institute of Statistical Mathematics, Tokyo. http://www.ism.ac.jp/~yoshino/jab/sum_e.html (Accessed on June 12, 2008)
- Yoshino, R. (2006) *The East Asia value survey (2002-2005) -Data analysis on people's sense of trust-*. The Institute of Statistical Mathematics, Tokyo.
- Yoshino, R. & Hayashi, C. (2002) An overview of cultural link analysis of national character. *Behaviormetrika*, **29**, 125-141.

Appendix

Draft Translation of the Japanese Questionnaire of Japan2004B Survey (Yoshino, 2005). Question numbers are not original questionnaires. The survey involved a face-to-face interview conducted by interviewers, who recorded their responses.

(Q1) About the following three questions, please see the same card.

a. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?

- 1 Can be trusted
- 2 Can't be too careful
- 8 Other (Please specify: _____)
- 9 Don't Know

(Q2) Would you say that most of the time, people try to be helpful, or that they are mostly just looking out for themselves?

- 1 Try to be helpful
- 2 Look out for themselves
- 8 Other (Please specify: _____)
- 9 Don't Know

(Q3) Please look carefully at the following list of associations or organizations and say... which, if any, do you belong to? (Code all 'yes' answers as 1, if not belong code as 2) (Multi choices)

	Belong	Not belong
a. Groups or association concerning politics	1	2
b. Chamber of commerce and industry and other industrial association		
c. Volunteer group		
d. Civil movement group or consumer association		
e. Religious organization		
f. Group or club for sports		
g. Club for hobby or cultural activities (Chorus, photo, climbing etc)		
h. Group on computer internet		
8 Others (Please specify: _____)		
9 No one		

(Q4) How much confidence do you have in them? Are you very confident, somewhat confident, not confident or not confident at all?

	Very Confident	Somewhat Confident	Not Confident	Not Confident At All	Don't Know
a. Judge and lawyer	1	2	3	4	9
b. Newspaper / TV report					
c. Government official					
d. Politician					
e. Fortune-teller					
f. Medical Doctor					
g. Scientist					

(Q5) Including your family members, how many people do you have such persons as follows?

	Many	Some	Only one	Almost no one	Don't Know
a. Person who lends things or money and helps you.	1	2	3	4	9
b. Person who understands your present feeling and condition					
c. Person who willingly calls or meet each other to consult with.					
d. Person who highly evaluate and respect you.					

(Q6) People may feel uneasy about themselves or their family members from time to time. To what extent do you worry, either for yourself or for your family, about each of the following? (Circle one of the numbers in the column)

	Very much	Somewhat	Slightly	Not at all	Other	Don't Know
	1	2	3	4	8	9
a. Serious illness						
b. Car accident						
c. Unemployment						
d. War						

(Q7) Do you usually care about each of the following things?

	Very much	Some what	Not at all	Don't Know
	1	2	3	9
a. Lucky or unlucky number				
b. Jinxes				
c. Nightmare				
d. Unlucky direction (aspect)				

(Q8) Without reference to any of the established religions, do you think a religious mind is important, or not important?

- 1 Important
- 2 Not important
- 8 Other (Please specify: _____)
- 9 Don't Know

(Q9) There are some opinions about human life and death. What do you think about each of them?

	Agree	Disagree	Depends on
	1	2	3
a. I have a feeling that some invisible power controls my life.			
b. Destiny beyond the human power is manifest to when and where we are to be born and die.			
c. After death, they are reborn repeatedly.			
d. One keeps living as a part of the nature even after they dies.			
e. I'll try everything I can do for the progress and happiness of all humanity			
f. I have ever thought that I could devote myself to someone else.			

Demographics

F1

- 1 Male
- 2 Female

F2 How old are you? _____ Years old

F3 What is the last school from which you graduated?

(If you dropped out or still in the school, please consider yourself graduated)

- 1 Primary or secondary school
- 2 Senior high school
- 3 Two-year college
- 4 Four-year college, university, or graduate school
- 9 Don't Know

F5 Would it be possible for you to tell me to which one of the following categories your family belongs in terms of the last past year's income before taxes including bonus?

- | | |
|--|---|
| 1 Less than 2,000,000 yen | 6 10,000,000 yen — Less than 15,000,000 yen |
| 2 2,000,000 yen — Less than 4,000,000 yen | 7 15,000,000 yen — Less than 20,000,000 yen |
| 3 4,000,000 yen — Less than 6,000,000 yen | 8 Over 20,000,000 yen |
| 4 6,000,000 yen — Less than 8,000,000 yen | 9 Don't Know |
| 5 8,000,000 yen — Less than 10,000,000 yen | |