

A social cognitive approach to burnout in elite athletes

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Accepted for publication 1 March 2007

The purpose of this study was to investigate athlete burnout from a social-cognitive perspective by examining the relationship between social cognitive motivational variables at the start of a season and signs of burnout in elite athletes at the end of the season. Participants were 141 ($F = 60$, $M = 81$) elite winter sport athletes competing in Alpine skiing, Biathlon, Nordic Combined, Nordic skiing, and Speed skating. Participants completed a comprehensive motivation assessment package at the start of the season and a further burnout inventory at season's end. Results indicated that motivational dispositions, measures of the achievement climate, perceived ability and

dimensions of perfectionism were associated with burnout in a conceptually consistent manner. Furthermore, the elite athletes could be grouped into two motivational profiles based on variables measured at the start of the season, one being adaptive and the other maladaptive. At season's end, the two different motivational profiles yielded distinctively different responses on an inventory assessing signs of burnout. The current findings strengthen the claim that burnout in elite athletes may not simply be "motivation gone awry" as Gould has suggested, but an inevitable consequence of exhibiting a maladaptive motivational profile.

It has been argued that a high level of motivation, reflected by dedicated practice and commitment to very high goals, enables talented athletes to fulfill their sporting potential and perform at an elite level (Ericsson, 1996; Starkes, 2000; Mallett & Hanrahan, 2003). Elite athletes in their preparation for competition reveal a single-minded determination that helps them to persevere through the most demanding workouts and survive harsh training conditions. Unfortunately, for some of these athletes, achievement striving fails to produce desired outcomes and the perceived setbacks lead to frustration. Consequently, the desire to achieve, which many believe to be the hallmark of elite athlete development (e.g., Hardy et al., 1996; Gould et al., 2002), may become psychologically dysfunctional and contribute to maladaptive training responses (Gould, 1996; Hall et al., 1997; Hall, 2005; Lemyre et al., 2006). These responses become manifest when elite level athletes experience a perception of enduring physiological and/or psychological exertion. When combined with chronic negative affect and debilitating self-focused cognition, a rigid adherence to intense achievement striving may lead to burnout. Research is needed to systematically examine the factors that give rise to this pattern of cognition, affect and behavior.

Burnout has been broadly defined by Freudenberg (1980) as a state of mental, emotional, and

physical exhaustion brought on by persistent devotion to challenging goals. Others, such as Gold and Roth (1993), have described burnout as a syndrome emanating from unmet needs and unfulfilled expectations. Both studies argue that burnout is characterized by progressive disillusionment and by psychological and physical symptoms that diminish one's self-esteem. Based upon research in the workplace, several attempts have been made to define athlete burnout (Feigley, 1984; Fender, 1989; Eades, 1991), but these have been widely criticized for adopting a unidimensional approach, confusing antecedents of the construct with its defining features and assuming that the symptoms exhibited by those suffering from burnout in the workplace will accurately reflect burnout in sporting contexts.

In response to this criticism, Raedeke (1997) argued that athlete burnout should be considered as a multidimensional construct and that the defining characteristics should be aligned to the core purposes and responsibilities of being an athlete. According to Raedeke (1997), athlete burnout is a syndrome arising from an individual's appraisal of sport performance, and it is reflected by three key indicators. First, when experiencing burnout, athletes report a depletion of emotional and physical energy. This is a consequence of the intensive demands under which they are placed during training

and competition. Second, athletes perceive a reduced sense of accomplishment because their goals are often unfulfilled and desirable outcomes appear elusive. Third, athletes begin to devalue their sport, express that sport has decreased relevance and exhibit decreased interest in performance. This is largely because their achievement striving appears to be bringing them little reward. Raedeke's (1997) work to establish the defining characteristics of athlete burnout and validate a measurement technology adapted from an approach developed by Maslach and Jackson (1984) with human service providers (Raedeke & Smith, 2001) has made an important contribution to the field. It has provided increased clarity about the construct under investigation and has enabled researchers to begin to identify the important psychological mechanisms that appear to underpin the burnout syndrome (Raedeke & Smith, 2004).

Unfortunately, to date, few studies have provided empirical verification of these mechanisms. Most published accounts of athlete burnout have been descriptive, anecdotal, or autobiographical (Raedeke, 1997; Cresswell & Ecklund, 2005; Lemyre et al., 2006). An exception is the work of Gould (1996) and colleagues (Gould et al., 1996a, b, 1997), who attempted to address important conceptual and empirical divergences found in three models of athlete burnout that were proposed by Smith (1986), Coakley (1992) and Silva (1990). As a result of a four-stage study of burnout in youth tennis players, Gould and colleagues reported that initial investment in sport was a consequence of high levels of motivation, and that successful experiences led to intense enjoyment and encouraged further investment. It was argued that the onset of athlete burnout was the result of stress, brought on by a complex interaction between personal and situational factors. Thus, burnout was thought to develop when individuals repeatedly appraised their sporting investment as threatening to self-worth, and this precipitated a motivational shift from an intense desire to succeed and continued investment, to a pattern of physical and psychological disengagement. This change in an athlete's investment patterns led Gould (1996) to conclude that burnout might be adequately described as "motivation gone awry."

A slightly different interpretation has also been proposed. It has been suggested that in order to understand why motivation might go awry and lead to burnout, one must examine the motivational framework that gives meaning to an athlete's cognition, affect and behavior (Hall et al., 1997; Lemyre, 2005). While the burnouts in Gould's research were initially motivated to invest in their sport, it may be questioned whether the initial cognitions, affective responses and behavioral strategies exhibited by

these athletes did, in fact, reflect an adaptive motivational pattern. Instead, it is argued that burnout may have been an inevitable consequence of endorsing a potentially debilitating motivational framework throughout their careers rather than adaptive motivation going awry in its later stages. From a social cognitive motivational perspective, one might suggest that the initial cognitive, affective and behavioral patterns of future burnouts would, at first, appear to be adaptive because a considerable number of positive outcomes emanate from a history of early success. It is further argued that the true maladaptive nature of the underlying motivational framework only becomes observable as these athletes begin to experience continuing difficulty, extreme challenge and sporting failure. Because most burnouts tend to be high achievers, and frequently highly able athletes, the circumstances that foster burnout will rarely be seen in talented athletes at the initial stages of sporting investment because difficulties and challenges are often short lived, and they can usually be overcome with relative ease through the application of effort and a perception of physical competence. However, the criterion a potential burnout uses to give meaning to achievement provides the basis for problems. When these athletes endorse a view of achievement that provides little recourse to protect the self against the psychological impact of *prolonged* difficulties or *persistent* failure to meet important goals, then it is simply a matter of time before the potential for psychological, emotional, and behavioral disengagement from sport becomes manifest as the challenges become progressively more difficult and the barriers to success at an elite level appear more formidable.

The role of motivation variables in the process of burnout

Within a social cognitive approach, it is an individual's achievement goals that are considered to be the critical determinants of achievement behavior (e.g., Maehr, 1989; Nicholls, 1989). It is these goals that provide the framework for understanding and interpreting athletes' achievement-related cognitions, affect and decisions about whether or not to engage (e.g., Duda & Hall, 2001; Roberts, 2001). Therefore, identifying an athlete's achievement goals provide a basis for understanding the onset of athlete burnout. Sport researchers have identified that two goals are prevalent in most achievement contexts (Roberts, 2001). When a task goal is endorsed, achievement is considered in self-referent terms, and success and failure are judged by whether one has mastered an activity, improved at the task or met self-imposed standards. In contrast, when an ego goal is endorsed,

achievement is considered in normative or comparative terms, and an individual's concern is with demonstrating ability or avoiding demonstrating a lack of ability, in comparison with others. A large body of evidence has confirmed that the adoption of a task goal gives rise to adaptive patterns of motivation for individuals of all levels. When a task goal is adopted, individuals have been found to seek out challenge, put forth effort, demonstrate persistence, maintain high levels of intrinsic interest, and show motivational enhancing attributional patterns for achievement outcomes (e.g., Duda & Hall, 2001; Roberts, 2001; Roberts et al., 2007). Because of this, it has been argued that the endorsement of task goals by elite athletes will mean that the probability of experiencing burnout will be low (Hall et al., 1997).

In contrast, Hall et al. (1997) and Lemyre (2005) have argued that the endorsement of an ego goal renders an elite athlete vulnerable to experiencing burnout. This is because it encourages self-focused attention where validation of who one is, what one can be or what one can do are highly salient in establishing and maintaining self-worth (Dykman, 1998; Kaplan & Maehr, 1999). Dweck (1999) has stated that when an individual becomes dominated by ego goals, establishing self-worth becomes a matter of repeatedly demonstrating one's ability. It is argued that this may be easily accomplished if individuals endorsing an ego goal establish a sense of competence when they first engage in sport. Their initial experiences in sport are largely positive and they achieve success because of their high ability, and they continue to put forth effort, strive to achieve, and make significant improvements. Because normative success is frequently experienced, and ability is rarely questioned, engagement enables them to demonstrate ability and validate self-worth. On those occasions when ability is exposed as being inadequate, these athletes seek to remedy the situation by applying more effort. However, it is when these athletes continually perceive that their ability and their effort levels are inadequate to demonstrate ability that the maladaptive nature of their motivational goal becomes apparent. Unsatisfactory performance brings about a series of maladaptive cognitions and negative affective responses. Stress then becomes chronic as the athlete constantly appraises competitive situations as threatening, and the athlete may experience symptoms of burnout as each attempt to validate a sense of self-worth is undermined. It is based upon this conceptual argument that we propose that elite athletes who endorse low task goals and high ego goals will experience elevated scores on the three dimensions of burnout if their motivational profile also suggests they question their ability.

Motivational climate

While individuals enter an achievement setting with a certain dispositional tendency to be ego or task involved, the motivational dynamics of the context have a profound influence on the adopted goal of action (Ames & Archer, 1988; Ames, 1992). Ames (1992) argues that a differential interpretation of achievement information defines the achievement climate athletes perceive to be operating. The achievement climate reflects the perceived salience of task- and ego-oriented cues emanating from within the achievement context, and it has the potential to enhance or constrain dispositional goals (Solomon, 1996; Parish & Treasure, 2003). Typically, when the sport context is characterized by a high value placed on interpersonal competition, social comparison, the coach emphasizing "winning at all costs," and public recognition of ability, a performance climate prevails. This reinforces individuals' likelihood of being ego involved in that context. If, on the other hand, the achievement context is characterized by learning and mastery of skills, the valuing of effort as an end in itself, and private recognition of effort, a mastery climate prevails. This increases the probability that individuals will be task involved in that context (Treasure & Roberts, 1995). Thus, when athletes perceive a strong performance climate and a weak mastery climate, it is predicted that athletes will experience increased vulnerability to burnout, and this will be reflected by increased physical and emotional exhaustion, reduced perceptions of personal accomplishments and a devaluation of sport.

Perfectionism

A further motivational factor that may be critical to the onset of athlete burnout is perfectionism. Dispositional perfectionism is considered by some to be a key feature of high achieving athletes (Henschen, 2000; Anshel & Eom, 2002; Dunn et al., 2002). This is because perfectionism is characterized by the relentless pursuit of excessively high performance standards that can lead to a sense of self-satisfaction and heightened self-esteem (Hamachek, 1978). Some researchers have reported that perfectionism can have motivationally adaptive qualities in different achievement contexts (Hamachek, 1978; Frost et al., 1990; Slaney et al., 1995; Terry-Short et al., 1995). However, while perfectionism may encourage heightened achievement striving, which itself leads to a number of positive outcomes, it may also precipitate maladaptive patterns of cognition and a vulnerability to failure that can lead to both psychological impairment and distress (Flett & Hewitt, 2002, 2005; Hall, 2005).

One of the first to explain its debilitating effects was Burns (1980) who argued that perfectionism was a unidimensional construct that reflected both irrational beliefs and dysfunctional attitudes. It described individuals who were striving “compulsively and unremittingly toward impossible goals” (p. 34) and who measured “their own worth entirely in terms of productivity and accomplishment” (p. 34). More recent work has demonstrated that rather than being a unidimensional construct, perfectionism has a complex multidimensional structure where both personal and interpersonal elements contribute to different forms of achievement striving and underpin various adaptive and maladaptive outcomes (Frost et al., 1990; Flett & Hewitt, 2002). Thus, perfectionism may have considerable energizing effects, which promote heightened effort and persistence, it also carries the potential to be psychologically debilitating because individuals are rarely satisfied with performance standards and constant self-criticism may become psychologically corrosive (Burns, 1980; Flett & Hewitt, 2002). For example, empirical evidence from the educational and counselling literature has found that various dimensions of perfectionism are associated with excessive forms of self-criticism, maladaptive cognitions, and with negative affective responses to achievement outcomes such as fear of failure, state and trait anxiety, guilt, shame, low self-esteem, and depression (Hewitt & Flett, 1991; Bergner, 1995). Similarly, perfectionism dimensions have been linked with dysfunctional behavioral strategies such as self-handicapping (Hobden & Pliner, 1995), learned helplessness (Flett et al., 1998), and interpersonal difficulties (Hill et al., 1997).

Further evidence has been found in sporting contexts. Dispositional perfectionism has been associated with achievement anxiety (Frost & Henderson, 1991; Hall et al., 1998), athlete anger (Dunn et al., 2006), low self-esteem (Gotwals et al., 2002), labile self-esteem (McArdle & Duda, 2004), poor interpersonal relations (Ommundsen et al., 2005), as well as athletic burnout (Gould et al., 1996). Frost and Henderson (1991) have attempted to explain the process by which dispositional perfectionism becomes debilitating in athletes. They argue that it is because different psychological mechanisms are prominent at different stages of performance. For example, immediately before competition, debilitating cognition is thought to result from athletes ruminating about the potential consequences of negative outcomes. Then, when errors occur during competition, performance debilitation is considered to result from cognitive interference brought about by intrusive and distracting thoughts. Finally, when perfectionist athletes fail to live up to their own performance expectations, debilitating cognitive and self-protective achievement strategies begin to

emanate from enduring negative emotions such as shame, anger, and anxiety. Extrapolating from Frost and Henderson, it could be argued that when this pattern becomes an enduring cycle of high effort, disaffection, and debilitating cognition, in conjunction with physical and emotional exhaustion, then the potential for burnout is considerably increased. Therefore, we hypothesize that athletes who report high scores on all dimensions of dispositional perfectionism experience increased vulnerability to burnout, reflected in elevated scores on the three burnout dimensions.

Aim and hypotheses

In line with the conceptual arguments above, we hypothesized that:

1. There is a positive association between an ego orientation, a performance climate, elements of perfectionism (high performance standards, concern about mistakes, doubts about action, parental expectation, and parental criticism) and the three dimensions of burnout. There is also a negative association between a task orientation, a mastery climate, perceived ability, and the three dimensions of burnout.
2. A maladaptive motivational profile, consisting of high levels of dispositional ego orientation, a perceived performance climate, high performance standards, concern over mistakes, doubts about action, as well as parental expectations and criticism, is associated with higher levels of burnout in elite athletes.
3. An adaptive motivational profile, consisting of high levels of dispositional task orientation, a perceived mastery-oriented climate, high perceived ability and low levels of perfectionism, is associated with lower levels of burnout in elite athletes.

In addition, it was hypothesized that:

4. A sense of high perceived goal attainment and satisfaction with performance during the season is associated with lower levels of burnout in elite athletes.

Methods

Participants and procedure

Participants ($N = 141$) were current Olympic team members ($N = 45$) or junior elite athletes studying at national sport academies ($N = 96$) in Norway. Over half of the participants (52%) had previous World Cup or World Championship experience. The participants (81 males, 60 females, age 17–32, $M = 20.1$ years, $SD = 4.79$) competed in Nordic Skiing, Alpine Skiing, Biathlon, Speed Skating, and Nordic Combined. Chosen because of their similarities in energy demands,

these five winter sports also have a high status within the national sport culture of Norway.

First data collection

Data were collected over a 3-week period in September (T1). Participants responded to a questionnaire assessing achievement goals, perception of the motivational climate, perceived ability and perfectionism. The first author traveled to training camps and testing sites to present the project and administer the pre-season questionnaire. Data collection for the junior athletes at sport academies was organized by phone. School officials received an information package by mail and consent forms to be filled by the participants. Parental consent was also requested for under-age athletes. In an effort to keep data collections as similar as possible, detailed procedure guidelines were provided and a list of instructions was given to read to the athletes. Participants were notified that participation in the study was voluntary and that they could withdraw at any time without penalty.

Second data collection

Team officials were contacted by phone and the second data collection (T2) took place within 2 weeks of the end of the official competition season. Together with a letter reminding them of the guidelines, goals and pertinence of the study, a follow-up questionnaire investigating athletes' cognitive appraisal of goal attainment and success, as well as symptoms of overtraining and signs of burnout, were sent by mail to the sport academy officials and directly to the home of each participating Olympic Team athlete. Authorization was received from the National Olympic Committee to get in touch with National Team athletes by phone. All questionnaires received within the 4-week window were included in the study. Of the 211 athletes who answered the first questionnaire, 141 completed the follow-up questionnaire. Thus, the drop-out rate from the September time point to the March follow-up data collection was 33%.

Measures

Achievement goals

A Norwegian translation (Roberts & Ommundsen, 1996) of the sport-specific Perception of Success Questionnaire (POSQ; see Roberts et al., 1998) was used to assess achievement goal orientations. It consists of two six-item subscales measuring task and ego goals. Scores were recorded on a five-point Likert scale anchored by (1) "strongly agree" and (5) "strongly disagree." The stem for each item was "When participating in my sport, I feel most successful when." Scores were computed for each subscale. Both subscales demonstrated satisfactory internal consistency (see Table 1).

Perceived motivational climate

Perception of the motivational climate was assessed by the translated version (Roberts & Ommundsen, 1996) of the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifriz et al., 1992). The original PMCSQ consists of 21 items and two subscales measuring performance- (12 items) and mastery (nine items)-oriented motivational climates. Dimensions of perceived mastery climate were assessed using items reflecting an emphasis on effort (e.g., "Trying hard is rewarded on our team," "Each player's improvement is important for our coach") while perceived performance cli-

Table 1. Descriptive statistics ($N = 141$)

Data collection	Variables	Mean	SD	α
T1	Achievement goal orientations			
	Ego	3.86	0.82	0.85
	Task	4.47	0.66	0.84
T1	Perceived motivational climate			
	Performance climate	2.22	0.73	0.79
	Mastery climate	4.02	0.54	0.81
T1	Perceived ability	3.82	0.62	0.69
T1	Perfectionism			
	Personal standards	2.95	0.76	0.77
	Concern over mistakes	2.22	0.72	0.81
	Doubts about action	2.77	0.81	0.69
	Parental expectations	1.51	0.74	0.84
	Parental criticism	1.52	0.72	0.74
T2	Burnout dimensions			
	Physical and emotional exhaustion	2.11	0.68	0.81
	Reduced sense of accomplishment	2.57	0.81	0.82
	Sport devaluation	2.11	0.66	0.72
	Total burnout	2.26	0.58	0.87
T2	Goal attainment*	2.84	1.13	–
T2	Performance satisfaction	2.93	1.17	–

*Response range for this item was from 1 to 4.

mate was assessed using items reflecting intra-team rivalry (e.g., "Outperforming team-mates is important") and unequal treatment of players due to skill differences (e.g., "Team stars receive special attention"). The stem for each item is: "On my team . . ." And responses were recorded using a five-point Likert scale anchored by (1) "strongly agree" and (5) "strongly disagree."

Perceived ability

Four translated questions from the perceived ability subscale of the Intrinsic Motivation Inventory (IMI; McAuley et al., 1989) and an additional summary question ("How good an athlete are you?") were used to assess perceived sport ability. Scores were recorded on a five-point Likert scale anchored by (1) "strongly disagree" and (5) "strongly agree." The stem for each of the first four items was "I experience that . . ." For the summary question, a five-point Likert scale was used, anchored by (1) "very good" and (5) "very bad." Results from previous research using confirmatory factor analysis (Lemyre et al., 2002) yielded an acceptable scale structure. A reliability analysis of the four original IMI items and the summary question was conducted for this elite population (see Table 1).

Perfectionism

The athletes' perfectionist dispositions were measured using a translated and adapted version (Ommundsen et al., 2005) of the Multidimensional Perfectionism Scale (MPS; Frost et al., 1990). The sport-specific version of the MPS (e.g., Hall et al., 1998) is a five-subscale, 29-item assessment tool. Each subscale measures one of five perfectionism dimensions identified by Frost et al. (1990): personal standards (e.g., "It is important to me that I am very competent at everything I do"); concern over mistakes (e.g., "I always get upset if I make mistakes");

doubts about action (e.g., “I usually have doubts about some aspect of my performance”); parental expectations (e.g., “My parents set very high standards for me”); and parental criticism (e.g., “My parents don’t seem to understand when I make mistakes”). Following the suggestion (Frost et al., 1990) that the Organization dimension of original MPS may not reflect a fundamental element of perfectionism, and consistent with previous perfectionism research in sport (e.g., Hall et al., 1998; Dunn et al., 2002; Ommundsen et al., 2006), the Organization subscale (e.g., “I am a neat person”) was removed from the perfectionist assessment package. Perfectionism scores were recorded on a five-point Likert scale, anchored by (1) “strongly disagree” and (5) “strongly agree.”

Burnout

Completing the assessment package was a translated version of the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The 15-item sport-specific measure was translated using a double Translation-Back-Translation technique. The stem for each question was “How often do you feel this way?” Athletes were requested to rate the extent to which the items refer to their participation motives on a seven-point Likert scale anchored by (1) “Almost Never” and (5) “Almost Always.” The ABQ has three five-item subscales assessing three key dimensions of burnout: (1) reduced sense of accomplishment (ABQ-RA; e.g., “It seems that no matter what I do, I don’t perform as well as I should”); (2) emotional and physical exhaustion (ABQ-EX; e.g., “I feel so tired from my training that I have trouble finding energy to do other things”); and (3) devaluation of sport participation (ABQ-DV; e.g., “The effort I spend participating in my sport would be better spent doing other things”). A total summed score for the ABQ (ABQ-T) is achieved by averaging all three subscale scores.

Cognitive appraisal

To investigate the athletes’ cognitive appraisal of their own performance at season’s end, participants were asked to express their perceived goal attainment (thinking back to the goals that you have set for yourself at the beginning of the season, to what extent do you feel you have reached these goals?) and their personal performance satisfaction level (how satisfied are you with your performance this season?). The perceived goal attainment question was scored on a four-point Likert scale, ranging from (1) “not reached any” to (4) “reached all of them,” while personal performance satisfaction level was scored on a five-point Likert scale anchored by (1) “0% satisfied” to (5) “100% satisfied,” with appropriate incremental steps in between (i.e., 25%, 50%, and 75%).

Results

Instrument reliability

To verify the internal consistency of each instrument, reliability analyses were conducted on each of the subscales included in the assessment package. Adequate internal consistency was revealed on each measure, and scores were above or close to the 0.70 suggested acceptance criterion (Nunnally, 1978). Included in Table 1 are the α coefficients (Cronbach, 1951).

Descriptive analyses

The mean values and standard deviations were calculated for each of the subscales (achievement goals, perception of the motivational climate, perceived ability, dimensions of perfectionist tendencies, and burnout dimensions) and are presented in Table 1. Examination of the means indicates that this sample of elite winter athletes expressed high levels of task orientation, high levels of ego orientation, moderate to high levels of a perceived mastery climate, moderate levels of a perceived performance-oriented climate and moderate to high levels of perceived ability. Mean scores were moderate on three of the perfectionism subscales (personal standards, concern about mistakes, and doubts about action) while being low to moderate on the two remaining dimensions (parental expectations and criticism). Ratings were moderate on the three subscales of burnout, as well as for total burnout.

The hypothesized relationships between motivational dispositions at season’s start and burnout dimensions at season’s end were first examined using bivariate correlation analyses (see Table 2). The results provided weak but conceptually consistent support for the first stated hypothesis by demonstrating significant positive bivariate relationships between an ego orientation, a performance climate, concerns about mistakes, doubts about action, parental criticism, and various dimensions of burnout. Significant negative relationships were also found between a task orientation, mastery climate, perceived ability, personal standards, and various dimensions of burnout. The strongest relationships were found in support of the fourth hypothesis, with goal attainment and performance satisfaction demonstrating moderate negative relationships with all three dimensions of burnout.

Because it was hypothesized that burnout is related to a maladaptive profile of social cognitive variables, a canonical correlational analysis was conducted to determine the multivariate association between the motivational constructs and the three burnout dimensions. The three burnout scales and the group of social cognitive variables were used to create linear combinations of the criterion and predictor variables. The overall multivariate relationship was significant, Wilks $\lambda = 0.54$ $F_{(30, 376)} = 2.84$ $P < 0.001$. One significant canonical function emerged with a canonical correlation of 0.58 ($R_c^2 = 0.34$) and a redundancy index of 17.4. The findings indicated that the squared canonical correlation exceeded the meaningful criterion of 0.10 (Pedhazur, 1982) and that there was 34% variance shared between the linear combinations of the two sets of variables. The redundancy index suggests that 17.4% total variance in burnout can be predicted by the group of social

Table 2. Correlations for achievement goals, motivational climate, perceived ability, perfectionism, burnout, and cognitive appraisal

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Ego	-	0.21 ^c	0.20 ^c	0.03	0.15	0.31 ^a	0.33 ^a	0.02	0.03	0.05	-0.05	-0.05	0.26 ^b	-0.03	-0.01	0.05
2. Task		-	-0.20 ^c	0.34 ^a	0.12	-0.15	-0.20 ^c	-0.09	-0.19 ^c	-0.14	-0.18 ^c	-0.25 ^b	-0.13	-0.23 ^b	-0.19 ^c	0.17
3. Performance climate			-	0.21 ^c	0.02	0.19 ^c	0.43 ^a	0.39 ^a	0.40 ^a	0.33 ^a	0.22 ^b	0.16	0.17 ^c	0.23 ^b	-0.19 ^c	-0.07
4. Mastery climate				-	0.24 ^b	0.08	-0.24 ^b	-0.19 ^c	-0.05	-0.12	-0.28 ^a	-0.33 ^a	-0.10	-0.30 ^a	0.22 ^b	0.17 ^c
5. Perceived ability					-	0.23 ^b	-0.05	-0.36 ^a	0.01	-0.09	-0.16	-0.39 ^a	-0.21 ^c	-0.32 ^a	0.25 ^b	0.22 ^b
6. Personal standards						-	0.60 ^a	0.20 ^c	0.25 ^b	0.19 ^c	-0.22 ^b	-0.19 ^c	-0.15	-0.22 ^b	-0.07	-0.07
7. Concern over mistakes							-	0.49 ^a	0.56 ^a	0.60 ^a	0.06	0.21 ^c	0.00	0.12	-0.20 ^c	-0.21 ^c
8. Doubts about action								-	0.24 ^b	0.39 ^a	0.11	0.37 ^a	0.15 ^b	0.27 ^b	-0.35 ^a	-0.33 ^a
9. Parental expectations									-	0.76 ^a	0.17 ^c	0.15	0.04	0.15	-0.11	-0.11
10. Parental criticism										-	0.16 ^c	0.25 ^b	0.10	0.21 ^c	-0.21 ^b	-0.27 ^a
11. Exhaustion											-	0.58 ^a	0.50 ^a	0.84 ^a	-0.28 ^a	-0.28 ^a
12. Reduced accomplishment												-	0.43 ^a	0.85 ^a	-0.59 ^a	-0.64 ^a
13. Sport devaluation													-	0.77 ^a	-0.32 ^a	-0.23 ^b
14. Total burnout														-	-0.50 ^a	-0.50 ^a
15. Goal attainment															-	-
16. Performance satisfaction																-

^a $P < 0.001$; ^b $P < 0.01$; ^c $P < 0.05$.

cognitive variables, thereby supporting the first hypothesis. The detail of the multivariate relationship can be observed by considering the canonical loadings, which reflect the contribution of each individual variable to the multivariate relationship. Pedhazur (1982) suggests that loadings with values above 0.3 are meaningful. In support of the first hypothesis the canonical loadings (Table 3) indicate that a combination of all three dimensions of burnout is positively associated with a performance climate, concern about mistakes, doubts about action and parental criticism, and negatively associated with a task orientation, a mastery climate and perceived ability.

The univariate and multivariate correlational analyses provide an indication of the degree of association between the social cognitive measures and the three dimensions of burnout. However, the construction of a maladaptive profile from this form of analysis is based solely upon significance testing. To determine the degree of difference in the dimensions of burnout between athletes endorsing a maladaptive motivational profile and those exhibiting an adaptive profile, a cluster analysis was first conducted on the social cognitive variables measured at the beginning of the season. Inclusion of each social cognitive construct into the cluster analysis was based upon current motivational theory.

Predicting burnout from motivational profiles

Consistent with recent research studying motivation profile groups in sport (Raedeke, 1997; Weiss et al., 1997; Hodge & Petlichkoff, 2000; Raedeke et al., 2000; Cumming et al., 2002), cluster analysis was used to generate motivation profile groups. K-means cluster analysis was used to classify participants according to scores on ego and task orientations, performance and mastery climates, perceived ability, personal standards, concern over mistakes, doubts about action, perceived ability, parental expectations, and parental criticism subscales.

A two-cluster solution was chosen over a three-, four-, and five-cluster solutions based upon the conceptual rationale presented earlier and the identification of a meaningful number of participants in each cluster. The two-cluster solution was the cleanest and the most robust of the cluster solutions tested. The first cluster consisted of 96 athletes, the second comprised a further 45 athletes. A Multivariate Analysis of Variance (MANOVA) was used to test for differences between the two cluster groups on the social cognitive variables. Further univariate analysis indicated that there were significant differences between cluster groups for each of the subscales: ego orientation ($F_{1,139} = 7.0, P < 0.01$); task orientation ($F_{1,139} = 10.4, P < 0.01$); performance climate ($F_{1,139} = 55.1, P < 0.001$); mastery climate

Table 3. Canonical loadings for burnout and social cognitive variables

	Canonical loadings
Criterion variables	
Physical and emotional exhaustion	0.57
Reduced sense of accomplishment	1.0
Sport devaluation	0.46
Predictor variables	
Ego goal orientation	- 0.09
Task goal orientation	- 0.43
Performance climate	0.34
Mastery climate	- 0.49
Perceived ability	- 0.68
Personal standards	- 0.28
Concern over mistakes	0.36
Doubts about action	0.65
Parental expectations	0.29
Parental criticism	0.42

Table 4. Means and standard deviations cluster motivation-profile group variables and corresponding dependent burnout measures cluster profiles

Variables	Cluster profiles			
	Maladaptive motivation (N = 96)		Adaptive motivation (N = 45)	
	M	SD	M	SD
Ego goal orientation	4.14	0.90	3.75	0.76
Task goal orientation	4.21	0.88	4.58	0.50
Performance climate	2.81	0.79	1.96	0.54
Mastery climate	3.75	0.52	4.13	0.51
Perceived ability	3.65	0.67	3.89	0.59
Personal standards	3.48	0.64	2.73	0.69
Concern over mistakes	3.04	0.62	1.88	0.41
Doubts about action	3.38	0.68	2.51	0.72
Parental expectations	2.17	0.95	1.23	0.37
Parental criticism	2.18	0.88	1.24	0.38
Physical and emotional exhaustion	2.96	0.71	2.40	0.79
Reduced sense of accomplishment	2.30	0.70	2.03	0.66
Sport devaluation	2.32	0.75	2.01	0.60
Total burnout	2.53	0.59	2.15	0.55

($F_{1,139} = 16.3, P < 0.001$); perceived ability ($F_{1,139} = 4.0, P < 0.05$); personal standards ($F_{1,139} = 36.2, P < 0.001$); concern over mistakes ($F_{1,139} = 171.5, P < 0.001$); doubts about action ($F_{1,139} = 44.2, P < 0.001$); parental expectations ($F_{1,139} = 71.5, P < 0.001$); and parental criticism ($F_{1,139} = 78.2, P < 0.001$). To test the stability of the two-cluster solution, we used a two-thirds random sample re-cluster analysis (Hair et al., 1995). Supporting the stability of the two-cluster solution, approximately 96% of the athletes remained in their original cluster membership. Means and standard deviations for the two clusters are presented in Table 4.

Reported mean scores for the two-cluster solution appeared to reflect a more and a less-adaptive

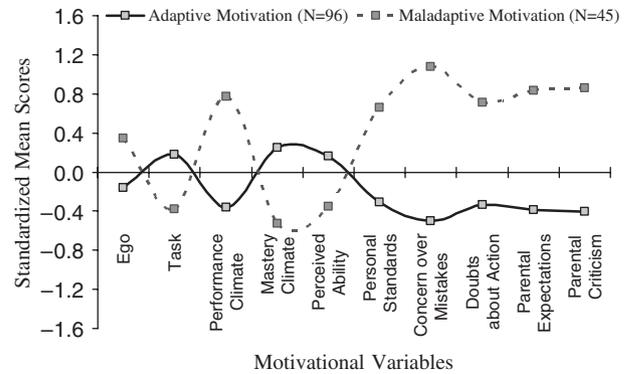


Fig. 1. Standardized scores for motivational-profile clusters of elite athletes at season start.

motivational profile for the elite athlete population tested. Although the clusters yielded significant differences for all variables included in the profiling, mean scores were only moderately different in magnitude when cluster 1 was compared with cluster 2. There are currently no conceptual or research-based guidelines as to what represents a clear high or low score for elite athletes on the motivational variables built into the profiles. To test for difference in maladaptive vs adaptive motivational factors hypothesized to influence the development of burnout in elite athletes, scores were standardized to allow for a better understanding of trends in differences between the two clusters studied. The z-scores, means for the variables included in the K-means cluster analysis are presented in Fig. 1. By using the z-scores, the qualitative and quantitative differences in motivation between the two clusters become clearer. As scores were centered on the mean for the population tested, differences in scores between the two clusters should be interpreted and labeled as higher or lower, rather than as high or low. Illustrating clearly the tenets of the motivational perspectives represented in the motivational profiling, the two clusters were labeled adaptive motivation and maladaptive motivation profiles.

Motivation profiles

It was hypothesized that distinct motivational profiles would be associated with different levels of burnout. To test for group differences in burnout levels at the end of the season, a MANOVA was conducted with the cluster membership as the independent variable and the burnout subscales and total score as the dependent variables. The analysis revealed a significant multivariate effect (Pillai's Trace = 0.110, $F_{3,137} = 5.635, P < 0.001, \eta^2 = 12.3\%$). Subsequent univariate analyses were conducted to determine which of the dependent measures contributed to the significant effect. Analyses revealed significant results

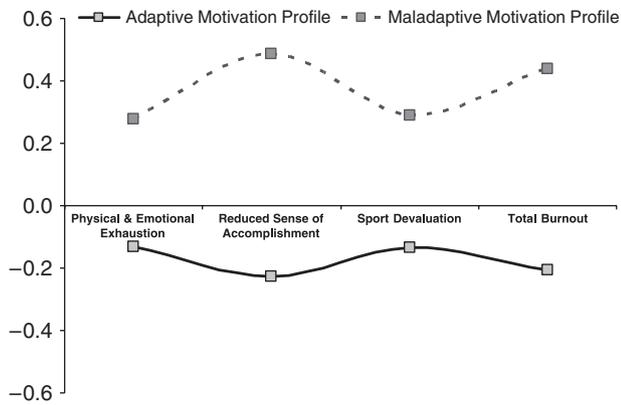


Fig. 2. Standardized burnout scores at season end for adaptive and maladaptive motivation profiles.

for physical and emotional exhaustion ($F_{3,137} = 4.87$, $P < 0.05$, $\eta^2 = 2.7\%$), reduced sense of accomplishment ($F_{3,137} = 15.88$, $P < 0.001$, $\eta^2 = 9.6\%$), sport devaluation ($F_{3,137} = 6.45$, $P < 0.05$, $\eta^2 = 3.7\%$), and total burnout ($F_{3,137} = 13.48$, $P < 0.001$, $\eta^2 = 8.2\%$). The unstandardized means and standard deviations for the two clusters on each of the burnout dimensions are presented in Table 4, while the z -scores for the burnout dimensions for the maladaptive motivation and adaptive motivation profiles are presented in Fig. 2.

Discussion

On the basis of the work of Dweck (1986), it has generally been assumed that as long as athletes remain confident in their current ability, their patterns of achievement-related cognition, affect, and behavior will *appear* to be adaptive, independent of the source of motivation. However, when athletes become pre-occupied with self-validation and experience achievement-related challenges such as persistent goal failure, or goal blockage brought about by injury or over-training, the inherently maladaptive nature of certain motivational parameters may appear.

Some have argued that athletes risk burning out when motivation goes awry (e.g., Gould, 1996). However, others (Hall et al., 1997; Lemyre, 2005; Lemyre et al., 2006) have questioned whether the burnout process involves a gradual shift, where motivation changes from being adaptive to maladaptive. Rather, it has been argued that over the course of their careers, burned-out athletes regularly demonstrate a variety of inherently maladaptive qualities, which do not immediately undermine investment patterns, but become problematic when challenges are experienced and barriers to progress have to be overcome. When athletes exhibit a profile that encourages a focus on the demonstration of competence and self-validation,

it may be inappropriate to label the resulting motivation as adaptive, even though it may result in athletic success. This is because such a profile has a tendency to restrict adaptive achievement behavior, such as challenge seeking and effective persistence in the face of obstacles, to occasions when confidence in current ability remains high. Dweck (1986) has noted that when individuals exhibit this profile, they will often display an extremely fragile sense of confidence in their current ability, and it is evident that highly talented individuals are not immune to this experience. While the successful demonstration of ability may be sufficient to restore confidence after setbacks, when difficulties persist and obstacles appear insurmountable, the debilitating nature of this profile becomes more pronounced. Unlike recreational athletes, elite athletes are rarely in a position to use strategies such as withdrawal from sport or the withholding of effort to protect their self-worth. This means that a profile that encourages a focus on the demonstration of competence and self-validation may be a critical factor that predisposes talented athletes toward an increased risk for burnout because it engenders a sense of entrapment when self-worth is under threat (Hall et al., 1997; Raedeke, 1997; Lemyre, 2005). This study set out to test this contention, and the results offer some preliminary evidence to support the argument that an athlete's motivational profile matters. Specifically, the findings suggest that the way individuals give meaning to achievement may combine with other social cognitive variables to play an important role in understanding the mechanisms that underpin the onset of burnout in elite athletes.

The relationship between social-cognitive variables, goal achievement, satisfaction, and dimensions of burnout

A bivariate correlation analysis was conducted to determine the degree of association between various social cognitive variables and three dimensions of burnout. The findings indicate conceptually consistent, albeit weak support for the contention that dispositional goals, the achievement climate and elements of perfectionism are associated with athlete burnout. Specifically, emotional exhaustion demonstrated a significant and positive association with a performance climate, parental expectations and parental criticism, and a significant negative association with a task orientation, a mastery climate and the pursuit of high personal standards. Reduced accomplishment was positively associated with concern about mistakes, doubts about action and parental criticism and negatively associated with a task orientation, perceived ability, a mastery climate and the pursuit of high standards. Sport devaluation was significantly and positively associated with an ego

orientation, a performance climate and doubts about action and negatively associated with perceived ability. These findings are consistent with a growing body of research in physical activity contexts, which has found that both individually and collectively, this pattern of motivational constructs tends to be associated with debilitating cognitions, negative affect, and maladaptive forms of achievement behavior in the face of barriers to learning and performance (for reviews see Duda & Hall, 2001; Roberts, 2001; Hall, 2005; Roberts et al., 2007).

The results of the correlational analysis also confirmed a low to moderate negative relationship among goal attainment, performance satisfaction, and the three dimensions of burnout, suggesting that burnout is an increasing possibility when athletes perceive they are not achieving. Although this was an elite sample, a number of athletes clearly perceived that they were not attaining their goals and they expressed dissatisfaction with their performance. One might, therefore, speculate from the bivariate correlational analysis that it was goal discrepancy in conjunction with an endorsement of a maladaptive motivational profile that underpinned elevated burnout scores in these elite athletes.

Although the bivariate correlations provide an indication that specific motivational constructs may be associated with athlete burnout, they do not permit researchers to examine the primary hypothesis that particular social cognitive variables will create a maladaptive motivational profile and act collectively to underpin burnout. A canonical correlation analysis provided a preliminary test of this hypothesis. When the multivariate nature of the association between burnout and social cognitive variables was examined, the results confirmed a significant multivariate relationship between all three dimensions of burnout and social cognitive variables assumed to represent a maladaptive motivational profile. The canonical loadings revealed the multivariate relationship to be conceptually consistent, indicating that the experience of burnout symptoms may be heightened in elite athletes when dispositional task goals are low and when the coaching environment encourages a belief that successful achievement comes about through the demonstration of ability. While these factors may not in themselves be sufficient to lead to burnout, the canonical correlation indicated that the risk is considerably elevated when athletes also demonstrate perfectionistic qualities such as a strong concern about mistakes, a perception that parents are critical of performance, an overall sense of doubt that their actions will lead to desired outcomes and low confidence in their current ability.

Both the bivariate and multivariate correlational findings appear consistent with those of Gould et al. (1997) who identified that elements of perfectionism

differentiated between burned-out athletes and a comparison group, while suggesting that an emphasis on outcome goals further contributed to a state of chronic disaffection reported by burned-out athletes. The present findings provide some initial evidence that the risk of burnout becomes elevated when dispositional perfectionism encourages athletes to view achievement as a reflection of self-worth. Perfectionism may underpin contingent self-worth in elite athletes. Findings provide evidence that the risk of burnout is increased when athletes perceive that the achievement climate encourages a preoccupation with the demonstration of ability.

A particular characteristic of socially prescribed perfectionism is that motivation is regulated by external pressures (Hewitt & Flett, 1991). This means that when perfectionist athletes begin to perceive the achievement climate as controlling and their achievement striving does not result in desirable outcomes, their maladaptive profile may lead them to feel trapped, because the perceived success, which reinforced self-worth in the past, appears elusive, despite their level of investment. While not linking this process directly to the maladaptive motivational profile of athletes in the present study, a recent investigation by Lemyre et al. (2006) reported that elite swimmers were more susceptible to burnout over the course of a season as their motivation became less self-determined. The relevance of this finding to the results of the present study becomes clear when one considers that it is well established that dispositional ego goals, performance climates and various perfectionism dimensions evoke less self-determined forms of motivational regulation (Hewitt & Flett, 1991; Duda & Hall, 2001; Petherick & Weigand, 2002). Future research should therefore examine whether the motivational dynamics identified by Lemyre et al. can be directly linked to the dispositions endorsed by the athletes and to the environments in which athletes learn and compete.

Motivation profiles

Because the multivariate correlational analyses identified a maladaptive motivational profile that was based upon significance testing rather than on the combined effects of all identified social cognitive constructs, a cluster analysis was conducted to create two intact groups that maximized differences on the social cognitive variables of interest. The cluster analysis provided the strongest support for the hypothesis that in comparison with an adaptive motivational profile, a maladaptive profile would be associated with higher levels of burnout (see Fig. 1). A two-cluster solution revealed two significantly different groups within the sample, and an examination of the means for the social cognitive variables

revealed that the two groups differed in the expected direction on the variables of interest. From an examination of the means it is difficult to identify the degree to which the adaptive and maladaptive groups differed. However, standardizing the scores revealed almost symmetrical profiles, and illustrated a conceptually consistent picture of the *a priori* hypothesized cluster profiles expected to yield different burnout tendencies (Fig. 1). The findings demonstrate that there are two consistent clusters and that it is appropriate to label these as adaptive and maladaptive profiles. A comparison of the profiles not only highlights considerable discrepancy between the two groups in their ego orientation, perception of performance and mastery climates, but also in concern about mistakes, doubts about action and perception of parental expectations and criticism.

To test the hypothesis that differences in the motivational profiles of elite athletes measured at the start of the season would yield differences in burnout levels at the end of the season, a MANOVA was conducted on the burnout scores for athletes exhibiting either an adaptive or a maladaptive motivational profile. The findings revealed that, as expected, there were significant differences in the three burnout dimensions between those exhibiting adaptive and maladaptive motivational profiles (Fig. 2). Those athletes exhibiting a maladaptive motivation profile reported significantly higher scores on all three dimensions of burnout. However, because few in the sample exhibited extreme burnout scores one must exercise caution and conclude that a maladaptive motivational profile appears to increase the risk of experiencing burnout. Caution must be warranted because the instrument upon which burnout was measured is a research tool that only records the symptoms of burnout. It is not designed to provide a burnout diagnosis (Raedeke & Smith, 2001). Furthermore, because as few as 10% of an elite athlete population may suffer from burnout during a season (Gould & Dieffenbach, 2002), very few athletes in this study were expected to exhibit extreme symptoms. Nonetheless, the current results indicate that a maladaptive motivation profile results in elevated burnout scores compared with athletes with an adaptive profile and may underpin a range of dysfunctional achievement behaviors.

The findings contradict those of Hodge and Petlichkoff (2000) and Cumming et al. (2002) who reported that a combination of moderate to high task and moderate to high ego orientation will facilitate adaptive patterns of motivation in athletes. When one examines the raw mean scores for the two clusters in this investigation, one can see that burnout is less likely in the cluster where an ego orientation is suppressed and a task orientation remains high, whereas burnout is more likely when both goal

orientations are reported to be moderately high. Hodge and Petlichkoff (2000) also suggest that perfectionism is associated with a high task orientation and that a moderate to high ego orientation may buffer the maladaptive influence of perfectionism. What is evident from previous research (Hall et al., 1998, 2007) is that perfectionism appears to be associated with a combination of moderately high task and ego goals. The present findings confirm this, and suggest that when this same pattern is exhibited in conjunction with elevated concerns about mistakes, doubts about action and tendency to perceive the climate as more performance and less mastery focused, the risk of burnout becomes elevated.

Conclusions

In summary, the findings from the correlational analysis and MANOVA examining differences between two clusters reveal that a maladaptive motivational profile may be a critical factor that underpins athlete burnout. The analyses reveal that when elite athletes demonstrate perfectionist qualities, where they fear making mistakes and doubt their ability, and the achievement environment encourages self-validation through the demonstration of ability, the risk of experiencing burnout is greatly increased. It is probable that a maladaptive motivational profile will lead athletes to appraise achievement contexts as a significant threat to self-worth (Hall et al., 1998). If athletes lack the necessary coping resources, stress will become chronic and burnout will be an inevitable consequence. Raedeke and Smith (2004) recently found evidence to suggest that this psychological process was operating in club swimmers. They found that athletes who were prone to burnout exhibited deficient coping skills that elevated stress levels. Future research must build upon the findings of the present investigation and that of Raedeke and Smith (2004) to further examine the psychological mechanisms that link an athlete's motivation with the onset of burnout.

While the data that have been reported present a social cognitive explanation for athletes reporting burnout at season's end, it is possible that the athletes may have been experiencing residual burnout at the start of the season. While we would expect this to be related to maladaptive motivational profiles we have no way of confirming this. Further research investigating athlete burnout from a social cognitive perspective needs to administer the same questionnaires at multiple time-points to assess the developmental aspect of burnout over the course of a competitive season (Lemyre et al., 2006). A further explanation for the athletes reporting symptoms of burnout at season's end may be due to overtraining and lack of recovery following the previous compe-

titive season (e.g., Kellmann, 2002). As the sports represented by the athletes participating in this study were high-energy sports, long-lasting physical exhaustion may have been an important additional variable contributing to the development of burnout (Silva, 1990; Lemyre et al., 2006).

Limitations

A weakness in the design of the present study was the fact that due to difficulties of access to the athletes, the assessment of burnout was limited to one occasion at the end of the season. Future research should monitor the development of burnout over time. A further weakness is a function of the sample size. Because the incidence of burnout has been found to be <10% of elite athlete samples over the course of a season (Gould & Dieffenbach, 2002), larger samples are necessary to maximize the probability of accurately capturing the construct.

Perspectives

The findings from this study support the use of a social-cognitive approach to study athlete burnout. In

elite athletes, adaptive and maladaptive motivational profiles at the start of the season yielded distinctive burnout responses at season's end. These findings are important as they provide information that may guide the development of effective interventions. The findings suggest that interventions might be most effectively targeted to influence changes in athletes' goal involvement through the manipulation of the achievement climate. Changing a dispositional view that the demonstration of ability is necessary to bring about self-validation may involve a long-term program of cognitive restructuring. However, Flett and Hewitt (2005) have suggested that one might develop resilience to dispositional perfectionism and a preoccupation with the demonstration of ability by manipulating other variables such as the achievement climate so that athletes maintain a mindset where achievement is perceived as being under personal control and self-worth is not considered to be a function of performance. Designing interventions to create this type of resilience may reduce the potential for experiencing burnout in elite athletes.

Key words: athlete burnout, motivation, goal orientations, achievement climate, perfectionism.

References

- Ames C. Classrooms, goals, structures, and student motivation. *J Educ Psychol* 1992; 84: 261–271.
- Ames C, Archer J. Achievement goals in the classroom: students' learning strategies and motivation processes. *J Educ Psychol* 1988; 80: 260–267.
- Anshel MH, Eom H. Exploring the dimensions of perfectionism in sport. *Int J Sport Psychol* 2002; 34: 255–271.
- Bergner RM. *Pathological self-criticism: assessment and treatment*. New York: Plenum Press, 1995.
- Burns DD. The perfectionists script for self-defeat. *Psychol Today* 1980; 20: 34–51.
- Coakley J. Burnout among adolescents: a personal failure of a social problem? *Social Sport J* 1992; 9: 271–285.
- Cresswell SL, Ecklund RC. Motivation and burnout in professional rugby players. *Research Quarterly for Exercise and Sport* 2005; 76: 370–376.
- Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951; 16: 297–334.
- Cumming J, Hall C, Harwood C, Gammage K. Motivational orientations and imagery use: a goal profiling analysis. *J Sports Sci* 2002; 20: 127–136.
- Duda JL, Hall HK. Achievement goal theory in sport: recent extensions and future directions. In: Singer RN, Janelle CM, Hausenblas HA, eds. *Handbook of sport psychology*. New York, NY: Wiley, 2001: 417–443.
- Dunn JGH, Causgrove Dunn J, Syrotuik DG. Relationship between multidimensional perfectionism and goal orientations in sport. *J Sport Exerc Psychol* 2002; 24: 376–395.
- Dunn JGH, Gotwals JK, Causgrove DJ, Syrotuik DG. Examining the relationship between perfectionism and trait anger in competitive sport. *Int J Sport Exerc Psychol* 2006; 4: 7–24.
- Dweck CS. Motivational processes affecting learning. *Am Psychol* 1986; 41: 1040–1048.
- Dweck CS. *Self-theories: their role in motivation personality and development*. Philadelphia: Psychology Press, 1999.
- Dykman BM. Integrating cognitive and motivational factors in depression: initial tests of a goal orientation approach. *J Pers Soc Psychol* 1998; 74: 139–158.
- Eades A. An investigation of burnout in intercollegiate athletics: The development of the Eades burnout inventory. Asilomar, CA: NASPSPA, 1991.
- Ericsson KA. The acquisition of expert performance: an introduction to some issues. In: Ericsson KA, ed. *The road to excellence: the acquisition of expert performance in the arts and sciences, sports and games*. Hillsdale, NJ: Lawrence Erlbaum, 1996: 1–50.
- Feigley DA. Psychological burnout in high level athletes. *Phys Sports Med* 1984; 12: 10–119.
- Fender L. Athlete burnout: potential for research and intervention strategies. *Sport Psychol* 1989; 3: 63–71.
- Flett GL, Hewitt PL. Perfectionism and maladjustment: an overview of theoretical, definitional, and treatment issues. In: Flett GL, Hewitt PL, eds. *Perfectionism: theory, research, and treatment*. Washington, DC: APA, 2002: 5–31.
- Flett GL, Hewitt PL. The perils of perfectionism in sports and exercise. *Curr Dir Psychol Sci* 2005; 14: 14–18.
- Flett GL, Hewitt PL, Blankstein KR, Pickering D. Perfectionism in relation to attributions for success and failure. *Cur Psychol* 1998; 17: 249–262.
- Freudenberger HJ. *Burnout*. New York: Doubleday, 1980.

- Frost RO, Henderson KJ. Perfectionism and reactions to athletic competition. *J Sport Exerc Psychol* 1991; 13: 323–335.
- Frost RO, Marten PA, Lahart C, Rosenblate R. The dimensions of perfectionism. *Cog Therapy Res* 1990; 14: 449–468.
- Gold Y, Roth RA. Teachers managing stress and preventing burnout: the professional health solution. London: The Falmer Press, 1993.
- Gotwals JK, Dunn JGH, Wayment HA. An examination of perfectionism and self-esteem in intercollegiate athletes. *Journal of Sport Behavior* 2002; 26: 17–38.
- Gould D. Personal motivation gone awry: burnout in competitive athletes. *Quest* 1996; 48: 275–289.
- Gould D, Dieffenbach K. Overtraining, underrecovery, and burnout in sport. In: Kellmann M, ed. *Enhancing recovery: preventing underperformance in athletes*. Champaign: Human Kinetics, 2002: 25–35.
- Gould D, Tuffey S, Udry E, Loehr J. Burnout in competitive junior tennis players: II. Qualitative analysis. *Sport Psychol* 1996a; 10: 341–366.
- Gould D, Udry E, Tuffey S, Loehr J. Burnout in competitive junior tennis players: I. A quantitative psychological assessment. *Sport Psychol* 1996b; 10: 322–340.
- Gould DR, Dieffenbach K, Moffett A. Psychological characteristics and their development in Olympic champions. *J Appl Sport Psychol* 2002; 14: 172–204.
- Gould DR, Tuffey S, Udry E, Loehr J. Burnout in competitive junior tennis players III: individual differences in the burnout experience. *The Sport Psychologist* 1997; 11: 257–276.
- Hair JF, Anderson RE, Tatham RL, Black WC. *Multivariate data analysis with readings*. New Brunswick, NJ: Prentice Hall, 1995.
- Hall HK. Perfectionism: a hallmark quality of world class performers, or a psychological impediment to athletic development? In: Hackfort D, Tenenbaum G, eds. *Perspectives in sport and exercise psychology: essential processes for attaining peak performance*, Vol. 1. Oxford, UK: Meyer & Meyer Publishers, 2005: 179–211.
- Hall HK, Cawthra IW, Kerr AW. Burnout: motivation gone awry or a disaster waiting to happen?. In: Lidor R, Bar-Eli M, eds. *Innovations in sport psychology: linking theory and practice*. Proceedings of the 9th ISSP World Congress in Sport Psychology, Vol. 1. Netanya, Israel: Ministry of Education, Culture and Sport, 1997: 306–308.
- Hall HK, Kerr AW, Kozub SA, Finnie SB. Motivational antecedents of obligatory exercise: the influence of achievement goals and multi-dimensional perfectionism. *Psychol Sport Exerc* 2007; 8: 297–316.
- Hall HK, Kerr AW, Matthews J. Precompetitive anxiety in sport: the contribution of achievement goals and perfectionism. *J Sport Exerc Psychol* 1998; 20: 194–217.
- Hamachek J. Psychodynamics of normal and neurotic perfectionism. *Psychology* 1978; 15: 27–33.
- Hardy L, Jones JG, Gould DW. *Understanding psychological preparation for sport: theory and practice of elite performers*. Chichester: Wiley, 1996.
- Henschen K. Maladaptive fatigue syndrome and emotions in sport. In: Hanin YL, ed. *Emotions in sport*. Champaign, IL: Human Kinetics, 2000: 231–242.
- Hewitt PL, Flett GL. Perfectionism in the self and social contexts: conceptualization, assessment, and association with psychopathology. *J Pers Soc Psychol* 1991; 60: 456–470.
- Hill RW, Zrull MC, Turlington S. Perfectionism and interpersonal problems. *J Pers Assess* 1997; 69: 81–103.
- Hobden K, Pliner P. Self-handicapping and dimensions of perfectionism: self-presentation vs self-protection. *J Res Pers* 1995; 29: 461–474.
- Hodge K, Petlichkoff LM. Goal “profiles” in sport: a cluster analysis. *J Sport Exerc Psychol* 2000; 22: 256–272.
- Kaplan A, Maehr ML. Achievement motivation: the emergence, contributions, and prospects of a goal orientation theory perspective. Unpublished Manuscript, Ben Gurion University, Beer Sheva, Israel, 1999.
- Kellmann M. *Enhancing recovery: preventing underperformance in athletes*. Champaign, IL: Human Kinetics, 2002.
- Lemyre PN. Determinants of burnout in elite athletes: a multidimensional perspective. Oslo, Norway: Norwegian University of Sport and Physical Education, 2005.
- Lemyre P-N, Roberts GC, Ommundsen Y. Achievement goal orientations, perceived ability, and sportpersonship in youth soccer. *J Appl Sport Psychol* 2002; 14: 120–132.
- Lemyre P-N, Treasure DC, Roberts GC. Influence of variability in motivation and affect on elite athlete burnout susceptibility. *J Sport Exerc Psychol* 2006; 28: 32–48.
- Maehr ML. Thoughts about motivation. In: Ames R, Ames C, eds. *Research on motivation in education: goals and cognitions*. New York: Academic Press, 1989; 3: 299–315.
- Mallett CJ, Hanrahan SJ. Elite athletes: why does the fire burn so brightly? *Psychol Sport Exerc* 2003.
- Maslach C, Jackson SE. Burnout in organizational settings. In: Oskamp S, ed. *Applied social psychology annual: applications in organizational settings*. Beverly Hills: Sage, 1984; 5: 133–153.
- McArdle S, Duda JL. Exploring social-contextual correlates of perfectionism in adolescents: a multivariate perspective. *Cogn Ther Res* 2004; 28: 765–788.
- McAuley E, Duncan T, Tammen V. Psychometric properties of the intrinsic motivation inventory in a competitive sport setting: a confirmatory factor analysis. *Res Quart Exerc Sport* 1989; 60: 48–58.
- Nicholls JG. *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press, 1989.
- Nunnally JC. *Psychometrics methods*. NY: McGraw-Hill, 1978.
- Ommundsen Y, Roberts GC, Lemyre P-N, Miller B. Parental and coach support or pressure on psychosocial outcomes of pediatric athletes in soccer. *Clinical Journal of Sports Medicine* 2006; 16: 522–526.
- Ommundsen Y, Roberts GC, Lemyre PN, Miller BW. Peer relationships in adolescent competitive soccer: associations to perceived motivational climate, achievement goals and perfectionism. *J Sports Sci* 2005; 23: 977–989.
- Parish LE, Treasure DC. Physical activity and situational motivation in physical education: influence of the motivational climate and perceived ability. *Res Quart Exerc Sport* 2003; 74: 173–182.
- Pedhazur EJ. *Multiple regression in behavioral research: explanation and prediction*, 2nd ed. New York: Holt, Rinehart and Winston, 1982.
- Petherick C, Weigand DA. The relationship of dispositional goal orientations and perceived motivational climates on indices of motivation in swimming. *Int J Sport Psychol* 2002; 33: 219–237.
- Raedeke TD. Is athlete burnout more than just stress? A sport commitment perspective. *J Sport Exerc Psychol* 1997; 19: 396–417.
- Raedeke TD, Granzkyk TL, Warren A. Why coaches experience burnout: a commitment perspective. *J Sport Exerc Psychol* 2000; 22: 85–105.
- Raedeke TD, Smith AL. Development and preliminary validation of an athlete burnout measure. *J Sport Exerc Psychol* 2001; 23: 281–306.

- Raedeke TD, Smith AL. Coping resources and athlete burnout: an examination of stress mediated and moderation hypotheses. *J Sport Exerc Psychol* 2004; 26: 525–541.
- Roberts GC. Understanding the dynamics of motivation in physical activity: the influence of achievement goals on motivational processes. In: Roberts GC, ed. *Advances in motivation in sport and exercise*. Champaign, IL: Human Kinetics Publishers, 2001: 1–50.
- Roberts GC, Ommundsen Y. Goal orientations and cognitive and affective correlates among team athletes. *Scand J Sports Med* 1996; 6: 46–56.
- Roberts GC, Treasure DC, Balague G. Achievement goals in sport: the development and validation of the Perception of Success Questionnaire. *J Sport Sci* 1998; 19: 337–347.
- Roberts GC, Treasure DC, Conroy DE. Understanding the dynamics of motivation in sport and physical activity: an achievement goal interpretation. In: Ecklund R, Tenenbaum G, eds. *Handbook of sport psychology*. New York, NY: MacMillan, 2007: 3–21.
- Seifriz J, Duda JL, Chi L. The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *J Sport Exerc Psychol* 1992; 14: 375–391.
- Silva JM. An analysis of the training stress syndrome in competitive athletics. *J Appl Sport Psychol* 1990; 2: 5–20.
- Slaney RB, Ashby JS, Trippi J. Perfectionism: its measurement and career relevance. *J Career Ass* 1995; 3: 279–297.
- Smith RE. Toward a cognitive-affective model of athletic burnout. *J Sport Psychol* 1986; 8: 36–50.
- Solomon M. Impact of motivational climate on students' behaviors and perceptions in a physical education setting. *J Educ Psychol* 1996; 88: 731–738.
- Starkes J. The road to expertise: is practice the only determinant. *Int J Sport Psychol* 2000; 31: 431–451.
- Terry-Short LA, Owens RG, Slade PD, Dewey ME. Positive and negative perfectionism. *Pers Individ Dif* 1995; 18: 663–668.
- Treasure DC, Roberts GC. Applications of achievement goal theory to physical education: implications for enhancing motivation. *Quest* 1995; 47: 475–489.
- Weiss MR, Ebbeck V, Horn TS. Children's self-perceptions and sources of physical competence information: a cluster analysis. *J Sport Exerc Psychol* 1997; 19: 52–70.