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Leisure-Related Social Support and Self-Determination as Buffers of Stress-Illness Relationship

Seppo E. Iso-Ahola and Chun J. Park
Department of Kinesiology, University of Maryland—College Park

The purpose of this study was to test the hypothesis that leisure-generated social support (companionship and friendship) and the self-determination disposition (perceived freedom and intrinsic motivation) buffer the adverse effects of life stress on mental and physical health problems. Data were provided by 252 subjects who were 18 to 65 years old and practitioners of Taekwondo sport as a leisure activity. Results indicated that life stress was positively related to mental and physical illness symptoms and negatively related to perceived health, regardless of any moderating variables. Hierarchical multiple regression analyses, however, showed that leisure companionship moderated the effect of life stress on mental illness (depression) symptoms, whereas leisure friendship did the same for physical illness symptoms. Data provided no support for the positive moderating effect of the self-determination disposition. In general, results confirm the importance of social support derived from leisure activity participation and suggest that it is the activity and things done with friends/companions that buffer the adverse effects of stress on physical and mental health.

KEY WORDS: *stress, social support, friendship, companionship, self-determination, intrinsic motivation, perceived freedom, depression, health*

Introduction

It is now well established that stress does not necessarily lead to illness. Social psychologists have shown that certain psychological variables moderate or "buffer" the stress-illness relationship (e.g., Cohen & Edwards, 1989; Cohen & Wills, 1985; Sarason & Sarason, 1984). These moderating factors or psychosocial resistance resources help people cope with stressful events. In general, such resources stem from the personality characteristics we possess and the social environment in which we live.

Kobasa (1979) was among the first to show that personality, especially a trait called "hardiness," affords those who have it a psychological shield against the adverse effects of stress on physical and mental health. Her research suggested that the probability of falling ill due to continuous exposure to stressful life events is reduced by about 50% if individuals possess a "hardy" personality. According to Kobasa, hardiness consists of three components: challenge, control, and commitment. Although an impressive array of research in support of Kobasa's original findings was reported in the 1980s, more recently her results have been challenged on theoretical and

Correspondence concerning this article should be addressed to Dr. Seppo Iso-Ahola, University of Maryland, Department of Kinesiology, College Park, MD 20742

empirical grounds (e.g., Funk & Houston, 1987; Hull, Van Treuren, & Virnelli, 1987).

Regardless of the criticism, it appears that the "control" component of hardiness remains critical for the psychological explanation of the buffering effect. This, of course, is not surprising in light of a long line of research which has demonstrated the importance of sense of control to human health (e.g., Langer & Rodin, 1976; Rodin, 1986; Rodin & Langer, 1977; Rodin, Timko, & Harris, 1985). Why the sense of control, be it a personality predisposition or situationally aroused, is so essential to human functioning and health may be related to human motivation. Perceived control, along with perceived freedom, is the core of intrinsic motivation and self-determination (Deci & Ryan, 1987). According to these authors, people who perceive their actions as self-determined are less likely to experience illness. However, "it is only when people learn to experience their environment as supporting self-determination, only when they become more autonomous, that there will be long-term positive effects on their health" (p. 1030). Such learning may take time, but the result is likely to be a personality orientation emphasizing a predisposition toward intrinsic motivation, which in turn is related to better health. In short, both theoretical and empirical research suggests that predisposition toward self-determination (with its emphasis on perceived control and freedom) is an important mediator of the stress-illness link.

Another moderating factor in the stress-illness relationship is social support. There is considerable evidence in the literature for the buffering effect of social support (e.g., Bolger & Eckenrode, 1991; Cobb, 1976; Cohen & Wills, 1985; Dean & Lin, 1977; Kessler & McLeod, (1985); Kessler, Price, & Wortman, 1985; Lin, Woelfel, & Light, 1985; Rook, 1987; Sarason & Sarason, 1985; Seeman & Syme, 1987). Conceptualizations of social support have been classified broadly as being either objective or subjective in nature (Barrera, 1986). The former refers to the extent to which others actually provide tangible assistance (e.g., work, money, decision-making), whereas the latter refers to the extent to which people believe that family and friends would provide assistance should a crisis exist. Wethington and Kessler (1986) reported that perceived support is, in general, more important than received support in predicting adjustment to stressful life events.

Rather than conceptualizing and measuring social support as a general feeling of being adequately supported or cared for by others, the present study approached this concept from a perspective that has received little attention in the past. Accordingly, a need for companionship and friendship is one of the fundamental human needs that drives people to participate in shared activities. Such participation continues throughout the life-cycle from children's play to older adults' leisure involvement (Iso-Ahola, 1980). Companionship and friendship may, therefore, be seen as forms of social support or even as its central elements. Having friends and companions with whom to do enjoyable things together is related to elevated psychological well-being (Crandall, 1979; Larson, Mannell, & Zuzanek, 1986). Thus, in everyday liv-

ing, social support may manifest itself most clearly through companionship and friendship in shared activities. Rook's (1987) data supported this theorizing by showing that companionship in shared leisure activities indeed buffered life stress. Similarly, Larson and colleagues' (1986) results suggested that "the power of friends to generate positive feelings is partly a result of the greater rate of active leisure activities with them" (p. 122).

If self-determination and social support are theoretically important buffers of life stress, a question then is: When and where are people more likely to be able to feel self-determined and socially supported and thus more likely to benefit from the buffering effect? Social psychologists have overlooked this question and assumed that the contexts in which social influence processes occur do not matter. However, there are reasons to argue that this is a false assumption. Abundant evidence exists in the literature to indicate that perceived freedom and intrinsic motivation are the two most important ingredients of people's perceptions of leisure (e.g., Iso-Ahola, 1980, 1989). Similarly, it is well documented that leisure is a social phenomenon (e.g., Crandall, 1979; Crandall, Nolan, & Morgan, 1980; Samdahl, 1992) and that leisure is often organized around friendship or family groups (e.g., Cheek & Burch, 1976). In contrast, it is much more difficult for people to be intrinsically motivated and feel self-determined about their work; obligation and extrinsic rewards are the defining characteristics of work (Shaw, 1985). Similarly, work is not generally conducive to genuine social interaction. Further, it is the stressful working conditions that are the main source of stress experienced in today's society (Schor, 1991). All of this puts leisure and sports in an important position for stress management (Brown, 1991; Wheeler & Frank, 1988).

It follows that if people perceive themselves intrinsically motivated and self-determined about their leisure, it is likely that the effects of stress in their lives are buffered. Similarly, if people find their leisure socially rewarding, it is likely that the buffering effect occurs. A recently advanced theoretical formulation is consistent with this reasoning (see Figure 1). Accordingly, leisure-generated self-determination disposition and leisure-generated social support buffer against increased life stress. The present study was undertaken to test the basic proposition of the model presented in Figure 1. The basic theoretical prediction of the model is that there is a statistically significant interaction (buffering) effect of the independent variable (stress) and the moderator variable (leisure) on health/illness. More specifically, it was hypothesized that the interaction terms, assessed in a series of hierarchical multiple regression analyses, involving stress and self-determination and stress and social support would be significant. Self-determination was conceptualized and measured by perceived freedom in leisure and intrinsic leisure motivation. Social support was also conceptualized and measured in two ways: companionship in shared leisure activities and leisure-related friendship. The model makes no specific predictions for the main effects.

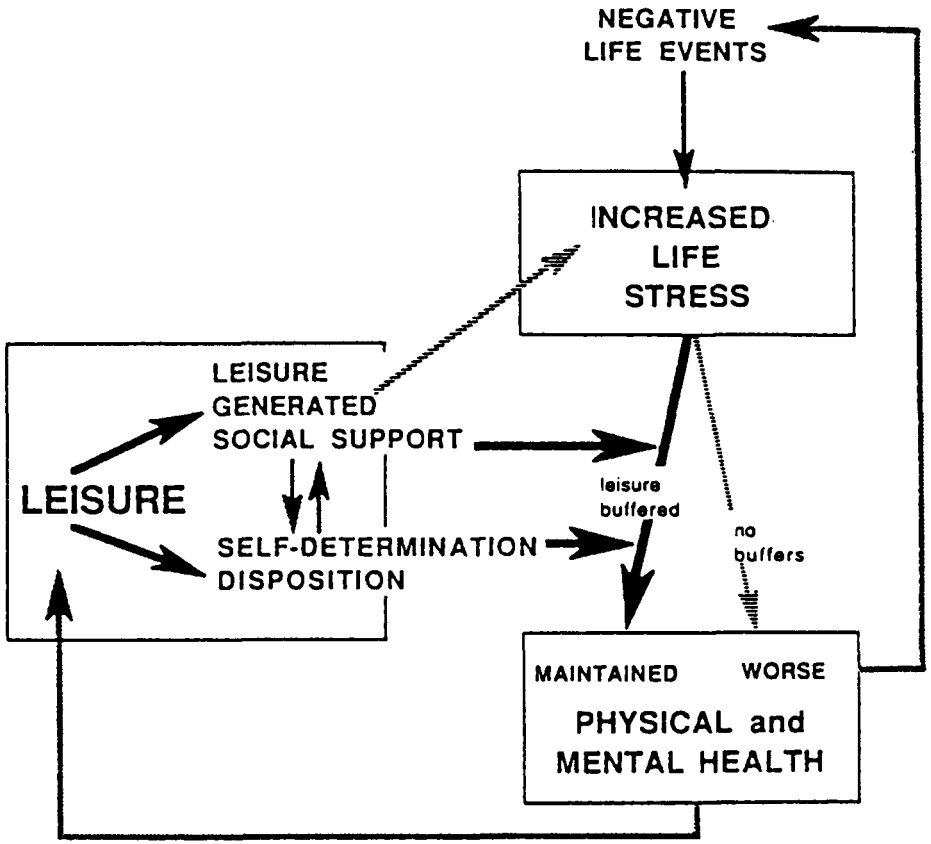

Figure 1. A theoretical model of the relationship between leisure and health (from Coleman & Iso-Ahola, 1993).

Method

Sample

Participants for this study were 252 Taekwondo (TKD) practitioners who attended private TKD studios and practiced TKD during their leisure time. A simple random sampling method was used to select 10 studios from 33 TKD studios in the Washington, D.C. metropolitan area. Although there were many similar types of oriental martial arts schools in the area, this study included only TKD studios in which the classes were conducted by owners or instructors who are certified as master instructors of TKD by the World TKD federation. From the 10 selected studios, 261 TKD students were asked to participate in the study. Out of these, 252 students completed the questionnaire; 188 males (74.2%) and 64 females (24.6%). The participants' ages

ranged from 18 to 65, with the mean age of 32 years. More than half of participants (56%) had received a BA/BS or higher degree. As for their ethnic origin, 65% were white, 15% Asian, 8% Hispanic, and 5% black. About half of the participants (52%) had an annual family income of $40,000 or more. The largest occupational groups were: professional/technical (25.8%); manager, official or proprietor (14.3%); service worker (18.7%); clerical/sales worker (14.7%); and student (10.7%).

Data Collection. The 10 selected TKD studios were visited to collect data from December 1993 to January 1994. The investigator met with all the potential participants (18 year-old or over) in each class. At the beginning of each class, the investigator (the second author) was introduced by the instructor to the participants in the classroom. He (the investigator) explained the purpose of the study ("a study of leisure behavior"), assured the confidentiality of the responses, and sought participants' cooperation in filling out the questionnaire. He also announced that he would provide a special self-defense demonstration after the questionnaires were completed. This was deemed to be an appropriate compensation for their participation in the study. The investigator then handed out the self-report questionnaire. Although the questionnaire generally took approximately 20 minutes, participants were allowed to finish at their own pace. Once they finished responding to all the questions, the investigator collected the questionnaires and the special demonstration followed. This procedure was followed in each of the 10 selected TKD studios.

Dependent Variables

The measures of physical health and mental health problems constituted the dependent variables in this study. Physical health was conceptualized and measured by the presence of physical symptoms and diseases. Mental health in turn was measured by the presence of depressive symptoms. While there are other measures of mental health in the literature, depression is acknowledged to be a central component of mental health (Beck, 1967). These two measures of health are conceptually similar, in that they determine health in terms of the absence of illness symptoms to a varying degree.

Physical health problems. Physical health problems were measured using the Pennebaker Inventory of Limbic Languidness (PILL) (Pennebaker, 1982). This 54-item self-report checklist of commonly recognized physical symptoms and diseases provides a measure of current and recent physical health problems. The PILL required respondents to rate the frequency of occurrence of physical symptoms along a 5-point scale ranging from 1 (have never or almost never experienced the symptoms) to 5 (more than once every week). The Cronbach alpha reliability of the PILL has been reported to be .91 and 2-month test-retest reliability .83 (Pennebaker, 1982). Internal consistency of the PILL for the present sample was .92. A number of validity studies have indicated that individuals with high PILL scores report more

symptoms across many settings relative to individuals with low PILL scores. The instrument also correlates moderately with other symptom inventories (Pennebaker, 1982).

Mental health problems. Mental health problems were measured by the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). The 20 items of this self-report scale assess depressive symptomatology. The respondents are asked to indicate the number of days that they have experienced various depressive symptoms during the previous week. Radloff (1977) reported Cronbach alpha reliability of .94 for the CES-D in the general population. Internal consistency reliability of the CES-D for the present sample was .87. The scale has been shown to have convergent and discriminant validity (Husaini, Neff, Harrington, Hughes, & Stone, 1980; Radloff, 1977).

Perceived health. In addition to the two objective measures of health problems, a subjective measure of health, perceived health, was used as a dependent variable. It consisted of four items: (1) "I am pleased with my physical stamina, energy, and strength;" (2) "I feel that I am emotionally unstable these days and often scared;" and (3) "I am mentally alert." Subjects responded to these items on a 1-5 scale (strongly disagree to strongly agree). The fourth item asked participants to rate their physical and mental health in general during the previous month from poor (1) to excellent (5). The mean score of the four responses was used as an indicator of overall perceived health. Internal consistency of the scale was .75.

Independent Variable: Life Stress

A measure of life stress constituted the independent variable of the study. The life stress measure consisted of Holmes and Rahe's (1967) Social Readjustment Rating Scale. This scale contains 43 life events that occur commonly in people's lifetime. Participants are asked to indicate whether or not they have experienced these events during the past 6 months. The scale is based on a set of ratings adjusted by psychometric procedures for the 43 life events ranging from minor violations of the law, with a rating of 11, to death of spouse, with a rating of 100. Casey, Masuda, and Holmes (1967) reviewed the evidence of reliability and validity of the scale and concluded that it is an appropriate tool to measure life stress. Because of its reliability and validity on one hand and because of its wide usage in studies on the moderating effects of sociopsychological factors on the stress-illness relationship (e.g., Kobasa, 1979; Kobasa, Maddi, & Puccetti, 1982a) on the other, the scale was employed here instead of similar other instruments.

Moderator Variables: Self-determination Predispositions

Measures of leisure-generated self-determination dispositions (perceived leisure freedom and intrinsic leisure motivation) served as one set of moderator variables.

Intrinsic leisure motivation. This variable was measured by the modified Intrinsic Leisure Motivation Scale (Weissinger & Bandalos, 1995). ILMS is a 24-item instrument comprised of four subscales: self-determination, competence, commitment, and challenge. Participants responded to the items on a 1 to 5 (from strongly disagree to strongly agree) continuum. Examples of items include: "I am as dedicated to Taekwondo as I am to other parts of my life;" and "I do not enjoy Taekwondo if it challenges my skills." Weissinger and Bandalos reported that internal consistency reliability coefficients for the total scale were high across nine studies, ranging from .87 to .91. The convergent/discriminant validity was indicated by significant correlations for almost all the hypothesized relationships between ILMS scores and other measures, such as leisure boredom, self-as-entertainer, and self-esteem. Internal consistency reliability of the ILM scale for the present sample was .86.

As Deci and Ryan (1987, p. 1033) noted, intrinsically motivated behavior is by definition self-determined. Intentional behaviors that are self-determined are characterized by "autonomous initiation and regulation." Thus, self-determination is based upon personal choice and control and a sense of personal competence. Weissinger and Bandalos' (1995) instrument, therefore, captures the essence of the construct self-determination as conceptualized in Figure 1.

Perceived leisure freedom. Instead of this encompassing approach, another way to measure self-determination is to focus on one dimension only, namely perceived freedom. The variable was assessed using the modified Perceived Leisure Freedom Index (PLFI) (Coleman, 1993). This scale contains five items requesting Likert scaled responses (1 to 5) to each statement dealing with perceived freedom in leisure (e.g., Taekwondo), for example: "I freely choose to practice Taekwondo." Coleman (1993) reported Cronbach alpha reliability of .69 for the scale. As for validity, Coleman found the scale to correlate positively with the Intrinsic Leisure Motivation Scale ($r = .53$) and negatively with the Leisure Boredom Scale ($r = -.47$), thereby providing evidence of its convergent and discriminant validity. Internal consistency reliability of the PLFI in the present sample was .51.

Moderator Variables: Social Support Indicators

The term "social support" typically refers to the general feeling of being adequately supported or cared for by others (Rook, 1987). A more specific and relevant conceptualization in the context of leisure behavior is the one that focuses on friendly feelings developed through activity participation on one hand and shared leisure activities undertaken primarily for the sake of enjoyment on the other. Because it has been reported that leisure-related forms of social contact buffer stress but obligatory contacts at work and school do not (Bolger & Eckenrode, 1991), it becomes important to determine whether feelings of friendship developed through leisure participation and companionship enhanced in shared leisure activities separately buffer

the adverse effects of stress. Clearly, a feeling of leisure friendship as a variable (attitudinal variable) is different from companionship in shared leisure activity undertaken (behavioral variable). To gain a better understanding of the role of leisure-generated social support, the moderating effects of leisure friendship and leisure companionship were determined separately.

Leisure friendship. Leisure friendship was measured by 15 items adapted from the Social Support Appraisals (SS-A) Scale (Vaux et al., 1986). This scale measures perceived friendly feelings or attitudes that people develop through activity participation. Likert responses (1 to 5) were requested to such items as: "I feel a strong bond with friends in Taekwondo school," and "I can rely on my friends in Taekwondo school." In the original work, reliability of the overall scale and its components was high with a majority of Cronbach alphas being between .80 and .90 (Vaux et al.). The study also provided evidence of the scale's convergent and discriminant validity (Vaux et al.). Internal consistency of the scale for the present sample was .91.

Leisure companionship. This variable was measured using the Leisure Companionship Index, which was adapted from the measures of companionship and social support (Rook, 1987). This measure was comprised of six items of social participation undertaken with Taekwondo classmates during the last month, including having a dinner, inviting over for a visit, participating in entertainment activities, and meeting at a public place. Companionship represents a number of companioned activities that subjects engaged in with their Taekwondo classmates. Because the variable was coded no = 1 and yes = 2 for each activity, the maximum score was 12.[1]

Control Variables

Level of involvement. This variable was measured by asking participants to indicate how long they have been practicing Taekwondo since they started (years and months). Since the participants ranged from novice to highly experienced or advanced practitioners of Taekwondo, it was thought important to statistically control the possible intervening effects of this variable when testing the buffering effect. The basic question asked was: Are the buffering effects robust at different levels of involvement?

Participants' experience was as follows: novice (34.1%), intermediate (35.3%), and advanced (30.6%). Percentage of those who had less than 6 months of training in TKW was 27.8%; those with 6 months to 2 1/2 years, 39.7%; and those with more than 2 1/2 years of training, 32.5%. The category of experience (novice, intermediate, advanced) was used as a control variable in all the analyses.

[1]Leisure companionship could also be operationalized by the number of people with whom the six companioned activities were undertaken. When we ran all the same statistical analyses using this definition of leisure companionship, the results did not differ from those based upon the activity definition of leisure companionship.

Sociodemographic variables. To further test the robustness of the buffering effect, the hypothesis was tested by including in multiple regressions those sociodemographic variables that showed significant contributions to the criterion variables in the preliminary analyses. Therefore, to determine the contributions of the sociodemographic variables to physical health problems, mental health problems (depression), and perceived health; age, gender, education, family income, living arrangement, ethnic origin, and occupation were entered into three multiple regression analyses. Results showed that only ethnic origin ($p < .025$) contributed significantly to physical health problems, only age ($p < .0001$) and family income ($p < .005$) explained a significant portion of the total variance in depression ratings, and only age ($p < .0001$) did the same for perceived health. Thus, it is these sociodemographic variables that were statistically controlled for in subsequent multiple regressions, as indicated in the notes of Tables 2, 3, and 4.

Results

Intercorrelations

Table 1 shows the intercorrelations among the major independent and dependent and moderator variables. Several interesting patterns can be seen in these data. First, mental health problems (depression) correlated positively with life stress and negatively with all the leisure variables. Physical health problems correlated positively with life stress but had no relationship to leisure variables. Perceived health, on the other hand, had a pattern similar to mental health problems; it correlated significantly negatively[2] with life

TABLE 1
Intercorrelations Among Variables

Variable	1	2	3	4	5	6	7	8
1. Mental Illness (Depression)	—							
2. Physical Illness	.44*	—						
3. Perceived Health	−.59*	−.30*	—					
4. Life Stress	.39*	.17*	−.23*	—				
5. Intrinsic Motivation	−.15*	−.06	.22*	.23*	—			
6. Perceived Freedom	−.21*	−.11	.25*	−.06	.38*	—		
7. Friendship	−.23*	−.07	.34*	.10	.56*	.29*	—	
8. Companionship	−.08	−.03	.16*	.12	.20*	.12	.44*	—
M	35.37	83.49	16.00	148.16	94.57	19.64	59.40	7.78
SD	10.87	20.23	2.79	109.48	9.64	2.52	7.82	2.05
Range	8–76	6–159	6–20	0–506	63–120	13–25	37–75	3–12

*$p < .05$, two-tailed.

[2]Because "perceived health" was measured and scored in the opposite direction to the other health scales, the correlation is negative rather than positive: The higher the life stress, the lower the perceived health.

stress and positively with the leisure variables. These results showed that higher levels of life stress were associated with more health problems. Further, more health problems, especially mental health ones, were associated with lower levels of intrinsic leisure motivation, perceived leisure freedom, and leisure friendship.

Contributions of Leisure Factors to Mental Health Problems (Depression)

Hierarchical multiple regression analyses (Cohen & Cohen, 1983) were employed to determine the main and interaction effects of stress and leisure factors on depression. Because age and family income had shown significant relationships with depression, they were entered before the standardized life stress and leisure-related factors (motivation, freedom, friendship and companionship). Finally, to test the buffering hypothesis, the interaction terms were entered into the prediction equation. These interaction terms were created by separately computing the cross products of the standardized stress and each leisure factor. In this way, the variances accounted for by the interaction effects were determined after controlling for the main effects.

Main effects. Table 2 shows that life stress was significantly related to depression such that people with higher levels of stress had higher levels of depression. Table 2 further indicates that leisure friendship (−.23), leisure companionship (−.18), intrinsic leisure motivation (−.24), and perceived

TABLE 2
Four Hierarchical Multiple Regression Analyses for Depression

	Before controlling for level of leisure involvement		After controlling for level of leisure involvement	
	Beta	R^{2a}	Beta	R^{2a}
Stress	.3719***		.3690***	
Leisure friendship	−.2343***	.05***	−.2239***	.05***
Stress × Leisure friendship	−.5739	.00	−.5580	.00
Stress	.3636***		.3595***	
Leisure companionship	−.1819***	.03***	−.1686**	.03**
Stress × Leisure com'ship	−.5989**	.02**	−.6099**	.02**
Stress	.4011***		.3967***	
Intrinsic motivation	−.2396***	.05***	−.2290***	.05***
Stress × Intrinsic motivation	−.6897	.00	−.6445	.00
Stress	.3357***		.3309***	
Perceived freedom	−.1576**	.02**	−.1621**	.02**
Stress × Perceived freedom	−.1276	.00	−.2465	.00

Note. All analyses were conducted after controlling for age and annual family income of subjects.
[a]Change in R^2 for step.
$^{**}p < .01$ $^{***}p < .001$

leisure freedom (−.16) contributed significantly (negatively) to depression regardless of life stress. This was true even after controlling for the level of leisure involvement and sociodemographic variables.

Interaction effects. Table 2 also shows the interaction effects and reveals that only the leisure companionship x life stress interaction was statistically significant (R^2 = .02). This effect is depicted in Figure 2. It can be seen that depression increased as stress increased for the low companionship group but did not change for participants who reported high levels of leisure companionship. The data in Figure 2 were derived by determining the depression scores for the participants who scored in the top (high) 30% and bottom (low) 30% on the measures of stress and leisure companionship. This

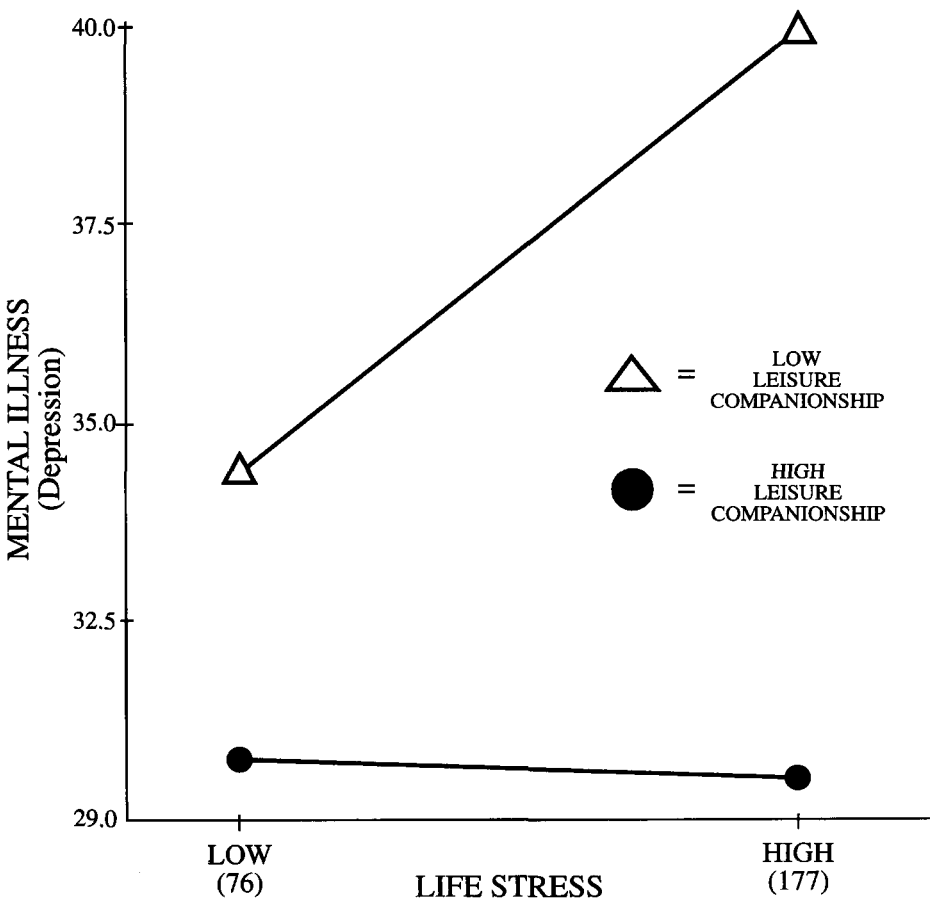

Figure 2. Interaction effect of life stress and leisure companionship on mental health problems (depression).

categorizing was done only for illustrative purposes, and the two variables were treated as continuous in all statistical analyses.

Contributions to Physical Health Problems

Main effects. Table 3 summarizes the results of four hierarchial multiple regression analyses when physical health problems was the criterion variable. It can be seen that life stress was significantly related to physical health problems, so that people with higher levels of stress had higher rates of physical health problems. In addition, leisure friendship (−.12), intrinsic motivation (−.14) and perceived freedom (−.14) were significantly related to physical health problems regardless of life stress; the significant main effect of leisure friendship, however, was lost after controlling for leisure involvement.

Interaction effects. Of all possible interaction effects, only the one involving life stress and leisure friendship (R^2 change = .02) was statistically significant. Figure 3 illustrates this finding and shows that physical health problems increased with life stress, but more clearly so for the low leisure friendship group than the high leisure friendship group. The data in Figure 3 were derived by determining the physical health problems scores for the participants who scored in the top (high) 30% and bottom (low) 30% on the measures of stress and leisure friendship. This was done only for illustrative purposes.

TABLE 3
Four Hierarchical Multiple Regression Analyses for Physical Illness

	Before controlling for level of leisure involvement		After controlling for level of leisure involvement	
	Beta	R^{2a}	Beta	R^{2a}
Stress	.1774**		.1706**	
Leisure friendship	−.1243*	.01*	−.1026	.01
Stress × Leisure friendship	−1.115*	.02*	−1.083*	.02*
Stress	.1728**		.1644**	
Leisure companionship	−.0542	.00	−.0368	.00
Stress × Leisure com'ship	−.1741	.00	−.1819	.00
Stress	.1989**		.1898**	
Intrinsic motivation	−.1454*	.02*	−.1266*	.01*
Stress × Intrinsic motivation	−1.044	.01	−.9724	.01
Stress	.1555**		.1483*	
Perceived freedom	−.1389*	.02*	−.1422*	.02*
Stress × Perceived freedom	.2642	.00	.1495	.00

Note. All analyses were conducted after controlling for ethnic origin of subjects.
[a]Change in R^2 for step.
*$p < .05$ **$p < .01$ ***$p < .001$

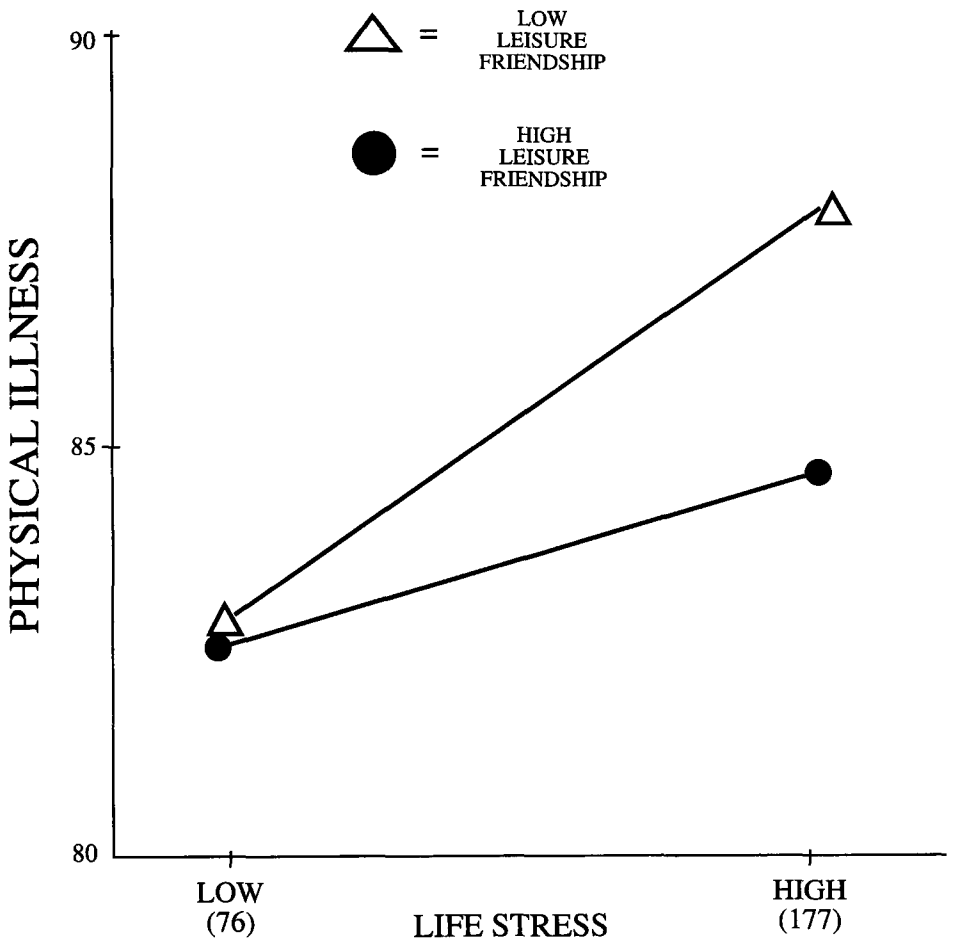

Figure 3. Interaction effect of life stress and leisure friendship on physical health problems.

Contributions to Perceived Health

Finally, the same four regression analyses were performed with perceived health as the criterion measure. Table 4 summarizes these results. It can be seen that stress, leisure friendship (.34), leisure companionship (.23), intrinsic motivation (.28), and perceived freedom (.23) all had a significant main effect on perceived health, even after controlling for leisure involvement. Thus, the higher the life stress, the lower the perceived health; the higher the leisure friendship, leisure companionship, intrinsic motivation and perceived freedom, the higher the perceived health. None of the interaction effects were significant at the $p < .05$ level.

TABLE 4
Four Hierarchical Multiple Regression Analyses for Perceived Health

	Before controlling for level of leisure involvement		After controlling for level of leisure involvement	
	Beta	R^{2a}	Beta	R^{2a}
Stress	−.2414***		−.2310***	
Leisure friendship	.3455***	.11***	.3093***	.08***
Stress × Leisure friendship	−.2161	.00	−.2763	.00
Stress	−.2255***		−.2135***	
Leisure companionship	.2299***	.05***	.1918**	.03**
Stress × Leisure com'ship	.0179	.00	.0438	.00
Stress	−.2678***		−.2515***	
Intrinsic motivation	.2808***	.07***	.2425***	.05***
Stress × Intrinsic motivation	.5712	.00	.3908	.00
Stress	−.1870**		−.1760**	
Perceived freedom	.2263***	.05***	.2345***	.05***
Stress × Perceived freedom	−.6447	.01	−.4045	.00

Note. All analyses were conducted after controlling for age of subjects.
[a]Change in R^2 for step.
$^{**}p < .01$ $^{***}p < .001$

Discussion

The results indicated that life stress is positively related to mental and physical health problems, with this relationship being greater between stress and mental health problems. Also, life stress was negatively related to perceived health. These findings are consistent with previous studies (e.g., Cohen & Hoberman, 1983; Creed, 1985; Dohrenwend & Dohrenwend, 1978; Kessler et al., 1985; Thoits, 1983). The results also showed that all the leisure-related variables were positively related to perceived health and negatively related to mental health problems. Two leisure factors (perceived freedom and intrinsic motivation) contributed negatively to physical illness as well. These latter findings support earlier theorizing (Iso-Ahola, 1980, 1994) and empirical evidence (Caltabiano, 1988; Coleman, 1993) that in and of itself, leisure is significantly related to mental and physical health. The direction of causality of these relationships, of course, cannot be inferred from the correlational data.

The question, then, is whether leisure-related factors moderate (Baron & Kenny, 1986) the relationship between stress and health. The results suggest that they do. The major finding was that leisure-generated friendship and companionship interact with life stress in a manner consistent with their being buffers against the adverse effects of life stress on physical and mental

health. Increased life stress was associated with enhanced depression in those participants whose level of leisure companionship was low, whereas there was no change in the depression level of those participants who had relatively many leisure companionships. Similarly, increased life stress contributed more to physical health problems in those subjects whose feeling of leisure friendship was relatively low than in those whose perceived leisure friendship was high. These moderating effects were observed regardless of the level of involvement in the activity, which suggests that the buffering effects of social leisure are robust. In this respect, leisure friendship and companionship benefit novices and experienced (or advanced) participants alike. The finding is consistent with the reported evidence that leisure is largely a social phenomenon (e.g., Samdahl, 1992).

These results are consistent with Rook's (1987) data that showed that companionship in shared leisure activities buffered life stress and enhanced psychological well-being of those who were exposed to considerable stress as well as that of those who were exposed to little stress. Based on the Australian data, Caltabiano (1988, 1995) also reported a significant stress-buffering effect of social leisure activities on physical and mental illness symptomatology. Similarly, Bolger and Eckenrode (1991) found that discretionary forms of social contacts (i.e., leisure contacts) buffered life stress. Thus, it appears that leisure-generated social relationships have the capacity to serve as a coping resource for stress (Coleman & Iso-Ahola, 1993). When stressful life events increase, people are able to resort to their leisure friends and companions for emotional support as well as for problem-focused aid (Iso-Ahola, 1996).

On the other hand, the stress-buffering effects of social leisure may not be that simple. As Coleman and Iso-Ahola (1993) theorized (see Figure 1), higher levels of social support can have some unintended negative outcomes. Caltabiano's (1995) data supported this notion, in that engaging in many social activities exacerbated the adverse effects of stressful life events on illness symptoms. Rather than being stress-reducing, social leisure can sometimes be stress-enhancing, especially if it undermines one's sense of freedom and control (Chick & Roberts, 1989). Well-meaning friends sometimes press close personal relationships too far and unwittingly provide excessive help for others' problems (Rook, 1987). This complex nature of social leisure was also evident in the findings of the present study regarding leisure friendship and leisure companionship.

Leisure companionship and leisure friendship had differing buffering effects on health. More specifically, the former buffered the effects of stress on depression whereas the latter did so for physical illness. Why such different effects? Aside from methodological or statistical artifacts, a possible answer to this question may have to do with the fact that companionship involves shared leisure activities engaged in with TKW classmates, whereas friendship refers to friendly feelings or attitudes toward the classmates. Having companions or friends *and* doing things with them in leisure is one of the best predictors of psychological well-being (Crandall, 1979) and people's

perceptions of leisure (Samdahl, 1992). This may, therefore, explain the moderating effects for mental health problems. On the other hand, leisure friendship may have its buffering effect on physical health problems because of social support provided in a variety of forms. For example, tennis and golfing friends may help one another by providing emotional support as well as tangible support, such as information about various treatments and medication for lower back problems. Whether these two forms of social support (companionship and friendship) have different psychological mechanisms for buffering effects remains to be further studied.

In general, the data lend credence to the idea that leisure-generated social support buffers stress, but do not provide evidence for the other component, self-determination predisposition, of the model presented in Figure 1. Because no buffering effects were observed for intrinsic motivation and perceived freedom, it appears that the social support component (friendship and companionship) of the model plays a more important role in buffering stress than the variables reflecting self-determination predisposition. This conclusion, however, is tentative due to the fact internal consistency reliability for perceived freedom was not high, although the same reliability coefficient for intrinsic motivation was quite high.

Coleman (1993), on the other hand, reported opposite findings when using the same measure. Perceived leisure freedom buffered the negative effects of stress whereas social support failed to do so. This inconsistency may be due to the different characteristics of the samples of the two studies. Coleman's respondents consisted of the general public whereas ours were participants in a specific leisure (sport) activity. It may be that a sense of freedom about one's leisure is an overriding factor for people in general. If they feel constrained or lack control over their leisure, then an important source of coping with stress is taken away from them. But, for those who have been able to exercise freedom over their leisure and participate in a specific activity (e.g., Taekwondo), a sense of freedom is not an important issue any more. Rather, other factors, such as friendship and companionship, become more important and therefore serve as means of coping with stress. This possibility needs to be examined further in future studies as part of the overall effort to understand the conditions under which self-determination and social support moderate the adverse effects of stress on health.

Finally, methodological limitations should be noted. The most limiting factor is the correlational nature of the study. Because of this, any causal relationships suggested by the results have to be viewed with caution. For example, one cannot rule out the possibility that health problems may affect the extent to which leisure friendship and companionship moderate the stress-illness relationship. Another limiting factor in studies such as this is the instrumentation. Although the measures generally had acceptable psychometric qualities, they were not perfect by any means. The resultant measurement error can lead to misleading and premature conclusions. On the other hand, the fact that the findings were consistent with the underlying

theory and previous studies lends credence to the data and theoretical discussion. Nevertheless, more research is needed, especially prospective studies, to clarify the moderating effects of leisure-related social support and self-determination variables on mental and physical health problems.

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