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# The Moderating Effects of Social Support and Playing Status on the Life Stress-Injury Relationship

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This study prospectively investigated the moderating effects of social support and playing status (i.e., starter vs. non-starter) on the life stress-injury relationship in collegiate football players. Playing status moderated the utility of life stress and social support as predictors of athletic injury. For starters, subjective satisfaction with social support moderated the negative life stress-injury relationship. Specifically, increases in negative life stress and subjective satisfaction with social support were associated with decreases in number of severe injuries, games missed, and time loss due to injury. No stress-injury relationships emerged for non-starters. Implications for future research are discussed.

Although the negative effects of life stress on athletic injury have been established in a variety of sporting contexts (Bramwell, Masuda, Wagner, & Holmes, 1975; Hardy & Riehl, 1988; Kerr & Minden, 1988), the accuracy of simple, linear models in explaining life stress-injury relationships has been challenged. In their extensive review, Andersen and Williams (1988) indicated that previous research neither considered the complex nature of stress nor the wide array of variables which might affect life stress-injury relationships. To address these inadequacies and provide direction for future research, Andersen and Williams (1988) proposed a dynamic, multicomponent life stress-injury model. In this model, personality factors (e.g., competitive trait anxiety, hardiness, locus of control) and coping resource variables (e.g., social support systems, coping skills/behaviors) were hypothesized to have direct and/or moderating effects on the life stress-injury relationship. In addition, Andersen and Williams (1988) emphasized the importance of examining these potential moderator variables in prospective, as opposed to retrospective, life stress-injury research designs.

Baron and Kenny (1986) defined a moderator as a variable which affects the direction and/or strength of the relationship between a predictor and a criterion variable. One such moderator that has been identified and extensively studied is social support. Thoits (1986) suggested that social support might moderate, or buffer, the potentially detrimental effects of life stress. That is, strong, well-established support systems would protect



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or shield individuals from life stress, while weak, poorly established systems would leave individuals vulnerable and unprotected. Life stress research in non-athlete populations has supported this buffering hypothesis (Cohen & Hoberman, 1983; Cohen, Sherrod, & Clark, 1986; Sarason, Sarason, Potter, & Antoni, 1985).

Recently, researchers have established the moderating effects of social support in athlete populations (Hardy, Richman, & Rosenfeld, 1991; Petrie, 1992; Smith, Smoll, & Ptacek, 1990). Petrie (1992) found that under conditions of low social support, female collegiate gymnasts were most vulnerable to the deleterious effects of life stress. In this high vulnerability condition, life stress accounted for 12 to 22% of the injury variance. Similarly, Smith and colleagues (1990) demonstrated that social support moderated the life stress-injury relationship, but only when considered in conjunction with coping skills. That is, athletes low in social support *and* coping skills were most likely to suffer a time-loss injury during their season. In Hardy et al.'s (1991) investigation, a "buffer-effects" model emerged for male, but not female, collegiate athletes. Specifically, decreases in negative life stress and number of providers of shared social reality support, as well as increases in negative life stress, number of providers of emotional challenge support, and level of fulfillment of emotional challenge support, were associated with corresponding decreases in injury frequency. Hardy and his colleagues (1991) concluded that (a) social support may have a functional or disaggregated role in life stress-injury relationships, and (b) additional research investigating the role of social support in the occurrence of athletic injury was warranted.

While research examining the moderating potential of psychosocial variables has produced consistently significant findings in a variety of athletic populations (e.g., Petrie, 1992; Smith et al., 1990), the results of moderator research with collegiate football players have been equivocal (Passer & Seese, 1983; Blackwell & McCullagh, 1990). The equivocal findings reported with collegiate football players may be due to the specific psychosocial variables (e.g., competitive trait anxiety, locus of control) that have been investigated as moderators. Although Blackwell and McCullagh (1990) examined the effects of coping resources, little or no research has investigated the moderating potential of social support with a population of collegiate football players. Since life stress-injury relationships appear to be sport and situation specific, and not immediately generalizable to all athletic environments, researchers will need to individually investigate specific sports to determine the degree to which psychosocial variables (e.g., life stress, social support) have direct and/or moderating effects on athletic injury. Thus, the first purpose of this study was to determine the direct and moderating effects of life stress and social support on athletic injury in collegiate football players. Consistent with previous research, it was hypothesized that social support would moderate the stress-injury relationships. Under conditions of high life stress, athletes who reported lower, as opposed to higher, levels of social support were expected to be more vulnerable to injury.

In attempts to establish and strengthen life stress-injury relationships,

researchers have divided their samples based on injury status (i.e., injured vs. uninjured) (e.g., Blackwell & McCullagh, 1990; Passer & Seese, 1983), gender and sport (Hardy & Riehl, 1988), and predictor variable scores (Petrie, 1992; Smith et al., 1990). Underlying these approaches is the belief that certain types or groups of athletes are most at-risk for injury and thus would evidence stronger stress-injury relationships. One group that has not yet been investigated, however, is starting vs. non-starting athletes. Powell (1986) indicated that one could not determine an athlete's risk for injury without considering the number of opportunities the athlete has to be injured. Possibly starting athletes may be more susceptible to injury than non-starting athletes simply due to their increased time of participation in practices and competitions. It also may be that the role of "starter" (e.g., pressure to perform at one's best during every competition, the desire to retain one's starting position) is a source of continual stress not experienced by non-starting athletes. In their model, Andersen and Williams (1988) suggested that the athlete's stress response (e.g., cognitive appraisals and resulting changes in attentional and physiological processes), and not psychosocial variables, related directly to the experience of athletic injury. They noted, however, that psychosocial variables as well as "potentially stressful athletic situations" were important in the prediction of athletic injury because these factors affected the stress response. It is quite possible that being a starter acts as a situational athletic stressor, which in combination with life stress and other psychosocial variables, negatively affects the stress responses and increases the athlete's susceptibility to injury. Thus, the second purpose of this investigation was to determine whether (a) differences existed in the injury rates of starting vs. non-starting football players, and (b) the athletes' playing status moderated the utility of life stress and social support as predictors of injury.

## METHOD

### *Participants*

The subjects represented an intact NCAA Division I-A football team from a major midwestern university. Athletes who attended the first team meeting of the fall football season voluntarily participated in the study; a 100% participation rate was achieved. The mean age of the 98 participants was 19.7 (SD = 1.4); sixty (61.2%) were Caucasian while the remaining 38 (38.8%) identified themselves as African-American, Asian-American, or Hispanic; and seventy-four (75.5%) attended school on an athletic scholarship. In addition, 28 (28.6%), 22 (22.4%), 20 (20.4%), and 28 (28.6%) of the players were in their first, second, third, and fourth year of school, respectively, while 31 (31.6%), 25 (25.5%), 17 (17.3), and 25 (25.5%) were in their first, second, third, and fourth year of athletic eligibility, respectively.

### *Instrumentation*

*Life Stress.* The Life Events Survey for Collegiate Athletes (LESCA) was employed in this investigation as the measure of life stress. The

LESCA, a 69-item life events survey, was systematically developed using a sample of 322 male and female athletes representing 22 different Division I collegiate sports (Petrie, 1992). For each life event experienced during the preceding 12 months, the athletes indicate the event's impact at time of occurrence on an 8-point Likert scale (−4, extremely negative to +4, extremely positive). Example items include: "Pressure to gain/lose weight—due to sport participation," "major change in playing status on team," and "major change in the amount of academic activity." Two life stress scores, negative (NEG) and positive (POS), are obtained by summing across those life events rated by the athlete as either negative or positive, respectively. A total (TOT) life stress score also can be obtained by adding the NEG and POS scores together. For the three stress scores, Petrie (1992) found that test-retest reliabilities ranged from .76 to .84. He also provided evidence for the construct and criterion-related validity of the LESCA. Petrie (in press) reported (a) correlation of .55 ($p < .001$) between the NEG life stress score and the Social and Athletic Readjustment Rating Scale (Bramwell et al., 1975), and (b) significant correlations between the NEG life stress score and the criterion measure, athletic injury.

*Social Support.* The Social Support Inventory (SSI) is a 39-item social support questionnaire developed by Brown and colleagues (Brown, Brady, Lent, Wolfert, & Hall, 1987; Brown, Alpert, Lent, Hunt, & Brady, 1988). Using a 7-point Likert scale (1, not at all satisfied to 7, very satisfied), individuals indicate their level of satisfaction with the support/help they have received over the past month. Sample items include: "assurance that you belong to a group of caring people" and "information about how someone else handled a situation similar to yours." A total subjective satisfaction score (SSI-SS) is obtained by summing across all items.

Brown et al. (1987) reported split-half and internal consistency (Cronbach's alpha) reliability coefficients of .94 and .96, respectively. They also provided evidence for the SSI's validity. Significant correlations were observed between the SSI-SS and measures of depression (Beck Depression Inventory; $r = -.53$), anxiety (Self-Rating Anxiety Scale; $r = -.51$), psychosomatic symptoms (Psychosomatic Symptom Index; $r = -.34$), another measure of social support (Qualitative Social Support Index; $r = .40$), and a general measure of satisfaction with social support ($r = .77$). In an investigation of the factor structure of the SSI, Brown et al. (1988) demonstrated the presence of five factors: acceptance and belonging; appraisal and coping assistance; behavioral and cognitive guidance; tangible assistance and material aid; and modeling. They reported internal consistency reliabilities (Cronbach's alpha) for these factors of .93, .88, .81, .78, and .83, respectively.

*Demographic Data.* The Demographic Data Sheet consisted of questions concerning the athlete's age, year in school, year in sport, race/ethnic group, and scholarship status.

*Procedure*

The football players completed the LESCA, SSI, and Demographic Data Sheet during the first team meeting of the fall season's training camp. To be eligible for participation, athletes had to be (a) academically and athletically eligible according to the NCAA's and university's standards, (b) free from any time-loss injury or illness, and (c) medically cleared for practice; based on these criteria, no athlete was eliminated from the study. These criteria helped to assure a physically asymptomatic sample, and significantly reduced the possibility of confounding between initial measures of life stress and social support and subsequent measures of injury.

Following the participating university's normal procedure for reporting injuries, the athletic association's assistant head trainer (who was a Certified Athletic Trainer) collected injury data throughout the season, which included a post-season bowl game. To reduce the potential for criterion contamination, the trainer was unaware of the athletes' questionnaire responses. Following completion of the season, the trainer provided copies of the athletic department's injury reports for each athlete. These reports included (a) the dates of injury occurrence and return to full practice or competition, (b) location of injury, (c) diagnosis, and (d) location of occurrence (i.e., practice or game).

Following an injury classification system used in previous research (Coddington & Troxell, 1980; Petrie, 1992), injuries were categorized as either minor (MIN; missing one to seven days of practice/competition due to injury), moderate (MOD; missing eight to 21 days due to injury), or severe (SEV; missing more than 21 days due to injury). Two additional injury outcomes were established—time loss (TIME; the total number of days absent from practice/competition due to injury) and games missed (GMISS; the total number of games in which the athlete was unable to participate due to injury).

*Design and Analysis*

The first purpose of this study was to determine the independent and combined effects of life stress and social support on various injury outcomes. To accomplish this goal, multiple hierarchical regression was employed (Cohen & Cohen, 1983). In accordance with Wheeler and Frank's (1988) recommendations, the predictor variables were entered into the equation in the following order: (1) life stress, (2) moderator (i.e., social support), and (3) life stress × moderator cross product. This statistical procedure (a) allowed the direct and moderating effects of life stress and social support to be determined from the partial increments in $R^2$ associated with each predictor variable, and (b) provided the amount of variance accounted for ($R^2$) in predicting the injury outcome at each step of the hierarchy (Cohen & Cohen, 1983).

To determine the predictive validity of the LESCA's life stress scores

and the moderating potential of social support, separate regression models were examined for each injury outcome. Due to the level of shared common variance between the LESCA TOT score and the LESCA NEG (r = .78) and POS (r = .61) scores, the TOT score was excluded from all regression analyses. Thus, the independent regression models generated to examine each injury outcome measure were:

Model 1—LESCA NEG score, social support, NEG stress × support interaction.

Model 2—LESCA POS score, social support, POS stress × support interaction.

The second purpose of this investigation was to determine whether athletes' playing status moderated the utility of life stress and social support as predictors of athletic injury. For this part of the study the sample was divided into two groups, starters and non-starters, and the statistical procedure described above was applied independently to each group. In other words, the two regression models were tested with the five injury outcome measures for each group. To have a relatively objective measure of playing status and thus minimize bias in group selection, the athletes' playing status was determined independently by the team's coaching staff (who were unaware of the athletes' scores on predictor variables). The coaches used position on depth charts (i.e., first or second team) and amount of time played in competition to determine playing status, and defined starters as athletes from the first or second level of the depth chart and who played approximately 50% of the time across the entire season.

## RESULTS

Of this study's 98 athletes, 64 (65.3%) experienced a total of 117 injuries. With respect to injury severity, 52 (53%), 21 (20.4%), and 16 (16.3%) of the football players suffered minor, moderate, or severe injuries, respectively. In terms of time lost due to injury, 51 (52%) athletes were unable to practice or compete for at least five days, while 39 (39.8%) players missed at least one game.

Means and standard deviations for the predictor and criterion measures observed in this study are presented in Table 1. With respect to injury severity, differences between the frequency of minor, moderate and severe injuries were uncovered [$F(2, 291) = 28.79$, $p < .0001$]. Tukey post-hoc analysis revealed that the football players suffered more minor than either moderate or severe injuries. For the life stress scores, athletes reported experiencing equivalent levels of negative and positive life stress during the preceding year [$t(194) = -.09$, $p > .5$].

To address the first question of the study, the entire sample was used in the regression analyses computed for each injury outcome measure. For Model 2, no significant relationships emerged with any injury outcome. In other words, there were no direct, moderating or full model effects for positive life stress and social support. For Model 1, however, direct and full model effects were observed (see Table 2). For the criterion

**Table 1**
**Means scores and standard deviations of life stress, social support and injury outcome (N = 98)**

| Variables | M | SD |
|---|---|---|
| LESCA NEG score | 19.94 | 16.44 |
| LESCA POS score | 20.14 | 13.07 |
| SSI-subjective satis. | 185.84 | 54.98 |
| Minor injuries | .85 | 1.05 |
| Moderate injuries | .21 | .44 |
| Severe injuries | .17 | .41 |
| Time loss | 13.75 | 22.84 |
| Games missed | 1.38 | 2.84 |

variable GMISS, Model 1 accounted for 7.9% of the injury variance. In addition, the NEG score was related directly to GMISS as determined by the full model Beta. Given that past research (Hardy, Richman, & Rosenfeld, 1991; Hardy & Riehl, 1988; Petrie, 1992) has demonstrated consistent, though sometimes weak, life stress-injury relationships, the fact that only one significant relationship emerged was somewhat surprising.

In addressing this study's second purpose, the sample was divided into the starter and non-starter groups based on the groupings previously designated by the coaching staff. Prior to calculating the regression equations, the life stress, social support and injury outcome measures were compared on the basis of playing status. A multivariate ANOVA revealed that no differences existed between starters and non-starters on the predictor and criterion measures [$F(7, 90) = 1.68$, $p > .1$]. In other words, starters and non-starters reported similar levels of life stress and social support, and experienced comparable numbers of injuries. This finding suggests that regardless of playing status, all student-athletes are susceptible to life stress and report comparable levels of social support at the beginning of the athletic season (see Table 3).

To investigate the moderating effects of playing status and the direct and moderating effects of life stress and social support, the regression analyses tested on the full sample were repeated independently for starters and non-starters. For the non-starters, no significant relationships emerged for either model. In other words, no direct, moderating or full model effects were uncovered for negative or positive life stress and social support across the five injury outcome measures. For the starters, however, significant relationships emerged for Model 1 with severe injuries, time loss, and games missed (see Table 4).

Although no full model effects were observed for severe injuries, significant direct and moderating effects did emerge. The LESCA's NEG score was related positively to the number of severe injuries as determined by the full model Beta. The partial increment in $R^2$ associated with the

**Table 2**
**Model 1 hierarchical multiple regression for the prediction of athletic injury for full team (N = 98)**

| Criterion measure/ variables entered | $R^2$ | F | *p* | Full model Beta | $R^{2a}$ | $F^b$ |
|---|---|---|---|---|---|---|
| Minor injuries | | | | | | |
| NEG | .001 | .14 | .71 | −.50 | .001 | .14 |
| SSI-SS | .008 | .39 | .68 | −.24 | .007 | .67 |
| Interaction | .025 | .79 | .50 | .46 | .017 | 1.64 |
| Moderate injuries | | | | | | |
| NEG | .001 | .09 | .77 | −.08 | .001 | .09 |
| SSI-SS | .003 | .15 | .86 | .03 | .002 | .19 |
| Interaction | .003 | .11 | .96 | .06 | .000 | .02 |
| Severe injuries | | | | | | |
| NEG | .017 | 1.72 | .19 | .52 | .017 | 1.72 |
| SSI-SS | .022 | 1.08 | .34 | .07 | .005 | .49 |
| Interaction | .036 | 1.16 | .33 | −.41 | .014 | 1.36 |
| Time loss | | | | | | |
| NEG | .033 | 3.25 | .07 | .70 | .033 | 3.25 |
| SSI-SS | .047 | 2.36 | .10 | .07 | .014 | 1.40 |
| Interaction | .072 | 2.43 | .07 | −.56 | .025 | 2.53 |
| Games missed | | | | | | |
| NEG | .050 | 5.04 | .03 | .75* | .050 | 5.04 |
| SSI-SS | .054 | 2.71 | .07 | .13 | .004 | .40 |
| Interaction | .079 | 2.69 | .05 | −.56 | .025 | 2.55 |

[a] Partial increment in $R^2$ associated with each predictor.
[b] F-value for the partial increment in $R^2$ associated with each predictor variable.
* $p < .05$.

life stress × social support interaction term reached significance, accounting for 11.5% of the variance above and beyond that already explained independently by life stress and social support. This finding indicates that social support moderated the life stress-injury relationship (see Figure 1).

For time loss, Model 1 explained 19.5% of the variance in number of days absent from practice and/or competition due to injury. In addition, significant full model Betas associated with the LESCA's NEG score and the social support score emerged, suggesting a positive relationship with TIME LOSS. With respect to the moderating effects of social support, the life stress × social support interaction terms for Model 1 accounted for 18.9% of the injury variance. This significant interaction term suggests that the life stress-injury relationship is being moderated by social support level (see Figure 2).

For games missed, Model 1 accounted for 18.9% of the injury variance.

**Table 3**

**Mean scores and standard deviations of life stress, social support and injury outcome measures for starters (N = 44) and non-starters (N = 54)**

| Variables | Mx | SD |
|---|---|---|
| LESCA NEG | | |
| Starters | 19.22 | 15.34 |
| Non-starters | 20.52 | 17.40 |
| LESCA POS | | |
| Starters | 17.43 | 12.74 |
| Non-starters | 22.35 | 13.04 |
| SSI-subjective satis. | | |
| Starters | 182.98 | 56.17 |
| Non-starters | 188.17 | 54.40 |
| Minor injuries | | |
| Starters | 1.12 | 1.21 |
| Non-starters | .63 | .85 |
| Moderate injuries | | |
| Starters | .21 | .46 |
| Non-starters | .22 | .42 |
| Severe injuries | | |
| Starters | .21 | .46 |
| Non-starters | .15 | .36 |
| Time loss | | |
| Starters | 14.32 | 21.55 |
| Non-starters | 13.28 | 24.04 |
| Games missed | | |
| Starters | 1.48 | 2.71 |
| Non-starters | 1.29 | 2.98 |

The full model Betas associated with the NEG score and the social support score also were significant, indicating a positive association between these variables and number of games missed. The life stress × social support interaction term's partial increment in $R^2$ accounted for 17.6% of the variance beyond that already explained independently by life stress and social support. This significant interaction indicates that subjective satisfaction with social support moderated the stress-injury relationship (see Figure 3).

## DISCUSSION

The results of this study provide support for the negative life stress-injury relationship, and the moderating effects of social support and playing status. Although no differences in the predictor and criterion measures

**Table 4**

**Model 1 hierarchical multiple regression for the prediction of athletic injury for starters (N = 44)**

| Criterion measure/ variables entered | $R^2$ | F | *p* | Full model Beta | $R^{2a}$ | F[b] |
|---|---|---|---|---|---|---|
| Minor injuries | | | | | | |
| NEG | .002 | .06 | .81 | −.58 | .002 | .06 |
| SSI-SS | .003 | .06 | .95 | −.20 | .001 | .04 |
| Interaction | .022 | .30 | .83 | .54 | .019 | .78 |
| Moderate injuries | | | | | | |
| NEG | .032 | 1.37 | .25 | .06 | .032 | .25 |
| SSI-SS | .064 | 1.36 | .27 | .13 | .032 | 1.40 |
| Interaction | .065 | .91 | .45 | .15 | .001 | .04 |
| Severe injuries | | | | | | |
| NEG | .002 | .08 | .77 | 1.35* | .002 | .08 |
| SSI-SS | .006 | .13 | .88 | .46 | .004 | .16 |
| Interaction | .121 | 1.80 | .16 | −1.32* | .115 | 5.24* |
| Time loss | | | | | | |
| NEG | .006 | .26 | .62 | 1.74** | .006 | .26 |
| SSI-SS | .007 | .13 | .88 | .52* | .001 | .04 |
| Interaction | .195 | 3.15 | .04 | −1.69** | .188 | 9.34** |
| Games missed | | | | | | |
| NEG | .012 | .49 | .49 | 1.71** | .012 | .49 |
| SSI-SS | .014 | .28 | .76 | .53* | .002 | .08 |
| Interaction | .188 | 3.01 | .04 | −1.62** | .174 | 8.57** |

[a] Partial increment in $R^2$ associated with each predictor.

[b] F-value for the partial increment in $R^2$ associated with each predictor variable.

* $p < .05$.

** $p < .01$.

existed between starting and non-starting athletes, playing status did moderate the utility of negative life stress and social support as predictors of athletic injury. For non-starting football players, no significant relationships emerged between these psychosocial variables and any injury outcome measure. For the starting athletes, however, significant relationships were found with the number of severe injuries (SEV), days missed due to injury (TIME), and number of games missed due to injury (GMISS). For TIME and GMISS, the variance accounted for by negative life stress and social support was in line with recent research (Petrie, 1992; Smith et al., 1990).

Although the SEV, TIME, and GMISS variance accounted for by life stress and social support might be considered moderate (e.g., Hardy et

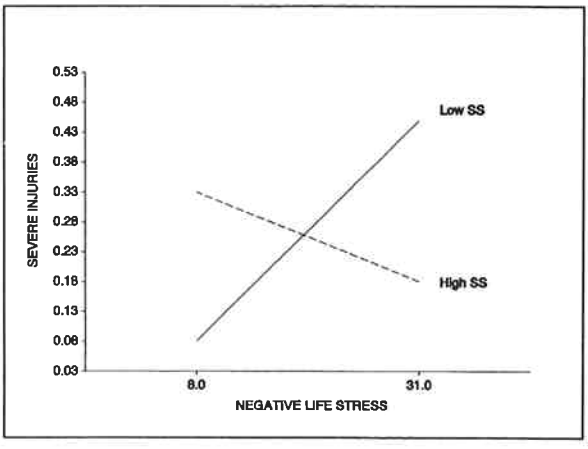


Figure 1. Schematic representation of negative life stress × social support interaction in the prediction of severe injuries for starting football players (N = 44).

al., 1991), it represented a 138% to 236% increase over that explained in the full team analyses (see Tables 2 and 4). As discussed in the introduction, being in the role of starting athlete may be a stressor that is not present for non-starters. Since starters and non-starters actually experienced similar levels of life stress and social support, the stress of being a starter may have a negative effect (i.e., increases injury susceptibility) through its influence on the athletes' cognitive appraisals of themselves and/or the athletic situation. The finding that playing status moderated the predictive utility of the life stress and social support suggests that

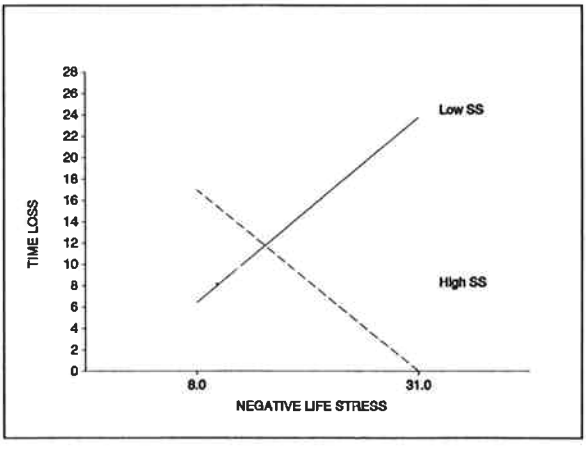


Figure 2. Schematic representation of negative life stress × social support interaction in the prediction of time loss for starting football players (N = 44).

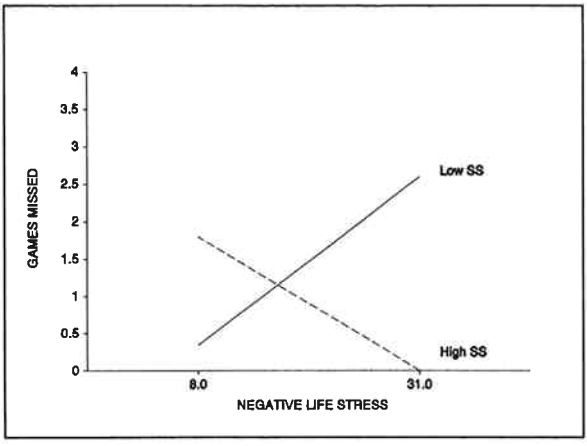


Figure 3. Schematic representation of negative life stress × social support interaction in the prediction of games missed for starting football players (N = 44).

previous research which examined entire teams collectively may have underestimated the strength of stress-injury relationships and/or the moderating potential of other psychosocial variables. Thus, the failure of researchers to consider the effects of playing status provides a potential explanation for finding no or weak stress-injury relationships (Blackwell & McCullagh, 1990; Passer & Seese, 1983; Williams, Tonymon, & Wadsworth, 1986), and no moderating effects (Passer & Seese, 1983; Williams et al., 1986). Before any definitive conclusions can be drawn concerning the moderating potential of playing status, additional research will need to be conducted to determine if the effects uncovered in the current investigation are present with female athletes and/or with other athletic teams.

Significant negative life stress × social support interactions were found for the number of severe injuries, the number of days absent due to injury, and the number of games missed. In this study, a positive relationship between negative life stress and each of these injury outcomes emerged for low social support starting football players, while a negative relationship existed between negative life stress and each of these injury outcomes for high social support starting athletes (see Figures 1–3). These findings support previous research which has suggested that social support may be serving protective and exacerbating functions in moderating life stress-injury relationships. While Petrie (1992) found negative life stress-injury relationships for low social support athletes, Smith and colleagues (1990) reported that athletes who were low in both social support *and* coping skills were most vulnerable to injury. Petrie (1992) and Smith et al. (1990) also found that athletes high in social support and high in social support *and* coping skills, respectively, were protected from the deleterious effects of negative life stress such that they were the least likely athletes to sustain

injuries. For college male athletes, Hardy and colleagues (1991) reported that injury frequency decreased as negative life stress and the number of providers of, and the degree of fulfillment for, emotional challenge support increased. Although the current investigation's results differ somewhat from recent research (Hardy et al., 1991; Petrie, 1992; Smith et al., 1990), these studies provide support for the conclusion that social support is a moderator of life stress-injury relationships.

How is it that psychosocial variables place some athletes at greater risk to injury than others? While the exact mechanisms underlying life stress-injury relationships are still unclear, Andersen and Williams (1988) suggested that athletes' vulnerability to injury may best be explained by considering their stress responsivity. They defined the stress response as a bi-directional relationship between cognitive appraisals of the demands, consequences, and resources of the person and situation, and physiological and attentional responses associated with stress. During acutely stressful situations such as athletic competitions, physiological (e.g., increases in muscle tension and autonomic activity) and attentional (e.g., peripheral narrowing) changes occur which may increase an athlete's susceptibility to injury. In this study, the stress associated with being a starter, in combination with higher levels of negative life stress and low social support, may have negatively influenced athletes' appraisals of practice and competitive situations. These starting athletes may have appraised their athletic situations as threatening or uncontrollable, as opposed to challenging or controllable (Folkman, 1984). Such appraisals may have subsequently corresponded with disruption of motor coordination/timing, increased distractibility, or narrowing of the visual field. If any of these physiological or attentional changes were present during competition/practice, the athletes' likelihood of suffering injury would have increased.

Although the mechanisms described above were not measured within the current investigation, recent research has found that, under acutely stressful conditions, higher levels of life stress, particularly negative, were related to greater narrowing of the visual field and elevated levels of state anxiety (Williams, Tonymon, & Andersen, 1990, 1991). While Williams and colleagues' (1990, 1991) studies provide initial empirical support for attentional changes as an underlying mechanism in the stress-injury relationship, additional research will need to be conducted to determine whether other mechanisms (e.g., generalized muscle tension, disruption of fine motor control) also are operating.

Although moderating the high life stress-injury relationship as expected, social support's effects on injury under conditions of lower stress were somewhat surprising. In this study, when faced with lower life stress, athletes who reported high levels of social support were more likely to experience injury than those reporting low levels. One possible explanation is that, under conditions of lower stress, high social support may provide athletes with an increased sense of security and confidence (Thoits, 1986). This self-confident state could translate into an increase in athletic risk-taking behaviors, which if beyond the athlete's skill level, would likely correspond to an increased vulnerability to injury. Hardy and colleagues

(1991) reported that higher levels of support were directly related to injury frequency for male athletes.

A second possibility, and a limitation of this study and related research (Hardy et al., 1991; Passer & Seese, 1983; Petrie, 1992; Smith et al., 1990), is the absence of repeated measures of the psychosocial variables across the athletic season. It may be that initial measures of social support taken during the first day of a five to eight month athletic season do not accurately represent the support available throughout the entire season. In other words, athletes' levels of social support may vary over time, particularly during a chronically stressful period such as a competitive season. Lepore, Evans, and Schneider (1991) provided evidence that perceived social support decreased and its role changed from moderator or buffer to mediator over a prolonged period of chronic stress. As a caution, Lepore and colleagues (1991) indicated that personality factors (e.g., locus of control, self-esteem) may influence whether (a) social support deteriorates over time in the face of chronic stress, or (b) the presence of chronic stress mobilizes the perception or actual availability of social support. In other words, some individuals, due to dispositional factors, will likely maintain and mobilize support during chronically stressful periods while others will probably experience a deterioration of their support systems.

In the current investigation, changes in social support similar to those found by Lepore and colleagues (1991) may have occurred. During the season, some football players' support systems may have deteriorated, while others may have been able to maintain their existing support systems or find necessary substitutes. It may have been that the starting football players in the low stress-high support condition, actually experienced a gradual or precipitous deterioration of support as they tried to balance the demands of academic, athletic and social life. Such a deterioration may have subsequently increased their vulnerability to injury through any of the mechanisms previously discussed. Starting football players in the high stress-high support condition, however, may have been able to mobilize their support systems during the season and thus maintain the protective effect of social support. Since multiple measures of social support or personality were not taken in this investigation, it is impossible to determine exactly how athletes' social support systems may have changed over the course of the season, for which athletes a change may have occurred, or how personality factors may have played a role in any change which did occur.

The direct effect of life stress found in the full team analysis does corroborate previous research (Hardy & Riehl, 1988; Passer & Seese, 1983), and provides additional support for the predictive validity of negative vs. positive life stress. This finding, however, is limited in that life stress was related to only one of several injury outcomes. Although the lack of significant findings may be surprising given recent research (Hardy & Riehl, 1988; Hardy et al., 1991; Petrie, 1992), previous studies also have failed to demonstrate life stress-injury relationships in full teams (Passer & Seese, 1983; Smith et al., 1990; Williams et al., 1986).

The major findings from this investigation concerned the moderating effects of playing status on the utility of life stress and social support as predictors of injury in collegiate football players. Based on the results of this study, it can be concluded that social support moderates negative life stress-injury relationships for starting football players. Furthermore, no relationship between the psychosocial variables under investigation and injury emerged for non-starting football players. As the starters and non-starters did not differ on the measures of support, stress, or injury, other variables, such as athletes' stress responsivity or competitive trait anxiety, must be investigated to determine how and why the stress-injury relationships occurred in only the starter group.

Although this study established the moderating potential of playing status and extended the moderating effects of social support to collegiate football players, additional research is needed to delineate which variables accurately predict injury and for which specific sports this prediction holds. Future research may best proceed by (a) continuing to investigate specific mechanisms thought to underlie life stress-injury relationships as has been initiated by Williams and her colleagues (1990, 1991), (b) examining as many of the psychosocial variables indicated by Andersen and Williams (1988) as possible, and (c) obtaining multiple measures of these psychosocial variables across an entire athletic season. It will be important to determine if measures taken at the beginning of a competitive season are representative of what is experienced at different times throughout the season. In addition, by repeatedly measuring psychosocial variables, researchers may be able to determine the temporal relationship of these variables to injury. In other words, do injured athletes experience an increase in life stress or a decrease in social support immediately prior to suffering an injury? Do athletes' stress responses become more labile if their levels of life stress or social support changes during a season? Answering these and other questions will be important for identifying and understanding the risk factors associated with athletic injury, and determining which interventions will be most effective for minimizing an athlete's vulnerability to injury.

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