

## Social Capital and Health in Malaria-prevalent Areas of the Solomon Islands

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### ABSTRACT

Social capital and health have drawn much attention in public health. Employing three models, this study examines relationships between vertical/horizontal/comprehensive social capital, self-rated health, malaria infection, as well as health-related behaviors/attitudes. In Model 1, odds ratios were calculated to scrutinize the relationships between component variables of social capital and “Self-rated health,” one by one. In Model 2, the variable “Health,” which combined “Self-rated health” and malaria infection, was used in lieu of “Self-rated health” in Model 1. Lastly, Model 3 utilized three composite measures of social capital and examined their associations with health, and health-related behaviors/attitudes.

Model 1 highlighted associations between some of the components of vertical social capital and self-rated health, whereas, in Model 2, it was elucidated that some of the constituent factors classified as horizontal social capital have significant relationships with “Health.” The most comprehensive approach in this study, Model 3, found significant associations between: Horizontal Social Capital (HSC) and “Health”; HSC and infection with malaria; and Vertical Social Capital (VSC) and malaria infection. In addition, Comprehensive Social Capital (CSC) and “Health,” CSC and malaria infection, and, finally, CSC and “Feeling threatened by malaria in the community” were found to be significantly associated.

In conclusion, the three methods employed in this study indicated some significant associations between social capital (or its components) and health outcomes in general and social capital and malaria infection in particular. It is noteworthy that Model 3 resulted in demonstrating significant relationships between HSC, VSC, respectively on the one hand, and malaria infection, on the other. Hence, developing social capital should possibly help deal with or reduce malaria infection, particularly in nations where other resources are scarce.

### INTRODUCTION

Social capital is a concept whose precedents can be traced as far back as the works of Emile Durkheim, who scrutinized the impacts of social solidarity on suicide rates in the 19th century. Durkheim claimed that there was an inverse relationship between the level of social solidarity and the suicide rate: that is, simply put, the higher the social solidarity, the lower the suicide rate would be (3), which is a theme that can also be seen in some of recent studies on social capital (11). Subsequently, in 1916, L. J. Hanifan coined the term “social

capital” to refer to “tangible substances in social interactions that make life satisfying for the individuals in the community” (8). Despite the long existence of the term “social capital,” it was Robert D. Putnam who, by and large, contributed to the dissemination of the concept of social capital—as we know it today—along with its significance, to a wider range of people, including those in the academia and international organizations alike. His widely accepted definition of the term can be summarized as “connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them” (22).

Being a broad concept, social capital can be analyzed from multiple perspectives, and, accordingly, its typology may vary. Some researchers/scholars have based the classification of the concept on the size or the scale of measurement. In this scheme, country or regional levels are categorized as *macro*, as seen in some studies by Kim *et al.* and Lindström (13) (16), neighborhood levels as *meso*—including the studies by Friedman *et al.* and Schultz *et al.* (4) (24)—social networks as *micro*, and personal or psychological levels as *individual*, exemplified by Hyppä's and Scheffler's studies (9) (23).

On the other hand, some researchers use the categories of bonding and bridging/linking social capital, as well as the related concepts of vertical and horizontal social capital. According to Putnam, vertical social capital is the link or the bridge between, e.g., individuals and formal-authoritative institutions, such as the official forms of government, including, e.g., nationally-run health facilities, and connects heterogeneous groups or people of diverse characteristics; horizontal social capital, on the other hand, creates cohesion and binds individuals and groups of similar characteristics together: i.e., it connects homogenous groups (22). Some studies focusing on particular settings—such as a workplace, exemplified by the study of Sun's *et al.*—may be classed into this category (25). Closely related to the notions of bonding and linking social capital, some studies have investigated the “epidemiology of participation,” which illuminates the importance of social participation in health (2).

Notwithstanding these typological variations, for the past few decades, the concept of social capital in its widest sense of the term in general and its relationship with health in particular have attracted much attention from professionals in various fields including those not only in public health and medicine but also in social sciences. As a manifestation of such a tendency, a number of studies have emerged in recent years on social capital and its implications on health status of people. Some of these studies have demonstrated cogent associations between social capital and health. For instance, Kim and Kawachi found evidence suggesting protective effects of U.S. State-level social capital on health-related quality of life (13). Moreover, Fujiwara and Kawachi, utilizing data on two groups composed of monozygotic and dizygotic twins in the United States, found that, for both groups, social trust had a positive effect on self-rated physical health, while, in contrast, sense of belonging had a significant association with perceived mental health among dizygotic twins only (6). In addition, another study by Sun *et al.* reported a significant association between lack of neighborhood cohesion among the poor and poor self-rated health, among the poor subsample (25). These studies have certainly contributed to enhancing our understanding of the relationships between social capital and health.

It is important to point out, however, that there have been comparatively fewer studies dealing with social capital and health in the context of developing countries, even though the number of such studies is on the rise, particularly from such nations as the People's Republic of China, as exemplified by the work of Yip *et al.* (30). Taking such a relative scarcity into account, this study examines social capital and health in one of the economically developing

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nations: the Solomon Islands—composed of 511,000 citizens (28)—a Melanesian country which gained its independence in 1978. Reportedly, the health expenditure per citizen in the country was approximately \$50 a year in 2007 (28). Malaria is prevalent in the Solomon Islands, and the country is known as holoendemic in terms of malaria, for almost everyone at some point gets infected with the disease (11). Three areas with active malaria-related projects have been selected as the fields for this study. To the authors' knowledge, there have been few studies dealing with social capital and health in the country.

The questions addressed in this study are as follows: (1) Are there significant relations between individual components of social capital and self-rated health, and between social capital and self-rated health plus malaria infection; (2) Do respective components of social capital have similar relationships with health indicators; and (3) As social capital can be seen as aggregate variables, which encompasses multiple (sub)variables in the single notion, would the employment of composite measures of social capital result in similar outcomes as those utilizing individual components of social capital?

### MATERIALS AND METHODS

This study utilizes the data collected from 613 respondents in the Solomon Islands in 2007. Of the 613 participants, 320 or 52.2 percent are from the Honiara area, 84 or 13.7 percent from the Tangarare area, and 209 respondents or 34.1 percent are from the Tetele area, all of which are part of the country where organizations supporting international cooperation, such as the Japan International Cooperation Agency (JICA), have implemented projects to control malaria—implicating the gravity of the illness. Available data on malaria infection per 1,000 illuminate some conditions with regard to the health status of the people: 172 in Honiara, 69 in Tangarare, and 356 in Tetele areas, while in the entire country, the prevalence in 2001 was 131 (unpublished data obtained through personal communication with a staff member from the Ministry of Health and Medical Service of the Solomon Islands)—which, though still high, is a remarkable drop from 455 in 1992.

In this study, male respondents constitute 289 or 47.1 percent of the total, while 324 or 52.9 percent are female counterparts. The mean age of the respondents is 34 years. With regard to education, 123 respondents (20.1 percent) reported not having finished primary education; 204 respondents (33.3 percent) have selected the item “Graduated from primary school,” while 213 respondents (34.7 percent) reported to have completed secondary education. Finally, 73 individuals (11.9 percent) had education higher than secondary education.

For evaluating relationships between social capital, health-related behaviors/attitudes, and health, three models have been constructed, while utilizing the categories of horizontal and vertical social capital. First, in Model 1, associations between individual components of social capital and self-rated health were analyzed. This model employs 11 individual components of horizontal social capital. Specifically, the responses to the following items pertinent to horizontal social capital in the questionnaire were utilized in the analyses: “Do you agree with the idea that family and close friends are important?” “In the past one year, how many times have you been appreciated for doing a favor to any of your family members, friends, or “one-talks” (which is defined, locally, as those from the same area and speak the same language)?” “Do you belong to a church group or a community committee?” “How many neighbors can you consult with, when you have a problem?” “Have any of your family members, friends, or relatives helped you in the past one year?” “In the past one year, have you helped any strangers?” “How many people with whom do you have a chat or a small talk in a day?” “In the past one year, has any stranger helped you?” “Have you contributed or

donated to your church?” “Did you vote in the election of 2006?” and “Do you think helping visitors out is important for everyone?”

In addition, Model 1 takes advantage of four component variables of vertical social capital. Namely, for vertical social capital, the following items were included in the analyses: “Are you satisfied with the health facility’s diagnosis and treatment for malaria?” “Are you satisfied with the explanation about malaria given at the health facility?” “Are you satisfied with the opening hours of the health facility?” and “Do you trust the quality of the malaria-related services provided by the health facility?” All of these questions have been interpreted to contain elements of trust in healthcare facilities, which has also been studied by some researchers (20).

In Model 1, each of these components classified as horizontal or vertical social capital has been analyzed in terms of its association with the variable “Self-rated health.” “Self-rated health” is a health indicator, which has been utilized in a number of studies to measure health status (19) (21) (24) (29). Specifically, this variable is in response to the question in the survey, “How would you describe your general health?” to which the respondents could select one from the following four answer choices: “Very good,” “Good,” “Fair,” or “Poor.” The outcome of this question was converted into a binary variable by combining the answer choices “Very good” with “Good,” (n=465) and “Fair” with “Poor” (n=148). Treating this item as a binary variable indicating health status, each of the aforementioned social capital-related variables—both horizontal and vertical—was independently employed to examine its possible association with the respondent’s health status, in terms of odds ratios.

However, for broadening the health outcome, Model 2 makes use of another health indicator, “Health.” “Health” is a variable based not only on “Self-rated health” but also on the “Malaria infection in the past one year.” The sample population was divided into two groups: the first group is composed of the respondents who either answered “Poor” in “Self-rated health” or those who indicated that they had been infected with malaria at least once in the preceding 12 months (n=445); the other group, on the other hand, consists of the respondents who reported neither “Poor” in “Self-rated health” nor any malaria infection during the past one year period (n=168); thus, the two groups—i.e., one not healthy group and the other not unhealthy (or possibly healthy group)—were extrapolated for analyses. While utilizing this binary variable of “Health,” relationships between individual components of horizontal and vertical social capital (the same variables used in Model 1) and “Health” were scrutinized.

In Model 3, associations between composite social capital variables, on the one hand, and health-related behaviors/attitudes and health status, on the other, were analyzed. The 11 components pertinent to interpersonal relations or horizontal social capital used in Model 1 and Model 2 were integrated into a composite variable that is a cumulative rank variable, ranging from the lowest of 0 to the highest of 11. If, for instance, a respondent thinks helping visitors out is important, he/she gets one point; if he/she has five or more neighbors to consult with when he/she has a problem, he/she receives another point, whereas if he/she has less than four neighbors for consultation, he/she does not get a point. Likewise, if the respondent belongs to a church group or a community committee, he/she receives one point. In other words, one point was cumulatively assigned to the respondent for each of the 11 social capital questions, when the answers were affirmative with regard to the presence of social capital, resulting in each respondent having a level of horizontal social capital ranging from 0 to 11—which is a rank variable. Thus, the higher the value, the higher the level of social capital the respondent has.

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Subsequently, this rank variable—that of horizontal social capital—was converted into a binary indicator by dividing the entire group with a cut-off point: those with a low level of social capital—that is, 0-6 points (n=377)—and the rest with a relatively high degree of social capital—those in the range of 7-11 points (n=236). This binary variable, Horizontal Social Capital (HSC), was utilized to illuminate the relationships between horizontal social capital and health as well as health-related behaviors/attitudes. To reckon the associations, odds ratios were calculated.

Model 3 includes not only HSC as described above, but also an indicator for vertical social capital. In the manner similar to the aforementioned composite HSC variable, a rank variable for vertical social capital was formulated using the four pertinent items in the questionnaire already articulated in the section describing Model 1. Subsequently, the resulting rank variable has been converted into a binary variable: one group with a low level of social capital having three points or fewer (n=191), and the other with a high level of vertical social capital possessing four points (n=422). This variable, entitled Vertical Social Capital (VSC), was utilized to delve into its associations with health and health-related behaviors/attitudes.

The last part of Model 3 is the analyses involving comprehensive social capital, which takes into account both HSC and VSC indicators. The aforementioned rank variables on HSC and VSC have been combined for ranking/measuring each respondent's level of overall social capital. Subsequently, this variable was dichotomized into a low social capital group (0-10 points: n=503) and a high social capital group (11-15 points: n=110). This binary indicator, Comprehensive Social Capital (CSC), is the most inclusive social capital variable in this study, and was utilized to examine associations with health-related indicators.

### RESULTS

In Model 1, which scrutinized the relationships between components of social capital, as well as health-related behaviors/attitudes, and health, the variables in the following were found to be significantly associated with “Self-rated health”: “Trust in health facility” (OR: 2.017; CI: 1.136-3.579), “Satisfaction with opening hours of health facility” (OR: 2.440; CI: 1.355-4.396), and “Satisfaction with diagnosis and treatment of malaria” (OR: 2.494; CI: 1.280-4.860) were discerned to have significant associations with “Self-rated health.” There were, however, components of social capital that did not demonstrate cogent associations with “Self-rated health.” For instance, “Number of people to chat with” (OR: 1.119; CI: 0.563-2.221) which has five as the cut-off point, “Helped by family members” (OR: 1.439; CI: 0.436-4.747), “Agrees with the idea that family, friends, and acquaintances are important” (OR: 1.255; CI: 0.241-6.536) are only a few of the variables that did not result in significant associations. See Table I for the results.

**Table I:** Associations between component variables of social capital and self-rated health (N=613). (Utilizing odds ratios, Model 1 analyzed relationships between the above variables and self-rated health individually.)

Variables	OR	95% CI
Horizontal social capital		
Agrees that family, friends, and acquaintances are important	1.255	0.241-6.536
Appreciated by family members, friends, and acquaintances	0.457	0.056-3.749
Belongs to church or committee	1.132	0.715-1.791
Donation to church	0.921	0.482-1.762
Having at least one neighbor to consult with	0.765	0.395-1.482
Helped by family members, friends, etc.	1.439	0.436-4.747
Helped by strangers	0.796	0.509-1.246
Helped strangers	2.825	0.696-11.466
Number of people to chat with (more than 5 per day)	1.119	0.563-2.221
Participation in election	0.922	0.559-1.520
Thinks that to help visitors out is important	2.110	0.349-12.748
Vertical social capital		
Satisfaction with diagnosis and treatment of malaria	2.494	1.280-4.860
Satisfaction with explanations on malaria	1.821	0.946-3.506
Satisfaction with opening hours of malaria-related health facility	2.440	1.355-4.396
Trust in health facility	2.017	1.136-3.579

Table II, on the other hand, lists notable results obtained in Model 2. This model analyzed relationships between individual components of horizontal social capital, vertical social capital, health-related behaviors/attitudes, and “Health” which consists not only of “Self-rated health” but also “Malaria infection in the past one year.” Consequently, the following variables were found to have significant associations: “Appreciated by family members, friends, or acquaintances for doing a favor” (OR: 4.510; CI: 1.065- 19.098), “Donation to church” (OR: 2.256; CI: 1.293-3.937) “Having at least one neighbor to consult with” (OR: 2.229; CI: 1.292-3.845), “Helped by strangers at least once” (OR: 0.611; CI: 0.391-0.952) all of which have been classified as components of horizontal social capital.

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**Table II:** Associations between components of social capital and “Self-rated health” plus “Malaria infection in the past one year” (N=613). (In Model 2, the constituents of social capital in relation to the variable, which combines “Self-rated health” and malaria infection in the past one year, are scrutinized.)

Variables	OR	95% CI
Horizontal social capital		
Agrees that family, friends, and acquaintances are important	1.055	0.203-5.493
Appreciated by family members, friends, or acquaintances for doing a favor	4.510	1.065-19.098
Belongs to church or committee	0.876	0.554-1.385
Donation to church	2.256	1.293-3.937
Having at least one neighbor to consult with	2.229	1.292-3.845
Helped by family members, friends, etc	1.087	0.556-2.127
Helped by strangers at least once	0.611	0.391-0.952
Helped strangers	0.857	0.171-4.298
Number of people to chat with (more than 5 per day)	1.615	0.863-3.023
Participation in election	1.424	0.909-2.229
Thinks that to help visitors out is important	4.027	0.667-24.317
Vertical social capital		
Satisfaction with diagnosis and treatment for malaria	1.125	0.534-2.370
Satisfaction with explanations on malaria	1.100	0.540-2.239
Satisfaction with opening hours of malaria-related health facilities	1.192	0.626-2.270
Trust in malaria-related services	1.566	0.865-2.834

In Model 3, the HSC variable exhibited significant associations with both “Health” (OR: 1.695; CI: 1.158-2.480) and “Malaria infection in the past one year” (OR: 1.547; CI: 1.059-2.259), but not with “Self-rated health” (OR: 1.999; CI: 0.816-4.899). Furthermore, when it came to the composite vertical social capital, “Malaria infection in the past one year” (OR: 2.376; CI: 1.644-3.433) demonstrated a significant association. VSC also had a significant association with “Visiting health facility more than 2 times per year” (OR: 2.291; CI: 1.554-3.378). For CSC, “Health” (OR: 1.876; CI: 1.114-3.159) and “Malaria infection in the past one year” (OR: 1.967; CI: 1.169-3.310) have been found to have significant associations. Table III juxtaposes the results.

**Table III:** Associations between composite social capital variables and health outcomes, as well as those between health-related behaviors/attitudes and health outcomes (N=613). (Unlike Model 1 and Model 2, Model 3 employs three kinds of composite social capital variables—namely, horizontal, vertical, and horizontal-vertical combined.)

Variables	OR	95% CI
Horizontal social capital (HSC) and health		
Health	1.695	1.158-2.480
Infection with malaria in the past one year	1.547	1.059-2.259
Self-rated health	1.999	0.816-4.899
HSC and health-related behaviors/attitudes		
Feeling threatened by malaria	1.473	0.955-2.271
Use of a net to avoid mosquitoes	1.230	0.799-1.894
Visiting health facility more than two times per year	1.414	0.950-2.103
Vertical social capital (VSC) and health		
Health	1.187	0.708-1.991
Infection with malaria in the past one year	2.376	1.644-3.433
Self-rated health	2.630	0.762-9.085
VSC and health-related behaviors/attitudes		
Feeling threatened by malaria	0.743	0.482-1.146
Use of a net to avoid mosquitoes	0.888	0.565-1.395
Visiting health facility more than two times per year	2.291	1.554-3.378
Comprehensive Social capital (CSC)		
Health	1.876	1.114-3.159
Infection with malaria in the past one year	1.967	1.169-3.310
Self-rated health	1.549	0.551-4.356
Comprehensive Social capital (CSC) and health-related behaviors/attitudes		
Feeling threatened by malaria	2.103	1.112-3.978
Use of a net to avoid mosquitoes	1.617	0.885-2.957
Visiting health facility more than two times per year	1.432	0.846-2.424

Model 3 utilized the composite social capital measurements—HSC, VSC, and CSC. This model indicates significant associations between HSC on the one hand and health and malaria infection on the other. In contrast, VSC was found to be significantly associated with malaria infection, but neither with self-rated health nor with “Health,” a more comprehensive notion of health than self-rated health or malaria infection, individually. The combined version of social capital employing both HSC and VSC revealed its significant relationships with health and malaria infection. None of the composite social capital indicators demonstrated significant associations with self-rated health per se, however.



## DISCUSSION

For the purpose of this discussion, the above outcomes can be summarized as follows. Significant associations between some components of vertical social capital and self-rated health have been found in Model 1. However, when malaria infection was incorporated into “Self-rated health” in Model 2, only some of the horizontal social capital components demonstrated significant associations with the health indicator. Hence, incorporating malaria infection into health indicator did make a difference in the results, even though the other conditions had been kept identical. Finally, in Model 3, composite measures of social capital elucidated that there were significant associations between the composite HSC variable, on the one hand, and “Health,” and infection with malaria, on the other, respectively. Moreover, there was a notable association between the composite VSC variable and malaria infection. Finally and most comprehensively, significant associations were found between CSC and “Health” as well as infection with malaria. To summarize, each model demonstrated some evidence of social capital's impacts on health—either at the component level (in Model 1 and Model 2) or the composite level (in Model 3).

What can we derive from these results? In Model 1, it became evident that only some components of vertical social capital are significantly associated with self-rated health. Taking into account the results of Model 2 may illuminate further insights. That is, not all components of social capital have health-promoting effects. In particular, “Appreciated by family members, friends, or acquaintances for doing a favor” and “Helped by strangers at least once” showed clearly contrasting results: even though both of these variables are about help and not only are important constituents of social capital, but are also part of reciprocity to some extent, the former had results indicating that the more appreciation one gained, the more likely he/she is healthy, while, in the latter, the relationship was reversed: the healthy individuals are less likely to be helped by strangers than the non-healthy people. Thus, it became clear that not all components associated with social capital have relationships with health-related variables in a health-promoting or health-affirmative manner.

In effect, some may have a reversed relationship as in the above case. In this specific example, it can be interpreted that the healthy individuals can afford to help others, but, in contrast, the not-so-healthy people tend to need help more than they are able to offer help to others. In other words, it may sensibly be conjectured that those having a lower health status tend to have more needs for assistance, and, hence, more opportunities to be helped by others. In contrast, the healthier individuals are more independent in terms of looking after their own daily life chores and responsibilities, and, thus, require less help from others. Therefore, according to this interpretation, they ended up getting less help from others.

In addition, Model 3—the most comprehensive model of the three—attests to the importance of social capital on malaria infection in this study. It is remarkable that Model 3 consistently confirmed the significant relationships between social capital and malaria infection. In fact, of the three health indicators in Model 3—that is, self-rated health, malaria infection, and health—malaria infection is the only variable found to be significantly associated with each of the composite social capital variables—namely, HSC, VSC, and CSC. These outcomes may offer an important clue as to the prevention and management of malaria, which is a serious issue in many developing nations, by highlighting the possible usefulness of social capital.

Taking into account the above outcomes, it is suggested that social capital should be one of the important preventive and managerial keys in reducing the burden of malaria infection. The role of social capital in preventing infection has been studied by fewer researchers than those who have studied that of social capital in lifestyle-related diseases. Nonetheless, in

the study carried out in Tanzania, for example, Frumence et al. found social capital to be effective in reducing HIV infections (5). It would not be a surprise to see the impacts of social capital on other infectious diseases, such as malaria, not just in terms of incidence and prevalence, but also with regard to prognosis and recovery. In this study, the results of Model 2 and Model 3 buttress the importance of social capital in malaria infection.

How does social capital promote health? Social capital can facilitate and encourage the dissemination of health-promoting information. For example, the associations between components of horizontal social capital and health in Model 2 can be attributed to the dissemination of preventive information through the network created by social capital. That is, when one is closer to one's family members, friends, and neighbors—it can be inferred—it is likely that there is more dissemination and exchange of information related to, e.g., geographical risk zones and safe areas with regard to malaria, which transmits through mosquitoes: simply put, the more horizontal social capital there is, the more information/knowledge dissemination may take place, which may help prevent or reduce certain illnesses including malaria.

From a methodological perspective, advantages to employing the three models in this study are at least twofold. The difference between Model 1 and Model 2 is specifically the health indicators—i.e., self-rated health in Model 1 versus self-rated health plus malaria infection in Model 2. Malaria—a persistent issue in the country—is a mosquito-borne infection, and has not conventionally been studied in its relationship with social capital. Yet, it can be hypothesized that social capital can influence prevalence and incidence of certain infectious diseases, not only through dissemination of information, which may have preventive effects, but also via social interactions/contacts, whose effects may be either positive or negative.

By separating Model 1—without specific inclusion of malaria—and Model 2, containing malaria infection as a specific item, the authors deemed it possible to highlight social capital's impact or lack of it on malaria infection, whose spread can be affected by a number of factors, such as vector control (27), anti-malarial drugs, behavioral patterns, geographic factors, preventive practices, and knowledge which can be imparted by significant others, peers, and sometimes even strangers. Moreover, analyzing relationships between components of social capital and health indicators as in Model 1 as well as Model 2 allowed us to see that not all variables classified as social capital may be related to health indicators in similar ways. If there is a relationship, it is important to see how the components and composite variables relate to health variables—either in a health promoting or exacerbating manner or direction.

As expected, utilization of multiple models resulted in some differences in outcomes. For instance, how can one explain the associations between some components of vertical social capital and self-rated health in Model 1, on the one hand, and those of some individual components of horizontal social capital and health in Model 2, on the other? Though there may be many possible interpretations, “Self-rated health” might have conjured up a longer term image or memories related to one's own health than “Malaria infection in the past one year,” when the respondents answered the questionnaire. In other words, it can be surmised that health, based on a longer-term assessment—namely, self-rated health—requires a cultivation of trust—that takes place over time—in healthcare facilities, which, in this case, are the authoritative entity bridged by social capital.

Then a question may arise as to the validity of self-rated health, which is used in Model 1. Some studies on social capital and health have found self-rated health a valid indicator for measuring health status (6) (13) (28). Self-rated health indeed has been utilized as a

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convenient tool to assess health status. Mohan et al., for instance, have found self-rated health to be useful in estimating health-adjusted life expectancy among newly diagnosed prostate cancer patients (19). The results of Model 1 in this study, which examined individual components of social capital and self-rated health, attest to associations between some components of vertical social capital and self-rated health.

Nonetheless, the results obtained from Model 3, which scrutinized composite social capital and health-related outcomes and behaviors/attitudes, were not congruent with the outcomes of Model 1: no significant associations were found between social capital and self-rated health. The concept of *gestalt*—the whole is greater than the sum of its parts—may be applicable in this instance. Yet, to see the direction to which individual components influence health status, the method employed in Model 1 and Model 2 is as essential as that of Model 3 in illuminating the impact of social capital on health variables at composite levels.

It is possible that the extent to which self-rated health can be employed as a proxy for measuring health status may vary depending upon medical as well as various social and cultural factors, including national and/or regional characters. For example, hypothetically, a people in one country or region may be more optimistic about their own health than another population in another country or region, even when the health conditions of the two peoples, in quantifiable ways, are remarkably similar. That is, at the individual level, for example, one's interpretation of one's own health status may be unlike another's, even when the two have exactly the same measurements in health-related indicators, such as blood pressure level, blood glucose level or any other physiological or biomedical measurements, which may affect quality of life. Evaluation of one's own health condition may differ cross-culturally as well as individually. Melby et al., for instance, found a remarkable difference in symptom reporting at menopause among Japanese, North American, and Australian studies (18). Similarly, cross-cultural differences may exist in perception of health in term of other physiological events as well.

Moreover, physical response to mental stress may also differ according to socio-cultural as well as individual factors. For example, Arthur Kleinman has described that Chinese and East Asian peoples are more likely to develop somatic symptoms in response to stress (14). It can be hypothesized that such differences based on society, culture, ethnicity or nationality may exist with regard to the perception of self-rated health. The resultant differences may be greater and more pronounced, when international comparisons involving two or more nations or peoples are carried out than when groups of people with geographical proximity as well as socio-cultural closeness are compared.

Supplementary analyses revealed some interesting significant associations. For example, using the methods employed in Model 1 and Model 2, relationships between education and individual components of social capital were examined. The results indicated significant associations between education, on the one hand, and “Participation in election” (OR: 2.130; CI: 1.391-3.260) “Donation to church” (OR: 2.891; CI: 1.597-5.235) and “Belongs to a church group or a community committee” (OR: 1.588; CI: 1.060-2.380) on the other. The method utilized in Model 3, on the other hand, illuminated that education was significantly associated not only with high level of HSC (OR: 1.474; CI: 1.061-2.048) but also with high level of CSC (OR: 1.749; CI: 1.140-2.684). All of these indicate that education is likely to foster or is buttressed by at least some components of social capital. Other socio-economic indicators available for this study did not yield significant associations with social capital. Nonetheless, not to mention social capital and its relations with

education and health, further analyses with other data sets on how socio-economic factors relate to social capital variables may offer additional insights.

One unique characteristic of this study is its use of composite measures in the third model. Detailed explanations on the usefulness of composite measures are offered by Babbie and Halley (1). Composite measures are created through combining multiple constituents, all of which represent a single concept. The method is not entirely new to epidemiologic studies. For examining socio-medical conditions, for instance, there are some studies utilizing composite measures: e.g., behavioral aspects of children with neurofibromatosis Type 1 (9), and multiple sclerosis (7). Yet, it seems that few have taken advantage of the method in terms of social capital and health. Nevertheless, many researchers, in effect, have pointed out social capital's broad and comprehensive properties. One may even argue that the concept of social capital can be conceived of as a cumulative one. For this reason, the application of composite measures for social capital in designing Model 3 is not only appropriate but also highly complementary for the purpose of this study: With the data available for this study and considering the nature of social capital, the composite measurements were one of the best-suited methods to be employed for the purpose of this study.

One limitation of this study is its relatively small sample size, which limits the extent to which inferences can be made about the population. This study incorporated responses from 613 people in Honiara, Tangarare, and Tetele areas. It is expected that studies with larger samples representing the entire Solomon Islands will one day be available. Moreover, in the future, it is hoped that culture-specific social capital indices be created. Does social capital in Brazil, for example, manifest in the same way as it does in Australia, China, France, Japan, Madagascar, Sweden, or Tanzania, only to name a few? To overcome the cross-cultural differences in scientific endeavors, interdisciplinary as well as international collaborations are necessary.

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