



## Wellness Following Wins and Losses Based on Psychological Hardiness in Division I Women's Lacrosse

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### ABSTRACT

*International Journal of Exercise Science* 16(5): 1182-1190, 2023. Psychological hardiness encompasses three components: commitment, control, and challenge, and illustrates how individuals respond to stressors. Analyzing athletes' responses to wins and losses, depending on their psychological hardiness level, may provide insight of the impact of game outcome on student-athlete wellness. The purpose of this study was to examine post-game subjective wellness scores based on level of psychological hardiness following wins and losses in collegiate female lacrosse athletes. Players ( $n = 17$ ) took the Dispositional Resilience Scale Scale-15 (DRS-15) at the start of the academic year and were grouped based on hardiness level: above average (AH) and below average (BA). Participants took a daily wellness survey rating their overall wellness, energy level, muscle soreness, stress level, and sleep quality. RM-ANOVA indicated no difference in post-game wellness scores between hardiness groups ( $\Lambda(5,11) = 1.073, p = .426, ES = .328$ ), by game outcome ( $\Lambda(5,11) = 2.361, p = .109, ES = .518$ ), or an interaction between hardiness and outcome of game ( $\Lambda(5,11) = 1.421, p = .291, ES = .392$ ). No hardiness group differences were found for overall wellness or sub-scores. These results show subjective wellness scores decrease collectively after a loss versus a win but refute prior studies as hardy players did not experience significantly less stress than their less hardy counterparts. Future studies should be conducted to assess wellness after differing game outcomes over many seasons to assist coaching staff on the subjective, psychological impacts of game.

KEY WORDS: Team sports, well-being, female athlete, collegiate sport

### INTRODUCTION

Psychological hardiness is a personality-based mental skill that influences how a person responds to stressors (12). This term was coined by Suzanne C. Kobasa in 1979 to describe individuals who view tough situations as an opportunity for growth and adaptability, instead of a hurdle (12, 24). Kobasa classifies psychological hardiness into three components: commitment, control, and challenge. Those exhibiting high commitment have strong determination and feel a sense of purpose. People who harness control are problem-solvers who feel they can positively influence a situation. Challenge-centered people view difficulties as a

challenge for opportunistic growth, rather than a detrimental obstacle (23). While everyone has a certain level of hardiness, it has been shown athletes have higher hardiness levels than their non-athlete counterparts (12). Athletic hardiness is dependent on factors such as the players' personalities, the style of coaching, and the perceived stress of practice sessions (12).

This study focused on psychological factors – hardiness and wellness; most women's lacrosse research conducted to date has focused more on measurements of training and game volume (1, 4, 5, 7, 13, 20, 31, 34) with little emphasis on psychological well-being (11), especially related to game outcome. Parker et al. (28) found collegiate athletes are high achievers who quickly adapt to compensate for injury, difficulties, and failure, both on and off the field. Duckworth and colleagues (15) state grit, similar to hardiness, is a personality trait athletes possess that can explain the high resiliency and sustained, passionate pursuit of collegiate athletes' desire to improve their athletic skills and reach competition goals. While it was found grit was not a direct indicator of success, a strong link was found between grit and athlete self-efficacy, mental toughness, and positive affect (30). Similarly, lacrosse athletes with above average hardiness were shown to have consistently higher subjective wellness scores during pre-season practice (10). Subjective wellness scores were highest during the pre-season when practice hours were kept at eight hours per week. Perceived stressors of increased academic and athletic workload in the third week of the study started the gradual decrease of subjective wellness scores (11). These studies in women's lacrosse have yet to show grit or hardiness as differentiating indicators in performance, but these psychological variables have not yet been evaluated in relation to subjective response to a game outcome.

A study of male hockey and soccer athletes' well-being after competitions found that after winning a game, players felt lower levels of depression and anger and higher levels of vigor (22). Perceived somatic exertion and anxiety levels were also ranked lower after a win than a loss. In addition, athletes experienced better social functioning. Losing can have profound effects on players because the intense training, preparation, concentration, and emotion control may not be enough to win a game (17). Furthermore, losing can lead to anger, decreased drive to win, loss of concentration, and development of defense mechanisms (17). Literature also indicates female collegiate athletes respond differently to training with lower subjective wellness scores than their male counterparts (21), but there is not a strong understanding of how they respond to the outcome of games or if psychological hardiness has any role in that response.

Wellness is a subjective measure indicating an athlete's response to training load wins and losses, and competition preparation like sleep, fatigue, and energy (4, 11, 16). It is frequently used to examine athlete's strain both psychologically and physiologically during training (8). Wellness has been shown to increase after a win, as professional male soccer players had improved sleep quality, decreased stress, and decreased fatigue (16). However, following a loss, these athletes felt their sleep quality decreased, with stress and fatigue high. Student-athletes are at higher risk of emotional, physical, and mental stress as they feel pressure to perform in the classroom and on the field (28).

Being an athlete consists of many physical and psychological demands, pressure from coaches and peers, and personal stress (3). Sport culture can emphasize winning over well-being, which takes a toll on athlete mental health (3). Contrasting the pressure to win, the outcome of a loss decreases positive emotions, and increases the stress of athletes (37). An athlete must be resilient to overcome the “stress, anxiety, and escapism,” that exists with game outcome (17). Research has studied how teams could win or lose, as well as physical outcomes of winning and losing, but there is little research on the psychological implications of a win versus a loss. Therefore, the purpose of this study was to examine post-game subjective wellness scores based on level of psychological hardiness following wins and losses in collegiate female lacrosse athletes. We hypothesized that athletes with above average hardiness would have higher subjective wellness scores than below average hardiness athletes regardless of game outcome. We also hypothesized subjective wellness scores would collectively be higher after a win compared to after a loss.

## METHODS

### *Participants*

This prospective and observational study included participants from a varsity women’s lacrosse team. Athletes were studied prior to the season and during the season with completion of subjective surveys yielding wellness and psychological hardiness level. The use of the surveys allowed participants to gauge their individual strengths and weaknesses.

Participants included 37 players cleared by athletic trainers and 18 years of age or older, from the Division I women’s lacrosse team. Injured players who missed more than 30% of games and athletes who were non-compliant with either the hardiness survey or the daily subjective wellness surveys were excluded from data analysis. A final n-size of 17 athletes were included in the study ( $20.9 \pm 1.0$  years). Dispositional Resilience Scale-15 scores entries were scored and categorized by psychological hardiness level—above average hardiness (AH) for scores  $\geq 28$ , and below average hardiness (BA) for scores  $< 28$  (24). Of the 17 uninjured and compliant participants, nine were classified as AH and eight were BA. All participants provided informed consent prior to investigation. This research was approved by the institutional review board and this research was carried out fully in accordance to the ethical standards of the International Journal of Exercise Science (29).

### *Protocol*

Athletes took the Dispositional Resilience Scale-15 (DRS-15) to evaluate psychological hardiness at the beginning of the 2021-2022 training year. This 15-question survey was adapted from the original DRS which consisted of 45 questions (2). The DRS-15 is a Likert scale questionnaire measuring participants’ degree of commitment, control, and challenge. It has proven to be a reliable measure in both sport and health psychology with an internal reliability score of .80 and its 3-week test-retest reliability of .78 (27).

Athletes’ subjective wellness was measured daily using an online survey through VX Sport technology (Wellington, New Zealand). This survey aligned with previous work in this

population (7, 11, 14, 18). Athletes completed the survey in the morning from their smartphone prior to 10:30 a.m. Participants answered questions which ranked their level of muscle soreness, sleep quality, stress, and energy level. Muscle soreness was related to how their muscles were feeling. Sleep quality was asking them to rate how well they slept the previous night. Stress was simply inquiring about how stressed they felt, and energy was asking about their energy levels for training that day. The survey consisted of a five-point scale ranging from 0, 25, 50, 75, 100, with 0 as a negative affect and 100 as a positive affect. Athletes answered the questions in relation to how they felt in that moment. An overall wellness score was calculated by taking the mean of each of the responses from the four questions. Each wellness question response and the overall wellness score were used for analysis. Wellness scores obtained the day after a game were used for analysis.

Athletes competed in 17 total games during the season. Ten of the games were wins and seven were losses. Subjective wellness scores the day after a game were tabulated for each athlete for wins and losses and used for analysis. All five measures of wellness were included in the analysis.

#### *Statistical Analysis*

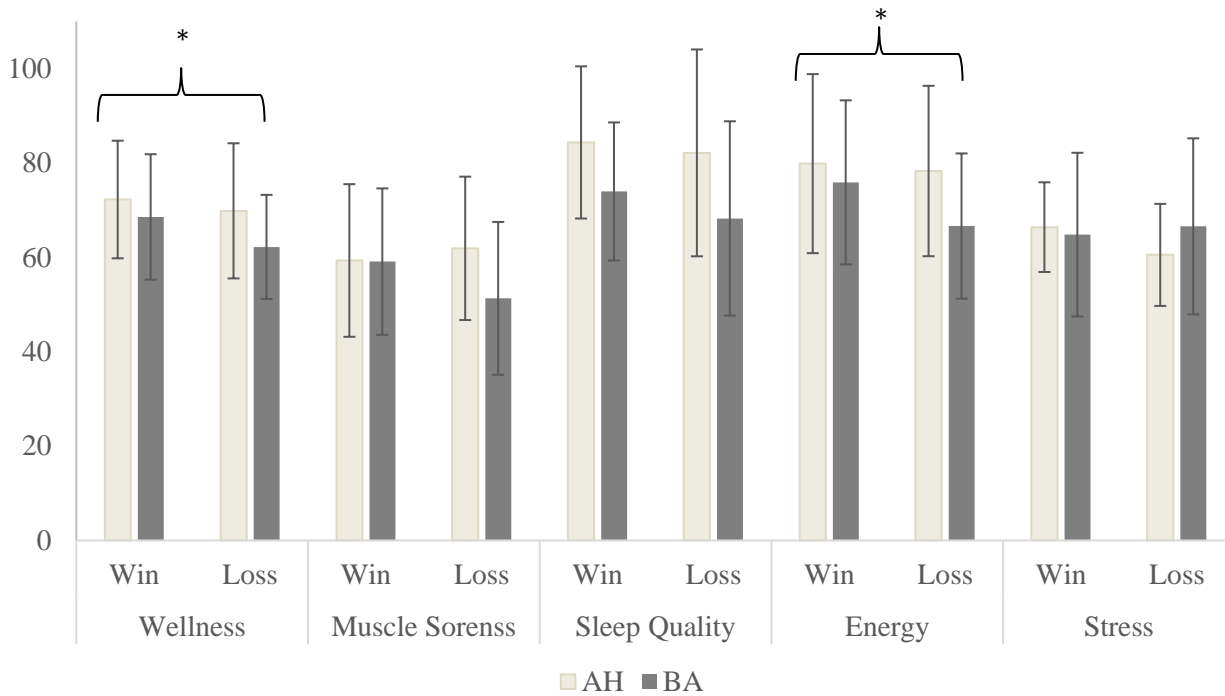
All data analyses were conducted in SPSS version 27.0 (Chicago, IL) and an alpha level of .05 was used to determine significance. A Shapiro-Wilk test determined the data were normally distributed, thus parametric analyses were utilized. Independent sample t-tests were used to verify differences between the two hardiness groups for DRS-15 scoring. A 2 x 2 repeated measures multivariate analysis of variance (RM-MANOVA) was used to evaluate the differences of subjective wellness scores by hardiness group (BA vs AH) and by game outcome (win vs loss). Univariate tests were used to determine specific areas of significance. Partial eta squared effect sizes (ES) were calculated to be small (.01), moderate (.06), and large (.14) (9).

## RESULTS

The two groups showed a difference in total hardiness scores ( $p < 0.001$ ) with the above average hardiness (AH) group ( $31.0 \pm 1.4$ ) scoring higher than the below average hardiness (BA) group ( $23.6 \pm 3.5$ ). The RM-ANOVA indicated no difference in post-game wellness scores between hardiness groups ( $\Lambda(5,11) = 1.073, p = .426, ES = .328$ ), by game outcome ( $\Lambda(5,11) = 2.361, p = .109, ES = .518$ ), or an interaction between hardiness and outcome of game ( $\Lambda(5,11) = 1.421, p = .291, ES = .392$ ). However, all effect sizes were interpreted as large, thus univariate analyses were inspected.

Figure 1 shows the means and standard deviations by hardiness group and by game outcome for the overall wellness score and the four wellness subscores. The univariate analyses showed a difference by game outcome for overall wellness (win:  $70.5 \pm 12.6$ , loss:  $66.2 \pm 13.1, F(1,15) = 7.600, p = .015, ES = .336$ ) and energy (win:  $78.0 \pm 17.8$ , loss:  $72.8 \pm 17.4, F(1,15) = 6.355, p = .024, ES = .298$ ) with wins evoking higher values than losses for both variables for the team regardless of hardiness level. These effect sizes were also large. No group differences were shown for

overall wellness or other subscores, but it is notable in Figure 1 that AH mean scores were higher than BA mean scores for each wellness item regardless of game outcome, with the exception of stress following a loss. The standard deviations around these means were quite similar, causing overlap in the scores between groups, resulting in no group differences. There were also no univariate differences for the interaction between hardiness group and game outcome.



**Figure 1.** Means and standard deviations of overall wellness scores and subscores from the subjective wellness survey based on hardiness level following wins and losses. \* indicates a difference in scores by game outcome,  $p < 0.05$ .

## DISCUSSION

The purpose of this study was to examine post-game subjective wellness scores based on psychological hardiness level following game outcome in collegiate female lacrosse athletes. It was hypothesized hardy athletes would have higher subjective wellness after both a win and loss in contrast to athletes with lower hardiness. In addition, it was theorized wellness scores for all athletes would be higher after a win than a loss. The results showed no main effect differences between hardiness groups or by game outcome for post-game overall wellness or subscores. Due to high effect sizes, these tests were explored further, and there was a difference shown by game outcome for overall wellness and energy, with post-game values being higher after a win compared to a loss.

Unlike the current findings, a prior study by Cooley et al. (10) found hardy players do have higher subjective wellness than those with low hardiness. Athletes encompassing a high level of psychological hardiness are more resilient to stressors and view challenges as an opportunity

for growth, a necessity for competitive Division I collegiate athletes. A previous study indicated collegiate athletes with higher subjective wellness also have higher stress-coping skills (36). Furthermore, female athletes with high subjective wellness scores demonstrated more adversity-coping skills, coachability, concentration, goal setting, mental preparation, and freedom from worry. In contrast, male athletes in the study were more likely to peak under pressure (36). von Guenther and Hammermerister did not assess hardiness in their research so it is unknown if their female athletes felt in control, committed to their goals, and viewed these adverse situations as challenges (36); however, one can assume those with higher adversity-coping and goal setting skills, would be hardier. Further research is needed to connect concepts of hardiness, wellness, and responses to adversity.

The results of the present study suggest that athletes responded to the outcome of a game in a similar manner, regardless of hardiness. This may be due to the team atmosphere associated with lacrosse because the team generally debriefs as a collective after the game to discuss effective and ineffective strategies and tactics. Team sport athletes, both male and female, have been shown to connect competition and collaboration more than their individual sport counterparts (25). Cooperative behavior is undermined in individual sport athletes after competition, but this is not the same for team sport athletes. Also, psychological collectivism has been shown to serve as an important factor in team sport cohesion, regardless of athlete gender, helping team sport athletes cope with stressful situations (19). Previous research has shown most individual emotions experienced after a game are representative of the collective team emotion and show the tendency of individuals to mimic the emotions of others (32). The subjective wellness response of athletes in the present study may have resulted from a shared game debrief, collaborative mindset, and psychological collective needed for cohesion within team sports. It may be of interest to explore this hypothesis in other team sports as well as comparing athletes competing in individual sports.

Results from the present study refute previous research indicating athlete's experience higher levels of subjective wellness after a win (16). Players in the present study experienced a season with numerous wins and little losses which could have impacted the data as well. With a 7-2 conference record, athletes experienced their longest winning streak of seven games with a final loss in the first round of playoffs (6). Present data were likely different than previous research because of the level of play, as stress is amplified in more elite competitions (33). Elite athletes experience a more extreme load of psychological and physical training than collegiate athletes, which could explain the difference in results between literature (33). Another point of discussion is that past studies focus on male soccer athletes, instead of female lacrosse athletes. As the participants are also student-athletes, academic strain could play a role in subjective wellness scores. Cooley et al. (10) found subjective wellness scores peaked during the first three weeks of pre-season practice and statistically decreased as the semester progressed. As the academic semester and sporting season grow in more difficulty, the more pressure to perform on and off the field is evident as subjective wellness scores decline.

A limitation of this study was it only observed one collegiate women's lacrosse team over one season. To provide more reliability, future studies should be conducted over multiple seasons. In addition, athletes completed the same subjective wellness survey daily (i.e., in the morning), contributing to survey fatigue and possibly decreasing accurate wellness data. Since survey results used were representative of the day after a game outcome, future studies could assess subjective wellness scores directly following the game.

In conclusion, it was hypothesized hardy athletes would have higher subjective wellness scores both after a win and loss because of adequate stress-coping skills. However, in this study, subjective wellness responses to games were not differentiated by hardiness level. The results do support previous research that shows subjective wellness and energy levels are higher after a win than after a loss (21). The current findings show subjective wellness, regardless of hardiness level, does fluctuate based on different game outcomes. While hardiness did not affect differences in subjective wellness scores after wins versus losses, additional psychological factors of game play should be studied, especially in women's lacrosse where little research has been done. The findings of this current study will assist coaches in formulating more effective practices following games, to compensate for athletes' low energy and overall wellness after a loss.

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