The Impact of Game Outcome on the Well-Being of Athletes

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Abstract
The present study examined the impact of game outcome on the well-being of athletes. Participants from hockey and soccer teams completed mood and general health questionnaires indicating how they had been feeling over the past few days on three separate occasions. These were four to six days after a win; four to six days after a loss; and over 10 days since the last competition (control period). Differences in well-being were observed following wins, losses, and during the control period. Specifically, athletes reported lower depression and anger after a win compared to a loss, while lower levels of vigour were observed after a loss compared to after a win and the control period. Lower somatic symptoms were reported after a win compared to after a loss and the control period. Lower anxiety and social dysfunction symptoms were reported after a win compared to after a loss. Future research should explore the mechanisms which might account for these findings.

Keywords: Outcome, result, well-being, health, mood, competition, sport, cold.

By its very nature competitive sport is evaluative and a great deal of effort is expended in both training and competition to achieve success. For those taking part, achieving success is important for both intrinsic (e.g., self-esteem, perception of competence) and extrinsic (e.g., trophies, points) reasons. As the legendary American Football coach Vince Lombardi remarked “Winning isn’t everything, it’s the only thing” (Michener, 1976, pp. 519-520). Given the importance many athletes attach to success, the present study represents an attempt to explore the impact of game outcome on well-being.

Research has shown that game outcome can have an impact on the affective state of competitors. Emotions are thought to occur as a result of an initial evaluation of an event (e.g., feeling happy after a win) and more detailed cognitive appraisal of the event including attributing reasons for success or failure (Vallerand, 1983, 1987; Weiner,
1986). In a laboratory setting Biddle and Hill (1992) were able to manipulate the outcome of a fencing contest to create a substantial defeat for one of the participants. The highest emotional feelings for winners were satisfaction, pleasure, and contentment, while for the losers it was dissatisfaction and disappointment. Data from actual competitions have indicated similar results. Willimczik, Rethorst, and Riebel (1986) reported that following a volleyball competition players reported lower levels of satisfaction and enthusiasm and higher levels of disappointment after losing than after winning. Similarly, rugby players reported a range of pleasant emotional states five minutes after a win and unpleasant emotions five minutes after a loss (Wilson & Kerr, 1999). Research has also examined athletes’ responses to game outcome over a number of games. Hassmén and Blomstrand (1995) reported data, from Swedish female soccer players collected over a season, showing that immediately after a game players had significantly higher vigour and significantly lower tension, depression, anger, and confusion when they won than when they lost or tied. Similar differences for depression, anger, and confusion were observed approximately two hours after the game. Collectively the findings indicate that competitors respond with positive affect following success and negative affect following a defeat. However, to date, research has not considered the longevity of these affective responses and explored whether similar findings are observed over the days following competition.

Physiological changes in competitors have also been observed in response to game outcome, with much of this research focused on two hormones: testosterone and cortisol. Testosterone has been examined in the context of competition because it is thought to rise in response to increased status, such as winning (Book, Starzyk, & Quinsey, 2001). However, research examining the impact of competition outcome on testosterone has produced equivocal results (e.g., González-Bono, Salvador, Serrano, & Ricarte, 1999; Passerlergue & Lac, 1999; Passerlergue, Robert, & Lac, 1995). One possible reason for these equivocal results is the moderating influence of personality factors (Schultheiss, Campbell, & McClelland, 1999). For example, only those individuals who demonstrated a strong motive to impact others in an assertive way had elevated testosterone after success in winning a number searching task (Schultheiss, et al., 1999). Cortisol is important because it is thought to be associated with a stress response, indicating mobilization of physiological resources to deal with an impending threat or challenge (Gatchel, Baum, & Krantz, 1989). A number of studies have shown that in sport settings cortisol rises in response to the onset of a competitive situation (e.g., Kugler, Reintjes, Tewes, & Schedlowski, 1996; Passerlergue & Lac, 1999; Passerlergue, et al., 1995). However, research examining the impact of competition outcome on cortisol has been equivocal. Some studies report an increase in cortisol for winners (e.g., Suay, Salvador, González-Bono, Sanchis, Martínez, Martínez-Sanchis, Simón, & Montoro, 1999), an increase in cortisol for losers, (e.g., Bateup, Booth, Shirtcliff, & Granger, 2002) or no significant difference between winners and losers (e.g., González-Bono et al., 1999).

Given the physiological and affective responses competitors display to game outcome it is surprising that no studies have investigated the impact of game outcome on competitors’ health. Research has shown that game outcome may have potentially
serious health consequences for supporters. Clinically significant levels of distress have been observed in a sample of fans from teams who have been relegated from the English Premier League (Banyard & Shevlin, 2001). The increased levels of stress provoked by watching a national soccer team taking part in an important penalty shoot out has been associated with increased mortality from myocardial infarction and stroke in Dutch men (Witte, Bots, Hoes,, & Grobbe, 2000) and increased risk of myocardial infarction in both English men and women (Carroll, Ebrahim, Tilling, Macleod, & Davey Smith, 2002). Conversely, Berthier and Boulay (2003) found that mortality associated with myocardial infarction was reduced in French men the day France won the 1998 World Cup of football.

Severe health consequences, such as myocardial infarction and stroke, are unlikely to be observed in competitors following a stressful loss, because of their age and general health as competitive athletes. However, other changes in health could be observed as a result of game outcome. Specifically, exposure to psychological stressors, for example not winning an important game, has been associated with an increase in the likelihood of catching respiratory illnesses (e.g., colds, flu) because of changes in immune function. In particular, daily hassles have been related to the occurrence of minor infections such as upper respiratory tract infections (URTIs) in a number of studies (Cohen, Frank, Doyle, Skoner, Rabin, & Gwaltney, 1998). For example, Stone, Reed, and Neale (1987) found that high numbers of undesirable life events and low numbers of desirable events were related to the occurrence of episodes of colds/flu three to five days later compared to the days immediately before. Other studies have confirmed these results (Evans, Pitts, & Smith, 1988; Evans & Edgerton, 1991). Sheffield, McVey, and Carroll (1996) investigated the impact of stressful daily events on the occurrence of general minor illnesses. They found that undesirable, but not desirable, daily events were correlated with somatic symptoms three or four days later, and that this relationship was significantly stronger than that between undesirable events and somatic symptoms on other days. Taken together, these studies suggest that relatively minor desirable and undesirable daily events can have an effect on symptom reporting. Given the importance of success to many athletes, failing to win may be a psychological stressor sufficient to alter immune function and increase the occurrence of minor infections (e.g., URTIs) similar to that associated with the occurrence of daily hassles.

The aim of the present study is to extend past research into the impact of game outcome on competitive athletes in two ways. First, it extends the work of Hassmén and Blomstrand (1995) by examining the impact of game outcome on the mood state of participants in the days following a competition. Second, it represents an initial attempt to determine if game outcome can have an impact on athletes’ health by examining the incidence of self-reported cold and flu symptoms and general well-being in the days following competition.
METHOD

Participants

Data were collected from male \( (n = 58) \) and female \( (n = 8) \) participants (mean age = 21.5, \( SD = 3.7 \) years). The participants were recruited from two local clubs and five university teams and the sports represented were soccer \( (n = 29) \) and hockey \( (n = 37) \). Participants had played their sport for an average of 5.67 years \( (SD = 3.67) \).

Measures

Data were collected via a booklet comprising a series of single-item questions in addition to three inventories: the Symptom Checklist (Evans, Doyle, Hucklebridge, & Clow, 1996), the General Health Questionnaire, (GHQ: Goldberg & Hillier, 1979) and the POMS—Short Form (POMS-SF: Shacham, 1983). The single-item questions were designed to gather demographic information and participants’ perceptions of the previous game and approach to sport in general. Questions relating to participants’ perceptions of the previous game were omitted from the control period.

Background Information and Participants’ Perceptions of Competition. Participants completed demographic information indicating age, gender, the sport they were participating in, and number of years’ experience. Two items assessed participants’ perceptions of the sport in general. These were: *In general how important is playing this sport to you?* and *In general how important is being successful in sport to you?* Responses were on an 11-point Likert scale with the verbal anchors 0 = ‘Not important’, 5 = ‘Moderately Important’, 10 = ‘Extremely Important’. Participants’ feelings relating to the previous game was assessed via the item *Please indicate on the scale below how important being successful in the last competition/match was to you* Responses were again on an 11-point Likert scale with the verbal anchors 0 = ‘Not important’, 5 = ‘Moderately Important’, 10 = ‘Extremely Important’. Participants’ perceptions of their performance in the last game were assessed via *How well do you feel you performed in the last competition/match?* Responses were on an 11-point Likert scale with the verbal anchors 0 = ‘Much worse than average’, 5 = ‘Average’, 10 = ‘Much better than average’.

The Symptom Checklist. Participants were asked to report how many cold/flu symptoms they had experienced using a 14-item checklist (Evans et al., 1996).

The General Health Questionnaire. Measures of psychological well-being were derived from three subscales of Goldberg and Hillier’s (1979) General Health Questionnaire (GHQ) which tap somatic symptoms; anxiety/insomnia; and social dysfunction. The factor structure of the GHQ has been repeatedly validated and has high internal reliability and validity (Goldberg & Hillier, 1979).

Profile of Mood States—Short Form. Mood state was assessed using the POMS—Short Form (POMS-SF, Shacham, 1983). This is a shortened version of the original Profile of Mood States (POMS, McNair, Lorr, & Droppleman, 1971). We chose a shortened version for its ease of administration. Participants rated each item on a 5-point response scale where: 0 = Not at all, 1 = A little, 2 = Moderately, 3 = Quite a bit and
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4 = Extremely. Scores on each of the POMS-SF subscales correlate highly (all rs > .95) with the original POMS (Curran, Andrukowski, & Studts, 1995; Shacham, 1983) and the internal consistency of the POMS-SF subscales were comparable to that on the original POMS (Curran et al., 1995).

PROCEDURE

Prior to data collection ethical approval was obtained from the Sport, Health, and Exercise ethics committee at Staffordshire University. Participants completed a booklet on three separate occasions. On each occasion participants completed an informed consent form. Data were collected between 4-6 days after a win, 4-6 days after a loss, and at least 10 days after the last contest (regardless of the result). This time frame was chosen because it is in line with previous studies which have indicated that symptoms are reported three to five days after elevations in daily undesirable events or reductions in daily desirable events (Evans et al., 1996; Sheffield et al., 1996; Stone et al, 1987). The order in which the booklets were completed differed with some teams reporting data following a win first, others following a loss and some teams completing the control data first. In the experimental periods (win, loss) participants were asked to indicate how they had been feeling in the few days since their last competition. In the control period participants were asked to indicate how they had been feeling over the past 5 days. In all conditions participants were asked to indicate as honestly as possible how they had been feeling. The booklet was administered to participants during training sessions.

ANALYTIC STRATEGY

Participants’ perception of their sport in general was compared across the three conditions using repeated measures ANOVA’s. Paired t-tests were used to compare participants’ perceptions of the game in which they won and the game in which they lost.

To examine differences in mood and well-being the mood data (POMS-SF) and measures of health (GHQ and The Symptom Checklist) were analysed using two repeated measures MANOVAs and subsequent univariate ANOVAs at the three time points and between hockey and football players. Where ANOVA’s were significant, post-hoc comparisons were made using Tukey tests.

Data were analysed using SPSS (v11.5). In addition to traditional statistical significance, effect sizes (eta²), indicating the proportion of shared variance, are reported (Clark-Carter, 2001). Finally, the small number of females in the sample meant that sex could not be treated as a moderator; however, analyses of the mood and health data were re-run using only males to ensure that the results were not biased by the few females.
RESULTS

PARTICIPANTS’ PERCEPTIONS OF GAME

Repeated measures ANOVA revealed no differences in participants’ overall perceptions of their sport following wins, losses, and the control period (see table 1). Paired t-tests were used to compare participants’ perceptions of the game in which they won and the game in which they lost (see table 1). Participants rated their performance ($t=7.54$, $p<.01$) more highly in competitions they had won compared to those they had lost. In contrast, ratings of importance of success in general, or in the last competition/match, did not differ between competitions they had won or lost ($p>.10$).

MOOD

Repeated measures MANOVA revealed differences ($F(12, 376)=2.91$, $p<.01$) in mood following wins and losses, and during the control period (see table 2 and figure 1). There was no main effect for sports team and no interaction effect ($ps>.05$). However, it is important to note that the Box’s M test was significant for this analysis ($M=184.105$, $F=1.62$, $p<0.001$), indicating unequal variance-covariance matrices. In these circumstances Tabachnick and Fidell (1996) note that the more numerous the dependant variables and the greater the discrepancy in cell sample sizes the greater the potential distortion of Alpha levels. However, although there are 6 dependent variables the number of participants in each group was similar. In any case, Pillai’s Trace is considered a robust statistic when dealing with data where there is inequality of variance-covariance matrices (Tabachnick & Fidell, 1996). Accordingly, while the Box’s M test is reported as being significant, follow up univariate analyses were conducted. Univariate ANOVAs were used to examine relationships between game outcome and each mood. For depressed mood, there was a significant but small effect of condition ($F(2,197)=3.98$, $p<.05$, $eta^2=.04$). Post-hoc Tukey tests revealed lower ratings after a win compared to after a loss ($p<.05$). For anger, there was a significant but small effect of condition ($F(2,197)=4.25$, $p<.05$, $eta^2=.04$). Post-hoc Tukey tests revealed lower ratings after a win compared to after a loss ($p<.05$). For vigour, there was a significant and large effect of condition ($F(2,197)=12.14$, $p<.01$, $eta^2=.11$). Post-hoc Tukey tests revealed lower ratings after a loss compared to after a win ($P<.05$) and after a loss compared to

<table>
<thead>
<tr>
<th>Measure</th>
<th>Win</th>
<th>Control</th>
<th>Loss</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Importance of Playing Sport’</td>
<td>8.12 (1.30)</td>
<td>8.33 (1.23)</td>
<td>8.11 (1.37)</td>
<td>.03</td>
</tr>
<tr>
<td>‘Importance of Being Successful in Sport’</td>
<td>7.91 (1.61)</td>
<td>7.92 (1.55)</td>
<td>7.62 (1.95)</td>
<td>.04</td>
</tr>
<tr>
<td>‘Importance of Being Successful in Last Competition/Match’</td>
<td>8.33 (1.75)</td>
<td>8.03 (1.70)</td>
<td></td>
<td>.04</td>
</tr>
<tr>
<td>Performance in Last Competition/Match</td>
<td>6.92 (1.81)</td>
<td></td>
<td>4.94 (1.91)</td>
<td>.47**</td>
</tr>
</tbody>
</table>

* $p<.05$, ** $p<.01$
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For tension, fatigue, and confusion, there were no significant effects of condition. Equivalent analyses of men only revealed a similar main effect of game outcome on mood. In addition, there was a main effect for sports team in that footballers reported higher scores on all the mood subscales (these are available from the first author). No interaction effect was observed.

**Health Measures**

Repeated measures MANOVA revealed differences following wins and losses and during the control period ($F(8, 380) = 2.79, p < .01$). There was no main effect for sport and no interaction effect ($p$s $>.05$). Univariate ANOVAs were then used to examine relationships between game outcome and each health measure. For somatic symptoms, there was a significant and medium effect of condition ($F(2,197) = 8.43, p < .01, \eta^2 = .08$).

<table>
<thead>
<tr>
<th>Measure</th>
<th>Win</th>
<th>Control</th>
<th>Loss</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension</td>
<td>.73 (.65)</td>
<td>.95 (.82)</td>
<td>.93 (.80)</td>
<td>.02</td>
</tr>
<tr>
<td>Depressed</td>
<td>.40 (.67)</td>
<td>.56 (.63)</td>
<td>.73 (.79)</td>
<td>.04*</td>
</tr>
<tr>
<td>Anger</td>
<td>.49 (.63)</td>
<td>.66 (.76)</td>
<td>.84 (.79)</td>
<td>.04*</td>
</tr>
<tr>
<td>Vigor</td>
<td>2.16 (.64)</td>
<td>1.88 (.73)</td>
<td>1.53 (.74)</td>
<td>.11**</td>
</tr>
<tr>
<td>Fatigue</td>
<td>1.03 (.78)</td>
<td>1.14 (.87)</td>
<td>1.20 (.78)</td>
<td>.01</td>
</tr>
<tr>
<td>Confusion</td>
<td>.65 (.69)</td>
<td>.82 (.82)</td>
<td>.82 (.79)</td>
<td>.01</td>
</tr>
</tbody>
</table>

$p < .05, **p < .01$,
Post-hoc Tukey tests revealed lower somatic symptoms after a win compared to after a loss and the control condition \( (p < .05) \). For anxiety symptoms, there was a significant but small effect of condition \( (F(2,197) = 5.36, p < .01, \eta^2 = .05) \). Post-hoc Tukey tests revealed lower anxiety symptoms after a win compared to after a loss \( (p < .05) \). For social dysfunction symptoms, there was a significant and medium effect of condition \( (F(2,197) = 6.00, p < .01, \eta^2 = .06) \). Post-hoc Tukey tests revealed less social dysfunction symptoms after a win compared to after a loss \( (p < .05) \). There was no significant effect for cold/flu symptoms \( (p > .1) \). Equivalent analyses of men only revealed the same pattern of findings (these are available from the first author).

**DISCUSSION**

Data from the present study suggest that game outcome is associated with short-term changes in well-being. Specifically, athletes reported lower depression and anger after a win compared to a loss, while lower levels of vigour were observed after a loss compared to after a win and the control condition. Differences in symptom reporting were also observed depending on game outcome. Lower somatic symptoms were reported after a win compared to after a loss and the control condition. Lower anxiety and social dysfunction symptoms were reported after a win compared to after a loss.

The changes in mood state observed are in line with previous studies (e.g., Biddle & Hill, 1992; Hassmén & Blomstrand, 1995; Willimczik et al., 1986; Wilson & Kerr, 1999), which reported a change in mood state soon after competition. The present study extended previous research by demonstrating that changes in mood associated with game outcome were observed over four to six days following the competition. Such changes may have a number of consequences. A negative affective response to competition may have an adverse impact on motivation levels in training and competition (Hanin, 2000; Vallerand & Blanchard, 2000) or performance levels (Beedie, Terry, & Lane, 2000), while the reverse may occur following a positive affective response to competition. Accordingly, coaches and athletes should, when necessary, become aware of a range of affective control strategies (e.g., Jones, 2003) to assist in controlling negative affective responses following a loss. This may help maintain effort and performance in subsequent training sessions and competitions.

### Table 3. Mean (SD) Scores and Effect Size for Scores on the Symptom Checklist and GHQ Subscales across the Win, Loss, and Control Periods

<table>
<thead>
<tr>
<th>Measure</th>
<th>Win</th>
<th>Control</th>
<th>Loss</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatic</td>
<td>3.94 (2.84)</td>
<td>5.29 (3.16)</td>
<td>6.38 (3.73)</td>
<td>.08**</td>
</tr>
<tr>
<td>Anxiety</td>
<td>3.06 (3.21)</td>
<td>4.21 (3.79)</td>
<td>5.14 (3.57)</td>
<td>.05**</td>
</tr>
<tr>
<td>Social</td>
<td>6.08 (2.18)</td>
<td>6.77 (2.08)</td>
<td>7.44 (2.34)</td>
<td>.06**</td>
</tr>
<tr>
<td>Cold/flu symptoms</td>
<td>2.71 (2.37)</td>
<td>3.65 (2.92)</td>
<td>3.45 (2.94)</td>
<td>.02</td>
</tr>
</tbody>
</table>

\* \( p < .05 \), ** \( p < .01 \)
To our knowledge the present study represents the first attempt to explore the impact of game outcome on the health of athletes. Collectively the data provide tentative support for previous research indicating that undesirable life events (such as losing for most athletes) are associated with an increase in symptom reporting (e.g., Cohen, et al., 1998; Evans & Edgerton, 1991; Evans et al., 1988; Sheffield et al., 1996; Stone et al., 1987). Interestingly, in our study we found that winning was associated with lower somatic symptoms compared to the control condition whereas there was no difference in somatic symptoms between losing and the control condition. This suggests that the positive effect of winning may be stronger than the negative effect of losing. This finding appears to be in accord with the broader literature examining live events and symptom reporting in which positive events have a more consistent effect on URTIs than negative events (Evans & Edgerton, 1991; Evans et al., 1988; Evans et al., 1996). In our study we did not notice differences in cold/flu symptoms but this may this may be due to the longer duration of cold/flu symptoms (compared with the other health measures employed) and accordingly possible contamination of the control period from preceding events. It is also possible that game outcome may impact self-reported measures of well being (assessed via the GHQ) but not more objective measures of symptomatology (e.g., number of cough and cold symptoms) which the symptom checklist assessed.

The data from the present study highlight an association between game outcome and self-reported somatic symptoms; however, it does not explain this association. Future research should explore possible mechanisms and may wish to consider research demonstrating that stress may compromise immune function (Cohen, 1996) and that positive affect is associated with enhanced immune function (Stone, Neale, Cox, Napoli, Valdimarsdottir, & Kennedy-Moore, 1994). Other potential limitations of the study include alternative explanations for the effects observed. For example, following a loss, athletes may be more likely to engage in a greater frequency of behaviors that could have a negative impact on mood and well-being (e.g., excessive alcohol consumption). Likewise changes in training load and performance levels resulting from game outcome could have impacted measures of well-being. It is also possible that mood or the changes in somatic well-being predicted game outcome. However, we consider this to be an unlikely scenario as all the data were taken from team games. It would have required a substantial number of players in the same team (which would have had to happen for all the 7 teams used in the study) to have experienced these changes for this to be a factor. A final limitation of the study is that it is unclear how performance in the contest prior to the one which preceded data collection may have impacted results. For example, a response to a loss may differ if it occurs following a run of victories or run of defeats.

Future research should address the limitations outlined which are present in this initial attempt to explore the relationship between game outcome and well-being. In addition, as attributions impact the emotional reaction to competition (Biddle, Hanrahan, & Sellars, 2001) further research could examine if attributions mediate the relationship between game outcome and well-being. For example, the impact of winning on well-being may be different if an athlete attributes success to external factors (e.g., “We

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won because the other team was poor") compared with an athlete who attributes success to internal factors (e.g., “We won because we played well”). Other psychological constructs, such as self-confidence, may also be important in mediating the relationship between game outcome and well-being. While a strength of the present study was that retrospective game importance did not differ during the win and loss periods, the games were regular season games and clearer effects may be observed in games like cup finals or championship deciders. Finally, in the present study data were collected retrospectively for a period covering a number of days, and future research should consider collecting mood and health data for each separate day to provide a more detailed and valid examination of the impact of game outcome on well-being.

The present study represents an initial attempt to explore the relationship between game outcome and well-being in athletes. The data suggests that game outcome is associated with short-term changes in some moods and some self-reported health symptoms. Future research should explore the mechanisms by which changes in well-being might occur as a result of game outcome.

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Acknowledgments
The authors wish to acknowledge the assistance of Haroon Dar, Richard Gunney, Ray Mellon, Mathew Pritchard, and David Wright with data collection.