

# Reflections on a Quarter-Century of Research in Sports Medicine Psychology

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## *REFLECTIONS ON A QUARTER-CENTURY OF RESEARCH IN SPORTS MEDICINE PSYCHOLOGY*

**KEY WORDS:** Psychological models, Athletic injuries, Rehabilitation, Sport and exercise psychology, Athletic trainers.

**ABSTRACT:** The three purposes of this paper are to provide reflections on (a) defining a new field of sports medicine psychology, (b) our research examining the genesis and testing of the integrated model of psychological response to the sport injury and rehabilitation process (Wiese-Bjornstal and Smith, 1993), and, (c) future directions for evaluating the model and advancing the field of sports medicine psychology. Illustrations visually summarize components of sports medicine psychology and show the integrated model, while a summary table highlights key findings from over 25 years of research about the integrated model components. Historical perspectives, philosophical dilemmas, conceptual frameworks, research findings, and professional issues interweave in addressing reflections in these three areas.

In this paper, I present reflections in three areas related to our psychological study of sports-related injuries over the past quarter-century. First, I describe a new name for our field, sports medicine psychology, which fits the comprehensive nature of research and practice on the psychological aspects of sports-related injuries. Second, I outline our research on the integrated model of psychological response to the sport injury and rehabilitation process. Third, I identify some areas of future direction for study of the field and model. Although writing these reflections from my own experience, I reference and acknowledge the many collaborators that I have worked with over the years. As my first act of reflection, I next start the paper with a proposal for a new field name and provide a definition of that field. My hope in doing so is to stimulate discussion among the many researchers across the globe that conduct research and engage in professional practice that involves athletes, injuries, psychology, coaching, and health care provision.

### **First Reflection: Sports Medicine Psychology**

My first major reflection is to say that finding a title for the field that captures the full breadth of our interests and research has been challenging. Yet titles are very important in conveying to scientists, practitioners, and athletes the diversity and complexity of what we do in this interdisciplinary field, and so I have spent a fair amount of time thinking about titles and accompanying definitions. Early on, I would often speak about “psychological rehabilitation from physical injury” as my area of interest. Others have used the term “psychology of sport injury”, as have I, but as my roots arise from kinesiology and my interests start with the sport context, I have preferred the reverse to

emphasize my predominant field, i.e., “sport injury psychology”. As I have defined sport psychology as the “...cognitions, affects, and behaviors of sport participants” (Wiese-Bjornstal, 2010b, p. 103), my evolving definition of sport injury psychology parallels that as follows: “Psychological and interpersonal cognitions, affects, behaviors, and interventions that affect the sport injury risk, response, recovery, and return of participants” (Wiese-Bjornstal, 2010a). As a counterpart and for the same reasons I have used the label “sport injury socioculture” as the title for the social and cultural climate surrounding sports injury, rather than using the reverse wording “sociocultural aspects of sport injury” (Wiese-Bjornstal, 2010b). My working definition for sport injury socioculture is as follows: “social and cultural structures, climates, processes, and interventions that influence the sport injury risk, response, recovery, and return of participants” (Wiese-Bjornstal, 2010a).

Ultimately both of these titles on face value, however, seem somewhat too narrow in reflecting primarily the postinjury side and not as much the preinjury side, and in limiting consideration to the vulnerable or injured party rather than including influences to others in the social environment as well. In 2010 as I was developing a new graduate course and trying to give it a title that fit the spectrum of what I wanted to encompass I had an epiphany. While staring at my bookshelf upon which sat a copy of a rehabilitation psychology handbook, it occurred to me that what I do is study sports medicine, not just sport injury, from a psychological and social perspective. Continuing my penchant for placing the sport context word first, and preferring parsimonious titles to cumbersome ones, it seemed that “sports medicine psychology” (Wiese-Bjornstal, 2010b) was a fitting title

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for my field of study and on par conceptually with the labeling parameters of related fields such as rehabilitation psychology, sports performance psychology, and sport and exercise psychology. I since have come to use the term not only for my course but also for our research and teaching lab, which we now call the Sports Medicine Psychology Lab. I find that this is more intuitively appealing to coaches and medical practitioners as it emphasizes a holistic view of prevention, care, rehabilitation, and exercise as influenced by psychological and social factors and many professional and personal individuals beyond the athlete.

After arriving at this title, I moved on to consider an inclusive definition and propose that sports medicine psychology comprises “theory, research and practice in the psychological, behavioral, and social aspects of injury prevention and experiences among physically active populations and those that coach, care for, or influence them across the lifespan” (Wiese-Bjornstal, 2010a). Figure 1 captures my first attempt at visually specifying the complex web of components that comprise sports medicine psychology and are of interest to those of us that research and practice in this field. I present this with recognition that this vision, the definition, and my schematic will continue to evolve over time.

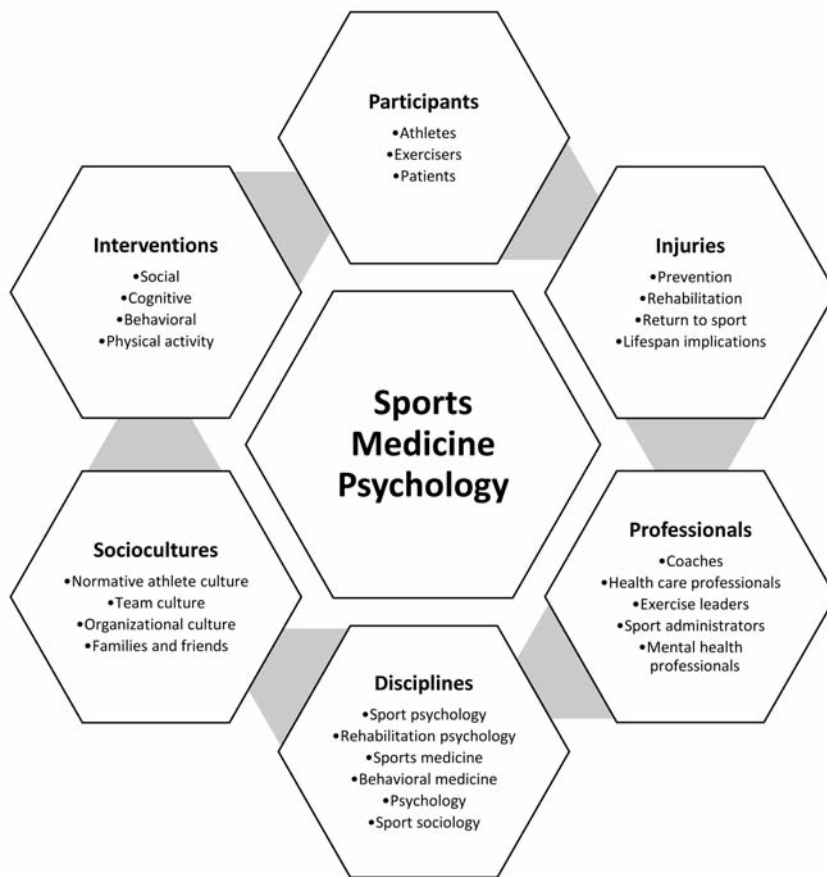


Figure 1. Web of factors comprising the field of sports medicine psychology.

**Second Reflection: Integrated Model of Psychological Response**

My second major reflection is that the breadth of sports medicine psychology becomes apparent when examining the research that we have done on the integrated model of psychological response to the sport injury and rehabilitation process (Wiese-Bjornstal and Smith, 1993) over the past quarter-century. The body of work represents a comprehensive spectrum of not only the experiences of the injured athletes themselves, but

of the psychological roles of those professionals around them from areas of sports, medical, and psychology practice. Further, the psychosocial influences of others in their social networks such as teammates, family members, fans, and media affect athlete risks of and responses to injury. Reviewing the conceptual evolution of the model provides a starting point for considering this breadth.

**Conceptual evolution of the model.** In 1987, I was nearing the end of my physical education doctoral studies in

biomechanics and the social psychology of sport at the University of Oregon and one of my classmates invited me to speak at a regional athletic trainers' conference on the topic of sport psychology. I began thinking about a chronology of components that might interest the athletic trainers ranging from psychological factors that affect injury occurrence to psychological responses to sport injury. I thought it would be helpful to identify how athletic trainers can assist in recovery through the effective use

of communication and motivation strategies, and to outline key considerations in a psychologically safe return to sport. As a starting point, I relied on a model presented by Weiss and Troxel (1986) and the groundings from the cognitive appraisal and stress process models popular in psychology at the time to develop a simple initial four stage schematic (Wiese, 1987; Wiese and Weiss, 1987; see Figure 2) illustrating the psychological response to sport injury process.

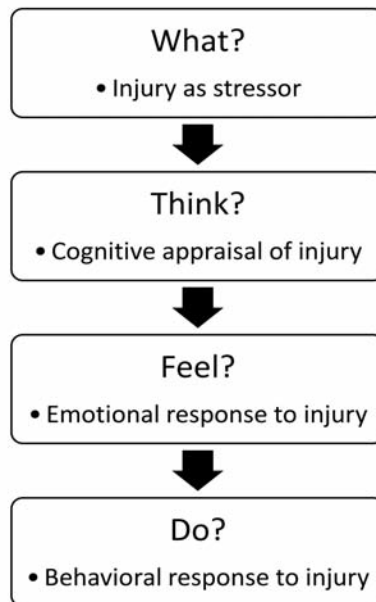


Figure 2. Four stage stress response to athletic injury. Adapted from “Psychological Rehabilitation and Physical Injury: Implications for the Sportsmedicine Team”, by D. M. Wiese and M. R. Weiss, 1987, *The Sport Psychologist*, 1(4), p. 321. Copyright 1987 by Human Kinetics.

Next, after accepting a faculty position at the University of Minnesota in 1988, I began a long collaborative relationship with Aynsley Smith of the Mayo Clinic in Rochester, Minnesota. Her strong medical background and clinical expertise provided the grounding for our collaborative development of the initial operational model of psychological response to athletic injury and rehabilitation (Wiese-Bjornstal, 1992; Wiese-Bjornstal and Smith, 1993). In our shared vision we saw the relevance of the model for both counseling and research contexts, hence our decision to call it operational in nature. We also agreed to the importance of acknowledging the continued influence of preinjury factors (Andersen and Williams, 1988) and addressing the dynamic and recursive nature of response changes over the time course of rehabilitation. In our next conceptual paper, we outlined the inductive and deductive processes and literature bases by which we supported specific model components. We also discussed the interactional role of personal and situational response moderators and mediators, and more clearly explained the dynamic recycling

core of the model that addressed the changes in cycles of psychological response over time (Wiese-Bjornstal, Smith and LaMott, 1995).

An invitation to contribute a paper to a special issue of the *Journal of Applied Sport Psychology* (Wiese-Bjornstal, Smith, Shaffer and Morrey, 1998, see Figure 3) provided us with the opportunity to continue to refine the model. We considered recovery outcomes and addressed the importance of understanding the sociocultural context and normative expectations of the sport culture as influencing athlete responses to sport injury. The integration of the model involved incorporating concepts from the grief response models historically used to understand responses to sport injury. It was our belief that cognitive appraisal and grief response models were compatible in that their mutual understandings of the perceptions of loss and emotions of grieving could be integrated into a coherent framework of psychological responses to sport injury.

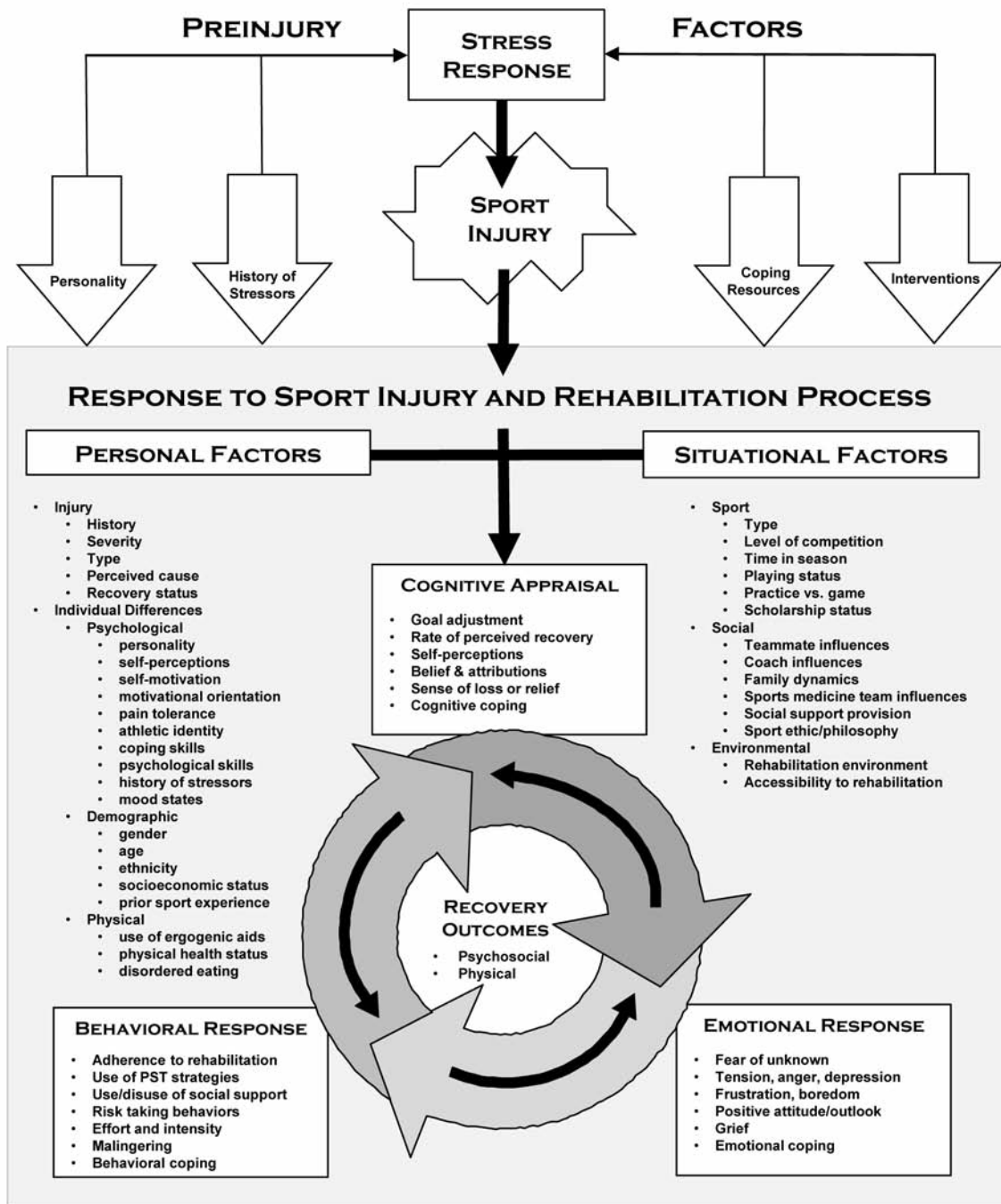


Figure 3. Integrated model of psychological response to the sport injury and rehabilitation process. Adapted from "An Integrated Model of Response to Sport Injury: Psychological and Sociological Dynamics," by D. M. Wiese-Bjornstal, A. M. Smith, S. M. Shaffer and M. A. Morrey, 1998, Journal of Applied Sport Psychology, 10, p. 49. Copyright 1998 by Taylor and Francis.

Presenting the model in textbooks designed for sports medicine professionals (Ray and Wiese-Bjornstal, 1999) next provided us the opportunity to articulate the relevance of the model to professional practice. In a 2010 consensus paper (Wiese-Bjornstal, 2010b) I strove to define and distinguish between the

constructs of cognition, affect, behavior, and outcome, and illustrated a temporal approach to understanding the psychological adjustment process over injury and rehabilitation timeframes. Throughout all of these renditions, the basic premises of the model have remained largely the same.

**Research on the model.** For over 25 years, we have used this model as a framework to guide research projects of student and faculty connected to our lab. In Table 1, I outline the key findings from our lab work as connected to the model components to illustrate the diversity of constructs examined. Our general approach to testing components of the model might be described as something like “evidentiary pluralism” (Tucker and Reed, 2008), defined as “...a research strategy that selects methods in service of content questions” (p. 279). Our primary focus has

been to use the research method that best matches our specific purposes and research questions in each study, rather than tie ourselves to any particular methodology. As Tucker and Reed (2008) articulate in *Rehabilitation Psychology*, this research strategy can “...help close the gap between the narrower clinical rehabilitation model and a public health disability model” (p. 279), in that evidence throughout the full spectrum from clinical intervention to public scholarship is acknowledged as useful in helping patients return to health.

Component	Finding	Method	Sample	Author(s)	Year
<b>Preinjury Factors</b>					
<i>Personality</i>					
Mood state	Low vigor and high fatigue were predictive of injury	Quantitative research	High school ice hockey players	Smith et al.	1997
Perfectionism	High personal standards, competitiveness, and compulsions related to injury susceptibility	Quantitative research	Intercollegiate runners	Smith	2002
Perceptions of risk	Male children and their parents perceive less risk of injury but have more risk of injury, opposite is true for female children	Professional commentary		Wiese-Bjornstal	2001a
<i>History of stressors</i>					
Life event stress	Major and minor life event stress predictive of injury frequency	Quantitative research	Intercollegiate football players	Luo	1994
<i>Coping resources</i>					
Social support	Emotional support and reality confirmation related to lower injury frequency	Qualitative research	Intercollegiate football players	Luo	1994
<i>Sport injury as stressor</i>	Athletes sustaining injury demonstrated more negative life event stress than non-injured counterparts postinjury	Quantitative research	Intercollegiate athletes	Wiese-Bjornstal et al.	2012
<b>Personal Factors</b>					
<i>Injury</i>					
History	Previously received benefits and consequences for playing through injury influenced future decisions	Qualitative research	High school gymnasts	Nippert	2005
Severity	Greater time loss predictive of more negative emotional response	Quantitative research	Adolescent & adult athletes	Smith et al.	1993
Type	Chronically injured rated social support as more important than did acutely injured	Quantitative research	Intercollegiate athletes	Henert	2000
Perceived cause	Attributions for injury cause differ among intercollegiate athletes, coaches, and athletic trainers	Qualitative research	Athletes, coaches, & athletic trainers	Brown	1995
Recovery status	Physical recovery status differentially affected mood states of recreational vs. competitive athletes	Quantitative research	Adolescent & adult athletes	Morrey	1999
<i>Individual differences</i>					
<i>Psychological</i>					
personality	Athlete personality traits influence effectiveness of athletic trainer interactions and rehabilitation adherence	Literature review		Franklin	2011
	Baseline mood state predictive of sport injury	Quantitative research	Adolescent & adult athletes	Smith et al. Wiese-Bjornstal et al.	1997 2013
pain tolerance	Pain experience is multifaceted and affects attitudes and behavioral choices during injury	Professional commentary		Wiese-Bjornstal	2002b
	Pain and suffering is enjoyable and motivating to sport performance	Qualitative research	Adult ironman triathletes	Armentrout	2007
<i>Demographic</i>					
gender	Females rated social support as more important to recovery well-being than males	Quantitative research	Intercollegiate athletes	Henert	2000
	Males may need to be coaxed to speak about their injuries while females need to be taken more seriously in their reports	Professional commentary		Wiese-Bjornstal	2000a

	age	Age and developmental status across the lifespan affect psychological responses to sport injury	Book chapter		Wiese-Bjornstal	2003
		Older gymnasts more likely to compete while injured than younger	Qualitative research	Adolescent gymnasts	Nippert	2005
	Physical	Multidimensional aspects of athlete health considered as consequences of sport injury affecting psychological responses	Professional commentary		Wiese-Bjornstal	2009
<b>Situational Factors</b>						
<i>Sport</i>						
	Type	Wrestlers had higher pain coping scores than baseball players	Quantitative research	Intercollegiate athletes	Berlin	2001
		Other types of physical activity populations such as exercisers are affected by similar psychological response variables	Book chapter		Wiese-Bjornstal	2004
	Level of competition	Athletes at higher levels of play show more negative mood states at point of return-to-sport	Quantitative research		Morrey et al.	1999
	Scholarship status	Scholarship status was a predictor of injury although not examined as predictor of response	Quantitative research	Intercollegiate athletes	Wiese-Bjornstal et al.	2012
<i>Social</i>						
	Teammate influences	Teammates are a major source of modeling and influence on playing with pain	Qualitative research	High school gymnasts	Nippert	2005
	Coach influences	Coaches often pressure athletes to compete while injured or in pain	Qualitative research	Adolescent wrestlers	Shaffer	1996
		Coaches, physicians and athletic trainers sometimes or often pressure athletes to play while injured or in pain	Quantitative research	Intercollegiate wrestlers	Hoppis	2012
	Sports medicine team influences	Competence, connection, and concern of athletic trainers related to positive recovery experiences	Qualitative research	Athletes formerly injured	Cook	2010
	Sport ethic	Sociocultural factors and the normative environment of sport affect athlete psychological response cycles	Consensus statement		Wiese-Bjornstal	2010b
<i>Environmental</i>						
	Rehabilitation access & environment	Developed strategies for teaching sports medicine care in Africa and managing intersections with psychological factors	Handbook chapter		Wiese-Bjornstal et al.	2010
<b>Cognitive Appraisal - THINK</b>						
<i>Pain coping</i>						
		Higher perceptions of pain related to slower recovery; higher pain coping related to shorter recovery time	Quantitative research	Intercollegiate male athletes	Berlin	2001
		Pain coping and catastrophizing thoughts affect use of risky behaviors	Quantitative research	Intercollegiate wrestlers	Hoppis	2012
		Thoughts about performance, perception of injury, importance of wrestling, and outside influences affect playing with pain	Qualitative research	Adolescent wrestlers	Shaffer	1996
<i>Motives</i>						
		Athletes are accepting of and motivated by the challenge of returning from injury	Qualitative research	Former artistic gymnasts	Whitney	2005
<i>Self-confidence</i>						
		Self-confidence increased pre- to post-surgery in ACL injured athletes	Quantitative research	Adolescent & adult athletes	LaMott	1994
<i>Attitudes and beliefs</i>						
		Willingness to listen and learn about injury, positive attitude, and intrinsic motivation related to successful coping and recovery	Quantitative research	Athletic trainers	Wiese et al.	1990
		Enhancing realistic optimism while reducing pessimism may benefit recovery from sport injury	Professional commentary		Wiese-Bjornstal	2002a

**Emotional Response - FEEL**

<i>Mood states</i>	Significant increases in depression and anger and decreases in vigor noted postinjury based on preinjury baseline data	Quantitative research	Adolescent & adult athletes	Smith et al.	1993
	Emotional responses fluctuate over time course of recovery from anterior cruciate ligament surgical repair	Quantitative research	Adolescent & adult athletes	LaMott Morrey et al.	1994 1999
	Frustration, fear, psychological distress evident among microtrauma injured	Qualitative research	Adult distance runners	Russell et al.	2013
<i>Mental health issues</i>	Diversity of mental health issues routinely encountered by intercollegiate athletic trainers unprepared to manage them	Qualitative research	Athletic trainers	LaRue	2010

**Behavioral Response - DO**

<i>Risk taking behaviors</i>	Factors affecting athlete decisions to play with and through injury through case example of the heat-illness death of pro football player Korey Stringer	Professional commentary		Wiese-Bjornstal	2000a 2002b
	Athletes utilize risky, deceitful, and impression management behaviors when injured	Quantitative research	Intercollegiate wrestlers	Hoppis	2012
<i>Use of PST strategies</i>	Psychosocial techniques and psychological skills training (PST) strategies rated as important to athlete recovery	Quantitative research	Athletic trainers	Wiese et al.	1990
	Psychological coping strategies supported in alleviating the emotional distress of injury	Literature review		Smith et al.	1990
	Different counseling roles and strategies identified specific to various members of the injured athlete social network	Book chapter		Wiese-Bjornstal & Smith	1993
<i>Behavioral coping</i>	Measurement of risk behavior conformity in sport injury highlights impression management, deceit, and healthy behaviors	Abstract	Intercollegiate athletes	Kenow & Wiese-Bjornstal	2010
	Role of religious or spiritual faith beliefs and behaviors as a coping resource in sport injury contexts	Professional commentary		Wiese-Bjornstal	2000c

**Recovery Outcomes**

<i>Recovery time</i>	Greater imagery use related to faster recovery time	Quantitative research	Intercollegiate female athletes	White	2001
<i>Return to play</i>	Athletic trainer return-to-play decisions are affected by internal and external sources of pressure	Qualitative research	Athletic trainers	Kenow	2014

**Dynamic Cycles**

<i>Mood states</i>	Mood states such as depression, anxiety, frustration, and boredom fluctuate over time course of ACL injury; defined an injury recovery emotional U	Quantitative research	Adolescent & adult athletes	LaMott Morrey et al.	1994 1999
	Mood states such as anxiety, frustration, and boredom fluctuate over time course of injury	Professional commentary		Wiese-Bjornstal	2001b
<i>Mood states &amp; coping behaviors</i>	Gradual progression from negative perceptions and responses to increasing optimism and improved coping behaviors	Qualitative research	Adolescent female athletes	Schwenz	2002
<i>Coping strategies</i>	Coping strategies changed over time course of rehabilitation for micro- and macrotrauma injured	Quantitative research	Intercollegiate athletes	Henert	2000

Table 1. University of Minnesota Sports Medicine Psychology Lab Findings Regarding the Integrated Model of Psychological Response to the Sport Injury and Rehabilitation Process Components.

Our most comprehensive attempt at simultaneously testing several of the model premises supported the major predictions of the model in an intercollegiate athlete population (Wiese-Bjornstal, Albinson, Henert, Arendt, Schwenz, Myers and Gardetto-Heller, 2012). Psychosocial variables predicted sport injury, sport injury was a stressor, and negative affect was both a predictor and consequence of sport injury. In this study, our use of an uninjured control group counterpart from the same sport teams let us directly attribute psychological changes to injury experiences rather than other negative stressors shared by injured and uninjured teammates such as poor team performance, school exam periods, or coach pressures.

With respect to the larger picture, general findings from our years of work on postinjury response illustrate several common threads that we continue to examine. First, characteristics of the injury sustained relate to psychological response. Injury severity based on time-loss predicts postinjury responses (e.g., Smith, Stuart, Wiese-Bjornstal, Milliner, O'Fallon and Crowson, 1993). Relatively minor injuries with minimal time loss in general do not lead to abnormal psychological responses, although it depends on the situation like the timing of the injury (e.g., at a key moment such as a championship event or prematurely ending one's career) and the person (e.g., an athlete who is already psychologically vulnerable). Moderate or severe injuries with greater time loss are generally, but not always, more challenging for athletes psychologically as one might expect.

Regarding type of injury, we have examined differing psychological implications of microtrauma (overuse, chronic) versus macrotrauma (acute) injuries. Admittedly, the basis for our model primarily derives from macrotrauma injured athlete populations. The psychological impact of microtrauma injuries has been somewhat overlooked (e.g., Russell, Steele, Hoppis, Franklin and Wiese-Bjornstal, 2013) as they may not seem as serious on face value nor overtly force time loss at least in the early stages. Yet they are often very difficult psychologically because there is typically no definable beginning or end, they can become chronic, and they link with physical parameters such as technique, biomechanics, or anatomy. Many microtrauma injuries are invisible to others, as are concussion injuries, and this is a particularly challenging aspect psychologically because athletes report receiving less sympathy or support for these types of injuries than they do with visible injuries such as those that require bandaging, bracing, crutches, or show surgical scars.

With respect to psychological responses, to borrow a principle from the physical activity domain, the frequency, intensity, time (duration), and type (FITT) of the cognitive appraisals, emotional responses, and behavioral responses seems to depend on a complex person by situation interaction that incorporates consideration of internal and external influences. These FITT dimensions perhaps serve as characteristics distinguishing between adaptive and maladaptive psychological responses. Athletes who cannot get past certain cognitions such as catastrophizing or ruminations about injuries, or work through affects such as reinjury anxieties or performance fears will not successfully achieve the hoped for physical and psychological recoveries. For example, we noted that anterior cruciate ligament (ACL) injured athletes at higher competitive levels of play reported greater negative affect at return to sport transitions than those at lower levels of play (Morrey, Stuart, Smith and Wiese-Bjornstal, 1999). If we are unable to recognize this and assist athletes with psychosocial strategies and interventions appropriate to our professional roles, then our work and relevance remains incomplete.

### Third Reflection: Future Directions

My third reflection is that we have significant work left to do on testing the integrated model of psychological response in specific, and in examining dimensions of the field of sports medicine psychology in general. Regarding the model, one future direction is that we need to broaden the scope of the model to encompass and consider injuries to other physically active populations aside from competitive athletes, such as exercisers or those who physically train for job performance purposes. An example of the relevance for this would be the literature review of Robertson (2011), who found that psychosocial factors relate to the genesis of and response to physical training injury among military personnel in ways similar to athletes. The military culture with its emphasis on physical fitness, displaying toughness by pushing through pain, and optimal performance under pressure is very similar to the sport culture. She noted that the use of sport psychology interventions and strategies by military athletic trainers could reduce physical training injury risk and negative responses to such injuries.

A second future direction for continued model evolution is exploring the role of personal and situational moderators and their influences on mediational constructs affecting athlete responses and outcomes (e.g., Wiese-Bjornstal, 2010a). For example, in the area of concussion research, although many authors suggest that gender moderates psychological responses such as cognitive decisions about willingness to report concussion injury, little evidence has documented whether this is true nor documented any specific cognitive mediational processes by which gender might influence decisions about the behavior of reporting. A third future direction related to the model would be that more comprehensive and elegant examinations of multiple model paths through the use of statistical analyses such as structural equation modeling would be helpful in understanding the nature of the intersecting parts. A fourth is to continue to consider positive and negative influences, responses, and outcomes over the dynamic time course of risk, injury, rehabilitation, and return (e.g., Henert, 2000; Schwenz, 2002) and more carefully explore psychosocial interventions targeted to these specific influences and time points.

With respect to the sports medicine psychology field in general, looking back at Figure 1 it appears that we need to continue to study the roles and experiences of the sport, exercise, and medical professionals who work with physically active populations. For example, Potratz (2000) found that nearly half of athletic trainers reported high levels of burnout symptoms, high stress and moderate role ambiguity, factors that may inhibit their ability to help others psychologically, such as injured athletes. Kenow (2014) found that certain personal (e.g., fears about job security, lack of experience) and situational (e.g., financial issues, player importance) pressures negatively affect athletic trainers in making optimal return to play decisions for athletes under their care.

It is also important to convey our knowledge base to the professionals and provide practical examples of how sports medicine psychology principles can improve their job performance (e.g., to future athletic trainers, Wiese-Bjornstal, Kenow and Flint, 2012). As well it is essential that we provide a public service to coaching professionals such as we have done through our contributions to a documentary video on concussions in female athletes (Lamke, 2011) and to consensus statements such as that on concussions in ice hockey (Smith et al., 2011). Both have provided specific recommendations and considerations for coaches relative to concussion prevention and care.



Through examining our model and associated research, it is evident that there is a continuum of responses and outcomes ranging from tragedy to triumph at opposite ends (Wiese-Bjornstal, 2004). For some athletes sustaining an injury becomes a tragedy in their lives from which they never fully recover. For others it presents a hurdle along the way that they struggle with but overcome to varying degrees. However, it is encouraging to note that for a significant number of athletes the injury experiences they have are ones of triumph over yet another of the many challenges faced in sport participation. Many athletes come through the experiences mentally and physically stronger—and perhaps wiser and better prioritized—than before their injuries,

often times due to the effective counseling and care that they are shown by coaches, medical professionals, and supportive friends and family (e.g., Cook, 2010). The real tragedy may be for us, the professionals who work with them, if we do not see the importance of applying our knowledge about sport injury psychology to improving their injury experiences, and the real triumph if we do. In this, I believe that we are in many ways still where I was in that very first 1987 presentation. Our use of effective motivation and communication strategies with athletes are central to reducing their risks, and enhancing the positive aspects of their recoveries.

#### *REFLEXIONES DE UN CUARTO DE SIGLO DE INVESTIGACIÓN EN PSICOLOGÍA DE LA MEDICINA DEL DEPORTE*

**PALABRAS CLAVE:** Modelo conceptual, Lesiones deportivas, Psicología del deporte, Entrenadores de deportistas, Aspectos psicológicos de las lesiones.  
**RESUMEN:** Los tres objetivos de este artículo son el reflexionar sobre (a) la definición d un nuevo campo de la psicología de la medicina del deporte; (b) la investigaciones que han examinado la génesis y la comprobación del modelo psicológico integrado de respuesta a la lesión deportiva y del proceso de readaptación (Wiese-Bjornstal y Smith. 1993), y (c) las futuras direcciones para la evaluación del modelo y para el avance en el campo de psicología de la medicina del deporte. Se han usado ilustraciones para sintetizar visualmente los componentes de la psicología de la medicina del deporte, y para mostrar el modelo integrado, mientras que se resumen en una Tabla los hallazgos clave de los últimos 25 años de investigación acerca de los componentes del modelo integrado. Finalmente, se combinan de forma sinóptica las perspectivas históricas, los dilemas filosóficos, los marcos teóricos, los hallazgos de la investigación y los temas profesionales, con la finalidad de responder a esos tres objetivos.

#### *REFLEXÕES SOBRE UM QUARTO DE SÉCULO DE INVESTIGAÇÃO EM PSICOLOGIA DA MEDICINA DESPORTIVA*

**PALAVRAS-CHAVE:** Modelo conceptual, Lesões desportivas, Psicologia do desporto, Treinadores de desportistas, Aspectos psicológicos das lesões.  
**RESUMO:** Os três objetivos deste artigo são reflectir sobre (a) a definição de um novo campo da psicologia da medicina desportiva; (b) as investigações que analisaram a génese e a comprovação do modelo integrado de resposta psicológica à lesão desportiva e do processo de reabilitação (Wiese-Bjornstal and Smith. 1993); e (c) as direcções futuras para a avaliação do modelo e para o progresso do campo da psicologia da medicina desportiva. Foram utilizadas ilustrações para sintetizar visualmente os componentes da psicologia da medicina desportiva, e para mostrar o modelo integrado, resumindo-se numa tabela as conclusões chave dos últimos 25 anos de investigação sobre os componentes do modelo integrado. Finalmente, combinam-se de forma sinóptica as perspectivas históricas, os dilemas filosóficos, os marcos teóricos, os resultados da investigação e as questões profissionais, visando responder a esses três objetivos.

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## References

- Andersen, M. B. and Williams, J. M. (1988). A model of stress and athletic injury: Prediction and prevention. *Journal of Sport & Exercise Psychology*, 10, 294-306.
- Armentrout, S. M. (2007). *A grounded theory of Ironman triathlete training* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database. (ATT 3268969).
- Berlin, T. L. (2001). *The relationships among pain perception, pain coping, and speed of recovery in male intercollegiate athletes*. Unpublished master's thesis. University of Minnesota, Minneapolis.
- Brown, M. (1995). *Athlete, athletic trainer, and coach perceptions of athletic injury cause and prevention*. Unpublished master's thesis. University of Minnesota, Minneapolis.
- Cook, S. M. (2010). *Competence, connection, and concern: Injured athlete recollections of high school athletic trainers*. Unpublished master's project. University of Minnesota, Minneapolis.
- Franklin, A. N. (2011). *The role of personality in athletes' sport injury responses and adherence to rehabilitation*. Unpublished master's project. University of Minnesota, Minneapolis.
- Henert, S. E. (2000). *Exploring injured athletes' perceptions of social support and use of coping strategies as a function of injury type, gender, and time*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 9966232).
- Hoppis, S. A. (2012). *Competing while injured: What wrestlers do and why*. Master's thesis, University of Minnesota, Minneapolis. Retrieved from <http://hdl.handle.net/11299/130935>
- Kenow, L. J. (2014). *Making return-to-play decisions in competitive sport: Challenges, coping, and preparation among athletic trainers*. Unpublished doctoral dissertation. University of Minnesota, Minneapolis.
- Kenow, L. J. and Wiese-Bjornstal, D. M. (2010, October). Risk Behavior Conformity in Sport Injury Questionnaire (RBCSI): Preliminary evidence in support of a new measure [Abstract]. *Proceedings of the Association for Applied Sport Psychology Annual Conference*, Providence, RI.
- Lamke, S. (Producer). (2011). *Concussions and female athletes: The untold story* [Television documentary]. United States: Twin Cities Public Television.
- LaMott, E. E. (1994). *The anterior cruciate ligament injured athlete: The psychological process*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 9501110).
- LaRue, M. J. (2010). *The role of certified athletic trainers in the recognition and referral of mental health issues in intercollegiate student-athletes*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 3434278).
- Luo, Y. (1994). *The relationship of daily hassles, major life events, and social support to athletic injury in football*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 9433079).
- Morrey, M. A., Stuart, M. J., Smith, A. M. and Wiese-Bjornstal, D. M. (1999). A longitudinal examination of athletes' emotional and cognitive response to anterior cruciate ligament injury. *Clinical Journal of Sports Medicine*, 9(2), 63-69. PMID:10442619
- Nippert, A. H. (2005). *"I have four months to compete, eight months to heal". The sport ethic and girls' interscholastic gymnastics participation: What does it mean to play through pain*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 3167684).
- Potratz, W. J. (2000). *The relationship of role conflict, role ambiguity, stress, coping skills, and psychology education as relating to burnout in certified athletic trainers*. Unpublished master's project. University of Minnesota, Minneapolis.
- Ray, R. and Wiese-Bjornstal, D. M. (Co-Editors). (1999). *Counseling in sports medicine*. Champaign, IL: Human Kinetics.
- Robertson, T. N. (2011). *Military non-combat musculoskeletal injuries, psychosocial factors, and the role of athletic trainers*. Unpublished master's project. University of Minnesota, Minneapolis.
- Russell, H. C., Steele, R., Hoppis, S., Franklin, A. N. and Wiese-Bjornstal, D. M. (2013, April). Microtrauma sport injury psychology narratives among long-distance runners [Abstract]. *Research Quarterly for Exercise and Sport*, 84(Supplement 1), A-74.
- Schwenz, S. J. (2002). *Athletes' perceptions of rehabilitation and the use of biofeedback to enhance psychological recovery following anterior cruciate ligament reconstruction*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 3020612).
- Shaffer, S. M. (1996). *Grappling with injury: What motivates young athletes to wrestle with pain*. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database (ATT 9700978).
- Smith, A. (2002). *Predisposing factors to overuse injuries: The effects of competitiveness, perfectionism, and compulsivity on male and female collegiate cross country runners*. Master's thesis. University of Minnesota, Minneapolis.
- Smith, A. M., Scott, S. G. and Wiese, D. M. (1990). The psychological effects of sports injuries: Coping. *Sports Medicine*, 9(6), 352-369.
- Smith, A. M., Stuart, M. J., Wiese-Bjornstal, D. M. and Gunnon, C. (1997). Predictors of injury in ice hockey players: A multivariate, multidisciplinary approach. *American Journal of Sportsmedicine*, 25(4), 500-507.
- Smith, A. M., Stuart, M., Greenwald, R., Benson, B., Dodick, D., Emery, C. and Meeuwisse, W. (2011). Proceedings from the ice hockey summit on concussion: A call to action. *Physical Medicine and Rehabilitation*, 3(7), 605-612.
- Smith, A. M., Stuart, M. J., Wiese-Bjornstal, D. M., Milliner, E. K., O'Fallon, W. M. and Crowson, C. S. (1993). Competitive athletes: Pre injury and post injury mood state and self-esteem. *Mayo Clinic Proceedings*, 68, 939-947.
- Tucker, J. A. and Reed, G. M. (2008). Evidentiary pluralism as a strategy for research and evidence-based practice in rehabilitation psychology. *Rehabilitation Psychology*, 53(3), 279-293.
- Weiss, M. R. and Troxel, R. K. (1986). Psychology of the injured athlete. *Journal of the National Athletic Trainers Association*, 21, 104-109; 154.
- White, S. N. (2001). *Mental imagery and recovery from sport injury*. Master's thesis. University of Minnesota, Minneapolis.
- Whitney, C. A. (2005). *A retrospective look at the gymnastics experience: Retirement and transition from sport of former artistic female gymnasts*. Unpublished master's project. University of Minnesota, Minneapolis.
- Wiese, D. M. (1987). Sport psychology and the athletic trainer: Psychological rehabilitation and physical injury. *Proceedings of the Northwest Athletic Trainers Association Sportsmedicine Seminar*, Spokane, WA, 19-26.
- Wiese, D. M. and Weiss, M. R. (1987). Psychological rehabilitation and physical injury: Implications for the sportsmedicine team. *The Sport Psychologist*, 1(4), 318-330.
- Wiese, D. M., Weiss, M. R. and Yukelson, D. P. (1991). Sport psychology in the training room: A survey of athletic trainers. *The Sport Psychologist*, 5(1), 15-24.

- Wiese-Bjornstal, D. M. (1992, October). A preliminary theoretical model for examining psychosocial factors in athletic injury rehabilitation. In A. M. Smith (Chair), When athletic injury does occur [Abstract]. *Proceedings of the Association for the Advancement of Applied Sport Psychology Annual Meeting*, Colorado Springs, CO.
- Wiese-Bjornstal, D. M. (2000a). Gender in the athletic training room. *Athletic Therapy Today*, 5(5), 26-27.
- Wiese-Bjornstal, D. M. (2000b). Playing with injury. *Athletic Therapy Today*, 5(2), 60-61.
- Wiese-Bjornstal, D. M. (2000c). Spirit, mind, and body. *Athletic Therapy Today*, 5(1), 41-42.
- Wiese-Bjornstal, D. M. (2001a). Child's play. *Athletic Therapy Today*, 6(4), 38-39.
- Wiese-Bjornstal, D. M. (2001b). In the mood. *Athletic Therapy Today*, 6(3), 38-39.
- Wiese-Bjornstal, D. M. (2002a). Accentuate the positive. *Athletic Therapy Today*, 7(4), 28-29.
- Wiese-Bjornstal, D. M. (2002b). Pain, no gain. *Athletic Therapy Today*, 7(5), 56-57.
- Wiese-Bjornstal, D. M. (2002c). To play or not to play? That is the question. *Athletic Therapy Today*, 7(2), 24-26.
- Wiese-Bjornstal, D. M. (2003). From skinned knees and Pee Wees to menisci and masters: Developmental sport injury psychology. In M. R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 525-568). Morgantown, WV: Fitness Information Technology.
- Wiese-Bjornstal, D. M. (2004, April). Triumph or tragedy: The mental pain of sport injury [Abstract]. *Research Quarterly for Exercise and Sport*, 75(1 Suppl), A141.
- Wiese-Bjornstal, D. M. (2004). Psychological responses to injury and illness. In G. S. Kolt and M. B. Andersen (Eds.), *Psychology in the physical and manual therapies* (pp. 21-38). Edinburgh: Churchill Livingstone.
- Wiese-Bjornstal, D. M. (2009). Sport injury and college athlete health across the lifespan. *Journal of Intercollegiate Sport*, 2, 64-80.
- Wiese-Bjornstal, D. M. (2010a, October). Does gender matter in sport injury occurrence and socioculture? In D. M. Wiese-Bjornstal, A. N. Franklin, J. B. Wings, M. A. Foster and T. N. Robertson, Sport injury psychology and socioculture: Does gender matter [Abstract]? *Proceedings of the Association for Applied Sport Psychology Annual Conference*, Providence, RI.
- Wiese-Bjornstal, D. M. (2010b). Psychology and socioculture affect injury risk, response, and recovery in high intensity athletes: A consensus statement. *Scandinavian Journal of Medicine and Science in Sports*, 20 (2 Suppl.), 103-111.
- Wiese-Bjornstal, D. M., Albinson, C. B., Henert, S. E., Arendt, E. A., Schwenz, S. J., Myers, S. S. and Gardetto-Heller, D. M. (2012). Evaluating the dynamic model of psychological response to sport injury and rehabilitation. In J. H. Bastos and A. C. Silva (Eds.), *Athlete performance and injuries* (pp. 79-98). Hauppauge, NY: Nova Science Publishers.
- Wiese-Bjornstal, D. M., Kenow, L. J. and Flint, F. A. (2012). Psychological aspects of sport injury and rehabilitation. In S. Hillman (Ed.), *Core concepts in athletic training* (pp. 537-558). Champaign, IL: Human Kinetics.
- Wiese-Bjornstal, D. M., Robertson, T., Foster, M., Franklin, A. and Wings, J. (2010). Prevention and care of athletic injuries. In J. Omli (Ed.), *International Sport Connection: Football coach training program for Uganda* (pp. 43-47). Retrieved from <http://www.iscoutreach.org/isc-handbook.html>
- Wiese-Bjornstal, D. M. and Smith, A.M. (1993). Counseling strategies for enhanced recovery of injured athletes within a team approach. In D. Pargman (Ed.), *Psychological bases of sport injuries* (pp. 149-182). Morgantown, WV: Fitness Information Technologies.
- Wiese-Bjornstal, D. M., Smith, A. M. and LaMott, E. E. (1995). A model of psychologic response to athletic injury and rehabilitation. *Athletic Training: Sports Health Care Perspectives*, 1(1), 16-30.
- Wiese-Bjornstal, D. M., Smith, A. M., Shaffer, S. M. and Morrey, M. A. (1998). An integrated model of response to sport injury: Psychological and sociological dynamics. *Journal of Applied Sport Psychology*, 10, 46-69.