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RELATIONSHIP OF SOCIAL PROBLEM-SOLVING ABILITY WITH INTERPERSONAL RELATIONSHIPS:
A PROSPECTIVE STUDY AMONG JAPANESE WOMEN AND MEN

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Summary.—The present study of a Japanese sample used a prospective approach to examine the relationship between self-rated social problem-solving ability and quality of interpersonal relationships. The Japanese versions of the Problem-Solving Self-Efficacy Scale, Problem-Solving Skills Scale, and the Interpersonal Relationship Inventory short form were administered to 139 female and 148 male Japanese college students, who participated in two sessions separated by 6-weeks (Time 1 and Time 2). Partial correlations controlling for scores on the interpersonal relationship scales at Time 1 indicated that self-ratings of social problem-solving ability were correlated with aspects of interpersonal relationships assessed at Time 2, and this relationship was stronger for men (five of six correlations were significant) than for women (two of six correlations were significant).
Social problem-solving is defined as the self-directed cognitive-affective-behavioral process through which a person attempts to identify or discover effective ways of coping with problems in everyday living (D'Zurilla, Nezu, & Maydeu-Olivares, 2004; D'Zurilla & Nezu, 2007). This ability consists of two major components: (1) problem orientation and (2) problem-solving skills (D'Zurilla, *et al.*, 2004; Nezu, 2004; D'Zurilla & Nezu, 2007). Problem orientation is the motivational aspect of the process, involving the operation of a set of cognitive-emotional schemas which reflect a person's general beliefs, appraisals and feelings about daily problems and one's own problem solving ability. Problem-solving skills refer to the core cognitive-behavioral activities that people engage in when attempting to understand and manage or cope with daily problems.

Social problem-solving can affect psychological well-being and adjustment (D'Zurilla, *et al.*, 2004; D'Zurilla & Nezu, 2007). One's social problem-solving ability is associated with the ability to handle various problems effectively in everyday living, including interpersonal problems (D'Zurilla, *et al.*, 2004; D'Zurilla & Nezu, 2007). It also has been found that this ability is related to interpersonal competence (D'Zurilla, Nezu, & Maydeu-Olivares, 2002; Sumi, 2011). Dealing well with interpersonal problems should be associated with healthier interpersonal relationships (Heppner, Hibel, Neal, Weinstein, & Rabinowitz, 1982; Elliott, Grant, & Miller, 2004), which are themselves associated with psychological well-being and adjustment (Felce & Perry, 1997; Cohen, 2004; Helliwell & Putnam, 2005).

Several previous studies have shown relationships between social problem-solving and various aspects of interpersonal relationships (Elliott, *et al.*, 2004; Heppner, Witty, & Dixon, 2004; Elliott & Hurst, 2008). Of these aspects, social support has probably received the most...
attention. Some studies have shown that effective problem solvers are more likely to report higher levels of social support (Elliott, et al., 2004; Heppner, et al., 2004; Elliott & Hurst, 2008). Greater social problem-solving ability would therefore predict a better quality of interpersonal relationships (D'Zurilla, et al., 2002), although this possibility requires more research, as the relationship between problem solving and various aspects of interpersonal relationships remain poorly understood.

Researchers have pointed out the necessity of examining the temporal relationship between prior social problem-solving and future well-being in order to clarify the role of social problem-solving on well-being (D'Zurilla, Chang, & Sanna, 2004; Heppner, et al., 2004). An understanding of this role would be advanced by research showing a temporal relationship between social problem-solving and subsequent quality of interpersonal relationships. However, most of previous studies looking at a relationship between the two constructs have utilized a cross-sectional design (see Elliott, et al., 2004; Heppner, et al., 2004) that in general is insufficient for examining temporal relationship. In order to examine a temporal relationship, it is necessary to utilize a prospective design where the two constructs are measured at baseline and the quality of interpersonal relationship is measured again after a certain time; such a design would allow for an examination of the temporal relationship while controlling for the variance associated with quality of interpersonal relationships reported at the time that social problem-solving was assessed.

Previous research has suggested associations of social problem-solving with demographic variables (D'Zurilla, et al., 2002; Rich & Bonner, 2004). Although there is little agreement on sex differences in social problem-solving that are common across different samples (Heppner, et al., 2004; Rich & Bonner, 2004), some studies have reported sex differences in components of
social problem-solving ability (e.g., D'Zurilla, Chang, Nottingham, & Faccini, 1998; D'Zurilla, Maydeu-Olivares, & Kant, 1998; Maydeu-Olivares, Rodriguez-Fornells, Gomez-Benito, & D'Zurilla, 2000; Calvete & Cardenoso, 2005). The results of these studies have generally shown that particularly in adolescents, men tend to be more positively (or less negatively) problem oriented than women. Additionally, it has been commonly assumed that in response to stressful daily problems, men tend to be more problem-solving oriented, while women respond more emotionally (Heppner, et al., 2004; Rich & Bonner, 2004; Helgeson, 2012). In light of the findings and assumption, social problem-solving ability may be associated with fewer interpersonal problems for men compared with women, which in turn would also be related to better quality of interpersonal relationships.

The present study investigated the temporal relationship between social problem-solving ability and the subsequent quality of interpersonal relationships among women and men by using a prospective design. Participants in this study were Japanese college students. The ability was assessed according to the two components, problem orientation and problem-solving skills. Social support, reciprocity in exchange of support, and interpersonal conflict were aspects of interpersonal relationships that were also examined in the present study.

Before investigating the temporal relationship, sex differences in social problem-solving ability and interpersonal relationships were examined. Since as mentioned above these differences might be associated with differences between women and men in the temporal relationship, a grasp of sex differences in each construct could promote an understanding of the temporal relationship. On the basis of the foregoing findings and assumption, it was hypothesized that men would have greater social problem-solving ability than women. Therefore, scores for the ability were expected to be significantly higher for men than for
women. On the other hand, given that previous studies have been inconsistent on sex differences in the three aspects of interpersonal relationships (Tilden, Nelson, & May, 1990; Sumi, 2003), these differences were not expected.

In light of the previously mentioned findings on the association between social problem-solving ability and interpersonal relationships (e.g., D'Zurilla, et al., 2002; Elliott, et al., 2004; Heppner, et al., 2004; Elliott & Hurst, 2008), it was hypothesized that social problem-solving ability would be positively related to the subsequent quality of interpersonal relationships. Thus, it was expected that significant partial correlations would be positive between scores for the ability and subsequent social support and reciprocity in exchange, and negative between scores for the ability and subsequent interpersonal conflict, even after controlling for initial interpersonal relationships scores. Based on the previous studies mentioned above (e.g., D'Zurilla, et al., 1998; Calvete & Cardenoso, 2005; Rich & Bonner, 2004; Helgeson, 2012), it was further hypothesized that the correlations would be stronger among men than among women. Therefore, compared with women, men's scores for initial problem orientation or problem-solving skills would be expected to more highly correlate with scores for subsequent social support, reciprocity in exchange, and interpersonal conflict when initial aspects of interpersonal relationships level was partialed out.

Method

The participants were 139 female (M age, 19.5 yr., SD = 1.1) and 148 male (M age, 20.2 yr., SD = 1.8) Japanese college students, who voluntarily participated in two sessions separated
by a six-week interval. The two sessions were required for administering the interpersonal relationships measure in order to examine partial correlations between scores for initial social problem-solving ability and subsequent quality of interpersonal relationships controlling for the initial quality. The participants completed the social problem solving and interpersonal relationships measures in the first session (Time 1) and the interpersonal relationships measure again in the second session (Time 2).

Japanese versions of the seven-item Problem Solving Self-Efficacy Scale and nine-item Problem Solving Skills Scale (Maydeu-Olivares, & D'Zurilla, 1997; Sumi, 2009a) were administered. These two scales were developed through a content analysis of the Problem Solving Inventory (Heppner, 1988), one of the representative measures of social problem-solving. The Problem Solving Self-Efficacy Scale assesses the belief in one's own capability to effectively solve problems (e.g., "I trust my ability to solve new and difficult problems") that is an important component of positive problem orientation. The Problem Solving Skills Scale assesses perceived skills to effectively solve social problem (e.g., "I try to predict the result of a particular course of action"). Items for each scale are rated on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). The three aspects of interpersonal relationships were assessed using the short form of the Japanese version of the Interpersonal Relationship Inventory (Tilden, et al., 1990; Sumi, 2003; Sumi, 2009b) that comprises 3 scales; (1) Support (e.g., "There is someone I can turn to for helpful advice about a problem"), (2) Reciprocity (e.g., "Within my circle of friends, I get just as much as I give"), and (3) Conflict (e.g., "Some people I care about are a burden to me"). Each scale has four-item that are rated on a 5-point scale.
ranging from 1 (strongly disagree) to 5 (strongly agree). All of the Japanese versions used in this study were found to have good reliability and validity (Sumi, 2009a, 2009b).

Results

The means, standard deviations, and Cronbach alphas for the scores on the measures are presented in Table 1. To begin with, sex differences were examined for the scale scores at Times 1 and 2. A MANOVA indicated a significant main effect for sex on the scores for the eight outcome variables, Wilk's Lambda = .65, $F(8, 278) = 18.88, p < .01$. As shown in Table 1, univariate tests indicated a significant sex difference for five out of the eight scores, using a Bonferroni adjusted alpha level of $.00625 [.05 \div 8 \text{ (the number of comparisons)}]$ for multiple comparisons. The results showed that men scored higher than women on the two social problem-solving subscales. Thus the hypothesis was supported for the social problem-solving scores. On the other hand, women had higher scores than men on the Support Scale at both Times 1 and 2 and the Reciprocity Scale at Time 2.

Before testing the hypothesis concerning the temporal relationship between social problem-solving ability and the subsequent quality of interpersonal relationships, zero-order Pearson correlations were calculated between scores on social problem-solving scales at Time 1 and interpersonal relationship scales at Times 1 and 2 separately for women and men. All the correlations were significant ($p < .05$), except those between scores on the Problem Solving Self-Efficacy Scale and the Conflict Scale at Time 2, and between the scores on the Problem Solving Skills Scale and the Reciprocity and Conflict Scales at Time 2. The significant zero-
order correlations were modest (|rs| = .18 to .26 for women and |rs| = .21 to .32 for men), but in the same direction as expected for the partial correlations.

In order to examine the hypothesis concerning the temporal relationship, Pearson partial correlations were calculated between scores on the social problem-solving scales at Time 1 and the interpersonal relationships scales at Time 2, controlling for all scores on the interpersonal relationship scales at Time 1. As shown in Table 2, for women there were only two significant partial correlations between scores on the Problem-Solving Self-Efficacy Scale and those on the Support and Reciprocity Scales. In contrast, for men, even after controlling for scores on the interpersonal relationships scales at Time 1, all of the partial correlations between scores on the social problem-solving scales and the interpersonal relationships scales at Time 2 remained significant, except for the one between the Problem-Solving Skills Scale and the Reciprocity Scale at Time 2. The significant partial correlations were relatively weak (|rs| < .18), albeit in the expected direction in all cases. Thus, the hypotheses regarding the temporal relationship and sex differences in the relationship were partially supported.

Insert Table 2 here

Discussion

This study examined the relationship between the two components of social problem-solving ability and the subsequent three aspects of interpersonal relationships among women and men, using a prospective design. Overall, the results of this study partially supported the hypothesis that scores for problem-solving self-efficacy and skills at one time should significantly correlate with scores for social support, reciprocity, and interpersonal conflict at a
subsequent time. As suggested by theoretical speculation and some empirical results (D'Zurilla, et al., 2002; Elliott, et al., 2004; Heppner, et al., 2004; D'Zurilla, et al., 2004), social problem-solving ability may improve various aspects of interpersonal relationships. However, since all the significant correlations were weak, social problem-solving ability may be less strongly related to the quality of interpersonal relationships than expected from the previous studies (Heppner, et al., 1982; D'Zurilla, et al., 2002; Elliott, et al., 2004). In sum, the results suggest that social problem-solving ability might have a limited but positive association with the quality of interpersonal relationships six weeks later. The prospective data from this study thus contribute to a better understanding of a temporal relationship that has not been sufficiently investigated.

The present results indicated sex differences in the strength of the relationship between prior social problem-solving ability and later aspects of interpersonal relationships. Although men who reported greater social problem-solving ability may tend to provide higher subsequent ratings of interpersonal relationships quality, this tendency may be much less pronounced for women. Therefore, the results generally support the hypothesis of the temporal relationship. However, it is likely that problem-solving self-efficacy and skills are better predictors of the subsequent social support, reciprocity, and interpersonal conflict for men than for women. Moreover, as expected, the observed sex differences on social problem-solving ability seem to support the common assumption that men are more problem-solving oriented (Heppner, et al., 2004; Rich & Bonner, 2004; Helgeson, 2012). For men, this tendency may be one factor that contributes to a stronger relationship between problem-solving self-efficacy and skills and subsequent quality of interpersonal relationships.

This study assumed that self-rated social problem-solving ability would be associated with reporting fewer interpersonal problems, which in turn would also be related to higher self-ratings of
interpersonal relationships; accordingly, the present findings were based on self-rating responses that may be potentially susceptible to influences from sex differences. In general, there is a tendency for women to underestimate their abilities and performance, while men overestimate theirs (Wilkinson, 1997; Carducci, 2009; Helgeson, 2012). The influence of these tendencies on the self-rating measures used in this study should be recognized as limiting the conclusiveness of the sex differences findings of the present study. Thus, further studies need to include independent ratings of the ability and quality of relationships, to control for the likelihood of people over- or under-estimating their abilities in a consistent way. Also, the correlations here are weak, which may also indicate that there is considerable change in self-ratings, so that they are less trait-like and more akin to state-determined perceptions that might change according to mood or other factors over time.
References


Table 1

*Means, Standard Deviations, and Cronbach Alphas for Women and Men*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Women (n = 139)</th>
<th>Men (n = 148)</th>
<th>Sex effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>α</td>
</tr>
<tr>
<td><strong>Problem-Solving</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy Scale</td>
<td>24.91</td>
<td>5.03</td>
<td>.85</td>
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<tr>
<td><strong>Problem-Solving</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skills Scale</td>
<td>34.64</td>
<td>6.01</td>
<td>.81</td>
</tr>
<tr>
<td><strong>Support Scale</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>17.18</td>
<td>2.32</td>
<td>.88</td>
</tr>
<tr>
<td>Time 2</td>
<td>16.81</td>
<td>2.29</td>
<td>.86</td>
</tr>
<tr>
<td><strong>Reciprocity Scale</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>15.79</td>
<td>2.50</td>
<td>.76</td>
</tr>
<tr>
<td>Time 2</td>
<td>16.60</td>
<td>1.90</td>
<td>.74</td>
</tr>
<tr>
<td><strong>Conflict Scale</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>10.37</td>
<td>3.79</td>
<td>.84</td>
</tr>
<tr>
<td>Time 2</td>
<td>10.16</td>
<td>3.58</td>
<td>.82</td>
</tr>
</tbody>
</table>
Table 2

*Pearson Partial correlations for Women and Men*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Support</th>
<th>Reciprocity</th>
<th>Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale</td>
<td>Scale</td>
<td>Scale</td>
</tr>
<tr>
<td>Time 2</td>
<td>Time 2</td>
<td>Time 2</td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-Solving</td>
<td>.17</td>
<td>.18</td>
<td>.07</td>
</tr>
<tr>
<td>Self-Efficacy Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-Solving Skills Scale</td>
<td>.08</td>
<td>.04</td>
<td>.08</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-Solving</td>
<td>.17</td>
<td>.17</td>
<td>-.17</td>
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<tr>
<td>Self-Efficacy Scale</td>
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<tr>
<td>Problem-Solving Skills Scale</td>
<td>.16</td>
<td>.07</td>
<td>-.17</td>
</tr>
</tbody>
</table>

*Note.* All partial correlations are controlled for scores on the Support, Reciprocity, and Conflict at Time 1.

*p < .05.*