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4 **Multilevel Model of Sport Injury (MMSI):**

5 **Can Coaches Impact and be Impacted by Injury?**

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Introduction

26 Psychology of sport injury is a field of research that emerged almost five decades ago
27 (Little, 1969). Evolving from a synthesis of sport psychology, behavioural medicine, and sports
28 medicine (Heil, 1993), it had two main objectives at its inception: to predict and prevent sports-
29 related injuries and provide adaptive psychological strategies to assist recovery following
30 injury. Given that injury is often considered part and parcel of competitive sport and that
31 rehabilitation from injury can be a challenging ordeal for many athletes (Wadey & Evans,
32 2011), it is unsurprising that research within this field gained increased momentum in the
33 1970s, 1980s and 1990s. An example of the wealth of research that emerged during this time
34 frame is perhaps best illustrated by the special edition dedicated to the psychology of sport
35 injury in the *Journal of Applied Sport Psychology* in 1998. Collectively, the published articles
36 within this special edition provided a comprehensive theoretical, methodological and applied
37 overview of the literature. For example, Williams and Andersen (1998) proposed the multi-
38 component theoretical model of stress and injury and Wiese-Bjornstal, Smith, Shaffer, and
39 Morrey (1998) proposed the integrated model of psychological response to the sport injury and
40 rehabilitation process; both of which are still being used to inform research and practice today.

41 In the 21st Century, research into the psychology of sport injury has continued to
42 flourish and diversify. The increased volume of research can be evidence from the numerous
43 books (e.g., Arvinen-Barrow & Walker, 2013; Brewer & Redmond, 2016), review articles
44 (Brewer, 2010; Ivarsson, Johnson, Andersen, Tranaeus, Stenling, Lindwall, 2017; Ivarsson,
45 Tranaeus, Johnson, & Stenling, 2017; Levy, Polman, Clough, & McNaughton, 2006; Wiese-
46 Bjornstal, 2010), and the introduction of new models and theories (Brewer, 2010; Brewer,
47 Andersen, & Raalte, 2002; Roy-Davis, Wadey, & Evans, 2017). For example, Brewer et al.
48 (2002) introduced the biopsychosocial model of sport injury rehabilitation with a rationale to
49 help bridge the gap between medical and psychological approaches to sport injury

50 rehabilitation, and to incorporate the myriad of factors that contribute to sport injury
51 rehabilitation outcomes. Yet, aside from these significant advancements, a critical perusal of
52 the psychology of sport injury literature reveals a predominant lens on the injured athlete. That
53 is, the focus is either on explaining whether an athlete's psychological response to a demanding
54 athletic situation can predict or prevent injury or understanding an athlete's responses to and
55 rehabilitation from injury. Yet, few researchers have explored beyond an intrapersonal
56 perspective; failing to consider other levels of analysis that may impact and be impacted by
57 injury (for notable exceptions, see Bianco & Eklund, 2001; Mankad, Gordon, & Wallman,
58 2009; Cavallerio, Wadey, & Wagstaff, 2016; Martinelli, Day, & Lowry, 2016; Salim & Wadey,
59 2018). Indeed, Brewer et al. (2002) recognised, "Sport injury rehabilitation does not occur in a
60 vacuum. Rather, it happens in a particular situational and environmental context that can affect
61 psychological aspects of sport injury rehabilitation" (p. 49).

62 The aim of this chapter is twofold: First, to introduce a new conceptual model:
63 *Multilevel Model of Sport Injury* (MMSI; Figure 1). The MMSI extends current theorising by
64 recognising and accounting for diverse units of analysis that are proposed to impact and be
65 impacted by sport injury. The MMSI is not intended to detract from the study of injured athletes
66 at an interpersonal level, quite the contrary, but to reflect the wealth of social-organisational-
67 cultural factors that might help to provide a more critical, nuanced, and holistic understanding
68 of sport injury. Drawing from contemporary research, the second aim is to provide a
69 population-specific example of the MMSI that critically examines two pertinent questions: Can
70 coaches impact sport injury? Can coaches be impacted by sport injury? Future avenues of
71 research are then discussed that shift the focus away solely from the injured athlete to account
72 for the complex, dynamic, and multifaceted nature of sport injury. The chapter concludes with
73 practical implications that can be debated in professional development courses to question,
74 challenge, and refine coaching practice.

75 **Multilevel Model of Sport Injury**

76 [Insert Figure 1]

77 The MMSI proposes five distinct, yet relational levels of analysis: intrapersonal,
78 interpersonal, institutional, cultural, and policy. Before describing each of these levels
79 however, it is firstly important to explain why the psychology of sport injury literature needs
80 yet another new conceptual model. First, the MMSI extends current theorising by proposing
81 five distinct, yet relational levels of analysis that are proposed to impact and be impacted by
82 sport injury. Current theories and models do not distinguish between these units of analysis.
83 For example, Williams and Andersen's (1998) multi-component theoretical model of stress
84 and injury, Wiese-Bjornstal et al.'s (1998) integrated model, and Brewer et al.'s (2002)
85 biopsychosocial model, all collapse situational variables together (e.g., 'potentially demanding
86 athletic situation', 'situational factors' or 'social-contextual factors' respectively), ignoring
87 how these variables may operate at multiple levels. Second, the MMSI provides a platform for
88 future research by illustrating how injury is influenced at multiple levels (and vice versa).
89 Researchers can use the MMSI to formulate hypotheses or research questions at one or multiple
90 levels. Importantly, the MMSI can also accommodate additional models and theories. For
91 example, Bowlby's (1969) attachment theory could be used to inform research at an
92 intrapersonal level; Cohen and Wills (1985) buffering model at an interpersonal level; Fletcher
93 and Fletcher's (2004) meta-model of stress, emotions and performance at an institutional level;
94 and Frank's (2013) narrative inquiry at a cultural level. Finally, MMSI provides a useful
95 framework for policy-makers (e.g., Department for Digital, Culture, Media & Sport in the
96 United Kingdom), institutions (e.g., Sport England) and various personnel (e.g., coaches,
97 doctors, physiotherapists) to target their interventions. However, it is important to note that the
98 levels of influence are interdependent and can affect one another. Thus, an intervention directed
99 at one level can have knock-on effects at other levels.

100 To reiterate, there is currently an over emphasis at the intraindividual unit level of
101 analysis in the psychology of sport injury literature. We believe the broader environment needs
102 to be considered to further contextualise the wider social-organisational-cultural influences and
103 the web of relationships with significant others that impact the sport injury process. To
104 illustrate, Wiese-Bjornstal (2009) reported, “Injury affects more than the injured; it often also
105 holds health-related consequences for the network of family, friends, teammates, coaches staff
106 and even the larger communities” (p. 64-65). Specifically, the MMSI proposes five distinct,
107 yet relational levels of analysis. The first level, *Intrapersonal*, reflects the characteristics of the
108 individual (e.g., age, gender, ethnicity, social-economic status, values, beliefs, attitudes,
109 motives, coping styles) and his or her thoughts, feelings, and behaviours prior to and/or
110 following injury. A significant body of research supports this level of analysis, which targets
111 athletes’ responses prior to (e.g., attentional responses) and following (e.g., cognitions and
112 emotions) injury (for reviews, see Brewer, 2010; Ivarsson et al., 2017). Importantly, the MMSI
113 can also be expanded to include individuals other than athletes and injuries that do not occur
114 in sport. For example, Didymus (2016) identified that coaches also experience injuries, and
115 Hargreaves and Waumsley (2013) examined the psychology of physical activity-related
116 injuries. These avenues warrant future research attention.

117 The second level of analysis, *Interpersonal*, focuses on formal and informal social
118 networks and support systems. Examples of interpersonal factors include social support,
119 others’ attitudes towards sporting injuries, and social processes (e.g., leadership, team
120 dynamics, dyads, roles). Existing research at this unit of analysis has typically focused on the
121 concept of social support and how support providers (e.g., coaches, teammates,
122 physiotherapists) can best meet the needs of the injured athlete (e.g., Corbillon, Crossman, &
123 Jamieson, 2008; Malinauskas, 2008). However, research at this level has predominately been
124 one-directional in nature (i.e., interindividual to intraindividual). What researchers have not

125 fully considered yet is how sport-related injuries can impact one's support network and how
126 we can support the well-being of injured athletes' support networks to enable them to function
127 effectively. Concepts such as vicarious trauma and vicarious growth are likely to be salient
128 here (Day, Bond, & Smith, 2013; Martinelli et al., 2016). In addition, certain individuals and
129 relationships or dyads have received limited research attention. For example, there is a
130 significant wealth of research exploring the coach-athlete relationship in sport psychology. Yet,
131 the physiotherapist-athlete relationship has by-in-large been ignored (for a notable exception,
132 see Heaney, Walker, Green, & Rostron, 2014).

133 The third level, *Institutional*, is concerned with the sport (e.g., type, level, norms,
134 values), institutions and organisations (e.g., strategy, functioning, climate), physical
135 environment (e.g., material provisions), psychosocial architecture (e.g., player welfare, key
136 stakeholder relationships), and injury protocols (e.g., screening, surveillance, services). This
137 unit of analysis has received less research attention in comparison to the previous two levels.
138 Examples include the norms and values of the sport and how they influence overuse injuries
139 (Cavallerio et al., 2016), how the rehabilitation environment can affect injured athletes'
140 rehabilitation adherence (Niven, 2007), and recommendations for screening and surveillance
141 (Wiese-Bjornstal, 2009). This unit of analysis represents an exciting area for future research,
142 especially considering its significant scope to inform professional practice. The fourth level,
143 *Cultural*, reflects the media, cultural narratives, and collective norms, traditions, and values.
144 This unit of analysis is best reflected by drawing on the work of Brett Smith and Andrew
145 Sparkes (2002, 2004, 2005) who have explored the stories of athletes who suffered a spinal
146 cord injury through sport. Their research illustrates how former able-bodied participants drew
147 upon and built their own stories based on the narrative resources (e.g., chaos, restitution, and
148 quest) that their culture made available to them. Furthermore, these stories did things on, in,
149 and for them. Importantly, narratives not only circulate in larger abstract social-cultural

150 environments, but also in physical locations such as rehabilitation clinics and sporting
151 organisations. In addition, the media has a critical role in supporting specific narratives while
152 disregarding and silencing others in sport (Carless & Douglas, 2013). Indeed, Wiese-Bjornstal
153 (2009) reflected her dissatisfaction with how popular press magazines around the time of the
154 2008 Summer Olympics depicted athletes as ‘machines’ rather than people with minds, souls,
155 and spirits. This unit of analysis represents an under researched area within the psychology of
156 sport injury literature and has significant scope for future research.

157 *Policy* is the final level of analysis. That is, local and national policies. To illustrate, the
158 Minister for Sport from the Department of Digital, Culture, Media and Sport in the United
159 Kingdom requested an independent report to Government by Baroness Grey-Thompson (2015)
160 into the Duty of Care sport has towards its participants. One of the themes within the report of
161 relevance is ‘Safety, Injury and Medical Issues’. Consequently, the report considers how the
162 likelihood of injury could be lessened and whether improvements can be made to how sporting
163 injuries are treated in the short and long term. Recommendations for this theme and others
164 (e.g., ‘Mental Welfare’) are put forward that have implications that are directed at various
165 levels: intra/interindividual level (e.g., “Staff, coaches, and athletes to receive mental health
166 awareness training and support, which should be included as part of induction processes as
167 well” p. 32), institutional level (e.g., “NGB [National Governing Bodies] to strengthen links
168 with NHS [National Health Service], mental health teams, mental health charities, and
169 community groups. Links should also be considered through UK sport and Sport England” p.
170 32), and policy level (e.g., “Governments should consider the potential for an insurance scheme
171 that all sports buy in to that covers catastrophic injury” p. 33). Implementing these
172 recommendations will ultimately have important implications at a cultural level. This report
173 clearly provides a powerful illustration of the different units of analysis posed in the MMSI
174 and how interventions can be targeted at each. Looking towards the future, it is now important

175 that researchers examining the psychology of sport injury literature strive to operate beyond
176 personal agency. By only focusing at an intrapersonal level it promotes a neoliberal health role,
177 which calls on the athlete to be a responsible citizen who must personally take care of his or
178 her health (Smith & Perrier, 2014). This perspective ignores social responsibility. Indeed, we
179 do not just need to make athletes more ‘mentally tough’ and ‘resilient’, we also need to ensure
180 that policies and practices are put in place the support their safety, well-being and welfare. The
181 MMSI provides a framework as to how this might be done in practice.

182 **Can Coaches Impact Sport Injury?**

183 To bring the MMSI to life and to illustrate how it might work in practice, this subsection
184 aims to critically examine the following question: *Can coaches impact sport injury?* In doing
185 this we concentrate on the prediction and prevention of sport injury, with a specific focus on
186 the impact of the coach. To date, this area of research has largely been guided by Williams and
187 Andersen’s (1998) multi-component theoretical model of stress and injury. The model suggests
188 that an athlete’s response (i.e., cognitive appraisals, physiological/attentional changes) to a
189 potentially demanding athletic situation directly leads to injury. Three factors are proposed to
190 impact an athlete’s response: personality, history of stressors, and coping resources. To
191 illustrate, if an athlete has a history of many stressors (e.g., relationship breakup with partner,
192 death of a close family member), possesses a personality trait that does not regulate stress
193 effectively (e.g., competitive trait anxiety), and has few or inappropriate coping strategies (e.g.,
194 ineffective social support exchanges), it will intensify their response to a stressful athletic
195 situation and increase the likelihood of injury. Many of the fundamental tenets of this model
196 have received empirical support (e.g., Maddison & Prapavessis, 2005; Wadey, Evans, Hanton,
197 & Neil, 2013). Yet, this model by-in-large operates at an intrapersonal perspective. Rather than
198 reviewing research at this unit of analysis here (see Ivarsson et al., 2017), the purpose of this
199 subsection is to synthesize research targeting units of analysis that operate above and beyond

200 an intrapersonal perspective. Underpinned by the MMSI and informed by contemporary
201 research, the aim of this section is twofold. The first subsection, *An Interpersonal Perspective*,
202 aims to critically examine the association between coaching practice and injury. The second
203 subsection, *An Institutional and Cultural Perspective*, aims to critically reflect on the social-
204 cultural-organisational environment and how this might impact coaches' actions.

205 **An Interpersonal Perspective**

206 Coaching philosophy is a central plank in understanding a coach's behaviour (Lyle &
207 Cushion, 2017). Indeed, it underpins practice and is made up of a collective of values, beliefs,
208 assumptions, attitudes, principles and priorities (Lyle, 2002). Thus, what coaches do and how
209 they behave is shaped by their individual coaching philosophy. For example, Lyle (1999) used
210 content analysis to identify the coaching philosophies of 43 senior coaches, which included 24
211 values common to all 43 coaches (e.g., personal growth, respect for others, partnership, self-
212 improvement, professionalism, openness, and supportiveness). These values, Lyle argued,
213 underpin beliefs and practices that, in turn, characterise coaching practice. Yet, while coaching
214 practice in sport has received significant empirical attention (see e.g., Lyle & Cushion, 2017;
215 Potrac, Gilbert, & Denison, 2013; Thelwell, Harwood, & Greenlees, 2017), few researchers
216 have examined its impact on injury (for notable exceptions, see Cavallerio et al., 2016; Krane,
217 Greenleaf, & Snow, 1997; Roderick, Waddington, & Parker, 2000).

218 In 1997, Krane et al. used a case-study approach that provided a powerful illustration
219 of how coaching practice led to serious injuries in an American former female elite artistic
220 gymnast. From reading and interpreting the identified themes, corresponding narrative and
221 verbatim quotes, the gymnast's coaches' beliefs and actions can be identified, thereby
222 providing insights into coaching philosophy. Beliefs were winning at all costs, ends justify the
223 means, sport demands intense commitment, success is measured by winning, self-worth is

224 based on athletic performance, and the products of coaching outweigh the process. Examples
225 of these beliefs-in-action included coaches insisting on participation in practices when injured,
226 demanding complete compliance to extreme training regimes, rewarding unyielding dedication
227 to achieving physical perfection, using punishment if perfection is not attained, and engaging
228 in unhealthy practices. For example, the gymnast described one technique used by one of her
229 coaches, “[She would] place bottle caps on the bottoms of your feet, if you fell on your heels
230 off of the balance beam, then you would have them, the Pepsi bottle caps, go into your heels.”
231 (p. 59). These beliefs and resultant actions taken by her coaches led the gymnast to suffer many
232 serious injuries. Yet, despite medical personnel recommending that she ceases participation,
233 medical concerns were disregarded by her coaches. After all, the gymnast was led to believe
234 that these excessive training techniques were a necessary aspect of performance in elite sport
235 and that her coaches were the gate keepers to advancing in her gymnastics career. However,
236 while this study illuminates how coaching practice can lead to injury, it is important to
237 acknowledge that only the gymnast’s perspective was considered; the researchers failed to
238 report the coaches’ point-of-view.

239 The aforementioned coaching practices have been observed to resonate in other sports:
240 rhythmic gymnastics (Cavallerio et al., 2016), professional golf (Douglas & Carless, 2009),
241 basketball (Papathomas & Lavellee, 2014), Australian football (Coulter, Mallett, & Singer,
242 2016), and swimming (McMahon & McGannon, 2017). Yet, the association between coaching
243 practice and injury is not as straightforward as it might seem. Indeed, the coaching process is
244 complex and cannot be assumed to be one-directional (Lyle, 1999). On the one hand, Krane et
245 al.’s (1997) research illustrates how coaches’ beliefs and actions can impact injury. Yet, on the
246 other hand, athletes do not have to conform to these practices. Further, coaches report that
247 athletes impose stressors on them (Didymus, 2016; Olusoga, Butt, Hays, & Maynard, 2009;
248 Thelwell, Weston, Greenlees, & Hutchings, 2008). Stressors include athletes not admitting to

249 being injured (Thelwell et al., 2008), athletes training despite chronic injuries (Didymus, 2016),
250 and a lack of personal disclosure surrounding injury (Cavallerio et al., 2016). By way of
251 addressing this paradox and recognising that coaching is often defined by the nature and quality
252 of interaction that occurs between coaching and athletes (Lyle, 2002), Cavallerio et al. (2016)
253 emphasised the value of communication and the importance of mutual or shared understanding
254 (Lorimer & Jowett, 2009; Jones, Armour, & Potrac, 2004). That is, athletes' and coaches'
255 capacity of accurately perceiving each other's feelings, thoughts, and behaviours. Put another
256 way, shared understanding enables coaches and athletes to 'be on the same page' and thereby
257 to better manage their interactions and relationship. For coaches and athletes to increase their
258 shared understanding, Lorimer and Jowett (2009) recommended that they should each actively
259 attempt to understand each other. One way to facilitate this is by looking for ways by which
260 they can improve their communication; time could be taken outside training sessions, sessions
261 lengthened, or less attempted within the allotted time, to allow for conversation and interaction
262 between coach and athlete. However, this recommendation needs to be considered in the wider
263 institutional and cultural climate where there is a perceived lack of time to speak to athletes
264 due to the increased demands placed on coaches.

265 **An Institutional and Cultural Perspective**

266 Sport coaches operate within a complex, ever changing environment that imposes many
267 pressures on them (Fletcher & Scott, 2010). In recent years, there has been growing recognition
268 of the stressful nature of coaching and that coaches should be labelled as 'performers' in their
269 own right (Frey, 2007; Olusoga et al., 2009; Thelwell et al., 2008). For example, Thelwell et
270 al. (2008) interviewed British coaches and following inductive and deductive analysis
271 procedures identified 182 stressors that they experience. Not only were performance-related
272 demands identified, but also organisational stressors that related to the training environment,
273 competitive environment, finances, stability, selection, travel, safety, administration,

274 organisation, other coaches, athletes, private life, social life, contractual issues, team
275 atmosphere, roles, and communication. These demands have been observed to affect coaches
276 in positive and negative ways, resulting in divergent effects on their personal well-being and
277 job performance (Goodger, Gorely, Lavalley, & Harwood, 2007; Thelwell, Wagstaff,
278 Chapman, & Kentta, 2017). Thelwell et al. (2017) found that coaches perceive themselves to
279 be less effective when stressed, which was reflective of their perceptions of competence, self-
280 awareness, and coaching quality. Examples of this reduced effectiveness include adopting a
281 more commanding style when coaching, forgetting about player needs when instructing,
282 talking down to players, and the creation of a negative environment. Clearly, these findings
283 reinforce the notion that coaches operate within a highly demanding environment that can
284 impact them and their relationships with athletes, which needs to be acknowledged and
285 accounted for when considering whether coaches impact injury.

286 To further understand overuse injuries at an institutional level, Cavallerio et al. (2016)
287 conducted a 12-month ethnography at an elite rhythmic gymnastics club in Italy. Ethnography
288 was chosen because it seeks to develop an understanding of a group's culture and of people's
289 behaviour in the context of that culture (Wolcott, 2005). Founded in the 1980's, the club was
290 based in Italy and is consistently among one of the highest performing clubs within the country.
291 It was identified that the values of the club and the demands imposed on the coach by the club's
292 president affected the coaches' behaviour which, in turn, impacted the gymnasts' state-of-mind
293 and the occurrence and experience of overuse injuries. To illustrate, the values of the club were
294 sporting success (i.e., winning and 'being the best'), discipline (i.e., complete dedication,
295 unwavering commitment, and a high work ethic), and striving for perfection. These values were
296 learnt, accepted, and adopted by the coaches through a process of occupational socialization,
297 which impacted their actions: encouraging participation in practices when in pain, depriving
298 athletes of attention and considering them 'weak' if they do not comply to extreme training

299 regimes, and using punishment if imposed standards are not met. The findings resonate with
300 Nixon's (1993) research on the culture of risk, where a sport culture normalises pain and injury.
301 In a culture of risk, pain is seen as something that has to be accepted and endured in order to
302 succeed, in line with the slogan 'no pain, no gain' (Loland, 2006). Yet, while the coaches in
303 Cavallerio's et al.'s (2016) study did adopt the club's values that ultimately led to injury, it is
304 important to acknowledge that this may not always be the case. Some coaches may challenge
305 the club's values or accept them and subvert them in practice. However, while some readers
306 might be questioning the integrity of the gymnastics club, the critical reader will be cognisant
307 of the wider cultural climate and how this might be impacting the club's functioning.

308 The cultural unit of analysis reflects the media, cultural narratives, and collective norms,
309 traditions, and values. To provide an illustration, sport is represented to the public on a daily
310 basis through various mediums (e.g., television coverage, documentaries, newspaper,
311 magazines, autobiographies, films). Through these channels, public portrayals have a wide
312 reach and exert a powerful influence, serving as a potent means of socialisation and
313 enculturation into sport. Douglas and Carless (2015) reported that these public portrayals help
314 to create a *master-narrative* of what sport *is* and what it *means*, which naturalises and
315 normalises a view of sport and sportspeople that is often inaccessible to our conscious
316 recognition. They described four particular characteristics that are evident in many public
317 portrayals: *The Sportsperson as Hero*, *War Metaphors*, *Winning is Everything*, and *Body as*
318 *Machine*. Of interest within this chapter is the latter characteristic, where it is often emphasised
319 in the media that an athlete's body is a 'machine'. Consequently, a sportsperson's body—and
320 often their mind as well—is viewed in mechanistic terms: as a machine to be developed and
321 fine-tuned (Douglas & Carless, 2015). Indeed, the 'body as machine' metaphor promotes the
322 body being seen as an object to be worked on that will underpin and guide practice to elicit
323 'maximum output' or 'maximum performance'. These practices can range from safe and

324 harmless behavioural interventions (e.g., sleep, rest, dietary modification) right through to
325 potentially damaging practices such as abusing training programmes and training despite pain
326 and injury. Yet, what happens when this ‘machine’ breaks down? What if the machine cannot
327 be ‘fixed’? Further, there is a danger that this metaphor will serve to depersonalise and detach
328 the body from the self. In light of the prevalence of athletes physically abusing their bodies
329 (e.g., Cavallerio et al., 2016; Krane et al., 1997), feelings of concern in this regard are justified.
330 All in all, the master narrative that surrounds what sport *is* and what it *means* provides an
331 illustration of the cultural pressures that might impact other units of analyses.

332 **Can Coaches be Impacted by Sport Injury?**

333 This section is interested in responses to and rehabilitation from injury, with a specific
334 focus on the impact that injuries can have on coaches. This area of research has largely been
335 guided by Wiese-Bjornstal et al.’s (1998) integrated model of response to sport injury. The
336 integrated model suggests that athletes’ emotional and behavioural responses to injury affect
337 recovery outcomes, which are moderated by both pre-injury and post-injury factors and
338 mediated by the process of cognitive appraisal. Post-injury factors include personal (e.g., injury
339 type and severity) and situational variables (e.g., social support and rehabilitation
340 environment). As a stress-process based model that embraces the concept of change, athletes’
341 physical and psychological recovery is viewed as a dynamic, interactive process in which
342 cognitive, emotions, and behaviours are explained within a cyclical cognitive framework.
343 Although the integrated model has yet to be examined in its entirety, researchers have focused
344 on and supported a number of its central hypotheses (for reviews, see Brewer, 2010; Levy et
345 al., 2006; Wadey & Evans, 2011). However, the integrated model largely operates at an
346 intrapersonal perspective, ignoring the impact of injury on others and how situational factors
347 operate at different units of analysis. The purpose of this section, therefore, is to synthesize
348 contemporary research targeting units of analysis that operate above and beyond an

349 intrapersonal perspective. Underpinned by the MMSI, this section largely operates at an
350 *Interpersonal* level of analysis and aims to provide critical insights into the experiences of and
351 by coaches in the aftermath of a sport injury. Consideration of these experiences at an
352 *Institutional* level of analysis will also be critically considered. Future researchers need to
353 critically consider how cultural and policy levels might impact other levels in the MMSI.

354 To understand the potential impact that an athlete's injury may have on coaches, a
355 growing body of research has explored athletes' accounts of their relationships with their
356 coaches in an injury context (Abgarov, Jeffery-Tosoni, Baker, & Fraser-Thomas, 2012; Bianco,
357 2001; Surya, Benson, Balish, & Eys, 2015; Tracey, 2003; Udry, Gould, Bridges, & Tuffey,
358 1997). This research not only typifies the complexity of the coach-athlete relationship, but also
359 illuminates multiple perspectives on the support provided by coaches to athletes after injury.
360 On the one hand, researchers such as Bianco (2001) have provided a positive perspective on
361 the role of the coach after injury. After interviewing elite skiers, Bianco found that when these
362 skiers perceived a positive relationship with their coach, support from that coach after injury
363 was seen as desirable, perceived to be helpful, and had motivational consequences. Yet, on the
364 other hand, both Udry et al. (1997) and Abgarov et al. (2012) have provided a more critical
365 athlete perspective on coach responses to injury. In similarity to Bianco (2001), Udry et al. also
366 interviewed elite skiers, yet here results illustrate that participants described being ignored by
367 their coach after sustaining a season-ending injury. This also resonates with Abramov et al.
368 (2012) who explored swimmers' experiences of social support during injury and who reported
369 on the experiences of three participants who described that their attempts to communicate with
370 their coach left them feeling overlooked and pushed aside. Further, Abramov et al. (2012)
371 reported suggestions across the interviews conducted that coaches' actions were indicative of
372 denial about the injury. Finally, Tracey (2003) provides an alternative perspective suggesting
373 that in a population of student-athletes with moderate-to-severe injuries, most did not even

374 request support from their coaches because they felt they did not want to admit the seriousness
375 of their injuries and felt uncomfortable asking for help. Taken together, while this research
376 focuses on how athletes may feel supported or unsupported with coaches after injury, it also
377 illuminates the potential that coaches themselves may be impacted by athletes' injuries. For
378 example, while coaches may be expected to be supportive to athletes after injury, we may
379 question why some coaches may avoid or deny conversations about injury. Such behaviours
380 are often reported as harmful to the athlete, yet until recently, researchers had not considered
381 the underlying reasons for such behaviours from the perspective of the coach.

382 Building upon and complimenting the previous body of research, a number of
383 contemporary studies have illustrated the perceptions of coaches, identifying how an injury to
384 one of their athletes imposes stressors on them (e.g., Didymus, 2016; Olusoga et al., 2009;
385 Thelwell et al., 2008). For example, elite coaches view injury to an athlete as a major stressor
386 (Thelwell et al., 2008), including chronic injuries, acute injuries, injury rehabilitation, and
387 injury anticipation (Didymus, 2016). One coach stated, "You just dread your key players
388 getting injured...especially the ones that make things tick for you or the ones that do the special
389 things in a game...you can't do anything about it, but when you lose your big players it certainly
390 creates headaches" (Thelwell et al. 2008, p. 910). These 'headaches' can include, amongst
391 other things, changes to team strategy, tactics and selection. Clearly, these findings combined
392 with previous research from the injured athletes' perspective provide a more well-rounded
393 understanding of the impact of injury on coaches. On the one hand, injured athletes are likely
394 to have specific expectations of the support they should receive from their coaches and
395 subsequent satisfaction is likely to be determined on whether or not their expectations are met.
396 Applied recommendations, therefore, are likely to target enhancing the quality of the support
397 exchange (communication) between recipient and provider, especially considering that this is
398 a critical feature of social support (Bianco & Eklund, 2001). For example, coaches should

399 spend more time with injured athletes, listening to their concerns and worries to help alleviate
400 the overall demand they are under. On the other hand, injury causes stressors for coaches (e.g.,
401 team strategy and selection), which injured athletes may or may not be aware of. Therefore,
402 applied recommendations also need to account for these additional demands on the coach,
403 especially considering that injury may be one of 182 stressors that they need to manage in order
404 to function effectively (Thelwell et al., 2008). Yet, while injury may impose performance and
405 organisational-related environmental stressors on coaches, how injuries affect coaches
406 psychologically has only recently been explored.

407 There have been two recent detailed explorations of coaches' personal experiences of
408 their athletes' injuries. Utilising life history interviews, Day et al. (2013) studied the
409 experiences of two national level trampoline coaches from the same club who were both
410 present during a training session in which one of their athletes sustained an open leg fracture.
411 Both coaches recalled that re-entering the environment in which the incident had occurred and
412 having contact with the injured athlete would trigger unpleasant episodes of involuntarily re-
413 experiencing (i.e., intrusions) the injury event. As such, there was considerable effort exerted
414 by the coaches to avoid conversations about the injury within the training environment. Day et
415 al. (2013) further reported that such avoidance was found to restrict the coaches' abilities to
416 receive social support. By identifying that the two coaches had experienced intrusions and
417 avoidance in the aftermath of witnessing an athlete's injury, Day et al. (2013) construed a link
418 with hallmark symptoms of post-traumatic stress (Brewin & Holmes, 2003; McNally, 2004).
419 Indeed, the oscillation between intrusions (e.g. involuntarily re-experiencing the event) and
420 behavioural as well as cognitive avoidance of event-related stimuli after witnessing (i.e.,
421 vicarious exposure) or learning about (i.e., indirect exposure) a traumatic stressor are
422 recognised by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as part of a
423 constellation of post-traumatic stress symptoms that may become clinically significant if they

424 persist for more than six months; a diagnosis of Post-Traumatic Stress Disorder (PTSD) (APA,
425 2013; Friedman, 2013).

426 Building upon the work by Day et al. (2013), Martinelli et al. (2016) examined the
427 emotional responses experienced by a variety of coaches in the aftermath of an athlete's injury.
428 The experience of guilt was identified as a key emotion that could be difficult to manage. Guilt
429 is an intense and unpleasantly valenced affective state, accompanied by beliefs that one should
430 have thought, felt or acted differently (Blum, 2008; Pugh, Taylor & Berry, 2015). Guilt
431 therefore constitutes a sense of wrongdoing because of the perceived connection between one's
432 actions or inactions and a negative outcome; hence some aspect of the self is being experienced
433 in a negative way (Lee, Scragg, & Turner, 2001). The coaches interviewed by Martinelli et al.
434 also reported several ways in which they had coped or could cope with experiencing guilt.
435 These strategies included: seeking reparation through punishment (i.e. requesting that the
436 injured athlete take legal action against the coach), keeping a contactable distance (i.e. physical
437 avoidance of the athlete whilst still offering some emotional and tangible support), terminating
438 one's involvement in sport, or constructing lessons from the felt mistakes.

439 In accordance with Martinelli et al. (2016) it is important to emphasise the subjectivity
440 of the guilt felt by these coaches whereby this emotion was recognized as an inevitable quality
441 to their responses to an athlete's injury, irrespective of the "objective" circumstances
442 surrounding the occurrence of the injury. To understand why this may be, it is useful to go
443 above and beyond an *interpersonal* level of analysis; considering other levels of the MMSI, in
444 particular an *institutional* level. Our understanding of what it means to be a coach is
445 increasingly defined from a deontological perspective that centers on the coach's duties or
446 obligations and their sports participants' entitlements, as evidenced in the development of
447 generic standards of practice or codes of conduct (Hardman & Jones, 2013). Examples of this
448 can be seen in the code of practice put forward by Sports Coach UK (2005) which states that

449 individuals with good coaching practice are those who, “ensure that the environment is as safe
450 as possible, taking into account and minimising possible risks”, and who “accept responsibility
451 for their actions” (p. 3). Such *institutional* messages encourage a seemingly inseparable
452 connection between the coach and the physical integrity of an athlete, and for McNamee
453 (2011), these codes of practice “franchise ‘blameability’ [sic] and consequently ‘punishability’
454 [sic] to their respective organisations” (p. 25). Clearly, not only is it important to provide a duty
455 of care to those who participate in sport, but it is also essential that policies and practices are
456 in place to support coaches too. For example, as Baroness Grey-Thompson (2015) proposed:
457 “Staff, coaches, and athletes to receive mental health awareness training and support” (p. 32).

458 **Implications for Applied Practice**

459 To revisit the question posed in this chapter—Can coaches impact and be impacted
460 sport injury?—the answer is a resounding *yes*. But, it is a complex question that needs to be
461 considered across several units of analysis before reaching any definitive conclusion and
462 informing policy to support the duty of care of coaches. Thus far, implications drawn from the
463 psychology of sport injury literature are rarely directed at coaches. While coaches have been
464 criticized for their reluctance to talk about injury (Bianco, 2001; Surya et al., 2015; Tracey,
465 2003; Udry et al., 1997), there are limited resources available to enable coaches to reflect on
466 and/or debate injury with other coaches in order to reduce the likelihood of injury and its
467 potential impact. Consequently, in this subsection we illustrate how the MMSI can be used to
468 consider the implications of injury for coaches. In doing this, we focus on implications that go
469 beyond the *intrapersonal* unit level of analysis and instead consider the wider social-
470 organisational-cultural implications.

471 At an *interpersonal* level, this chapter highlights the complex environments coaches
472 operate in, the pressures they are under, and how their practices can lead to injury. We pose

473 three pertinent recommendations here. First, coaches need to raise awareness of their own
474 coaching philosophies (as well as other philosophies available to them) and how it may relate
475 to injury. There are a number of excellence resources available for coaches that can be drawn
476 upon and reflected upon to challenge and refine one's philosophy (Lyle & Cushion, 2017).
477 Second, considering the significant stress experienced by coaches, coaches should be labelled
478 as 'performers' in their own right. Underpinned by the Meta-Model of Stress, Emotions, and
479 Performance (Fletcher & Scott, 2010), a tripartite approach to stress management could be
480 implemented: primary interventions to combat strain by eliminating or at least reducing the
481 quantity, frequency, and/or intensity of stressors, hence alleviating the overall demand place
482 upon the coach; secondary interventions to increase coaches' awareness of their stress-related
483 reactions and to enhance their resiliency to stressors through 'mental toughness' training
484 programmes; and tertiary interventions that minimise the damaging consequences of stressors
485 by helping coaches cope more effectively with reduce well-being or performance as a result of
486 strain. A final strategy would be to enhance communication in the coach-athlete relationship
487 to enable coaches and athletes to 'be on the same page' and thereby enable them to better
488 manage their interactions and relationship. Time could be taken outside training sessions,
489 sessions lengthened, or less attempted within the allotted time, to allow for conversation and
490 interact.

491 At an *institutional* and *cultural* level, coaches may be part of what Norman (2010) terms
492 a community of practice, which includes other coaches and the sporting organisation. Entry
493 into such a community contributes to a neophyte coach's socialization within the subculture
494 (Jones et al., 2012). Yet, as highlighted in this chapter, the norms and values within certain
495 sporting clubs and organisations promotes the tendency to assume a totalitarian belief that
496 winning is, and must be, the primary focus for all professionals (Douglas & Carless, 2009).
497 The implication for coaches here is that winning, results, and achievements are pre-eminent

498 and thus the performance of the athlete may also link closely to the mental well-being, identity,
499 and self-worth of the coach. Injury is therefore unacceptable, and actions such as encouraging
500 the minimisation of pain and the glorification of playing injured serve to re-enforce these norms
501 and values. Such actions are often further celebrated by media portrayals of injury as narratives
502 of heroic disposition (Anderson & Kian, 2012) and consequently alternative norms and values
503 are silenced. Coaches might therefore be encouraged to reflect on dominant stories of injury
504 within their community of practice and consider the availability of counter stories. As Hall and
505 Gray (2016) suggest, in order to challenge culturally situated practice rather than accommodate
506 it, the potential of reflective practice must be maximized thorough questioning discursive
507 complexities of practice and challenging assumptions.

508 Finally, at a *Policy* level it is important to consider the formal coach education
509 programmes run by governing bodies. Interestingly, research has provided valuable guidance
510 on the appropriate psychological aspects of sports injuries that should be delivered to sport
511 injury rehabilitation professionals (Heaney et al., 2014) and professional bodies such as the
512 Society of Sports Therapists and the National Athletic Trainers' Association have mandatory
513 requirements for degree programmes to cover aspects of sport psychology (NATA, 2011; SST,
514 2005). Yet, such competencies are rarely specified for sport coaches. As a consequence, sport
515 coaches are not only unprepared to support athletes during injury, but are also unaware of the
516 psychological consequences that they themselves may experience (Day et al., 2013; Martinelli
517 et al., 2016). By not adequately preparing coaches to cope with the psychological
518 manifestations of injury, we are not only producing coaches who are ill equipped, but also those
519 who will recycle injury practices taught to them by their own coaches rather than providing a
520 developmental approach. Consequently, policy makers need to ensure that competencies for
521 sports coaches go beyond the need for first aid training and ensure coaches are prepared for the
522 psychological impacts of chronic, acute, and traumatic injury.

523 To conclude this section, we pose the following questions to coaches to reflect upon,
524 which can also be used at professional development courses to encourage debate:

- 525 • What is your coaching philosophy? How might this philosophy impact injury?
- 526 • How well do you know your athletes? Would you be able to interpret their thoughts
527 and feelings? Would they be able to interpret yours?
- 528 • What pressures are the culture and organisation you're operating within imposing on
529 you? How are these pressures impacting your coaching practice?
- 530 • What social support do you provide to your injured athletes and how effective are
531 these support exchanges between you and your injured athletes?
- 532 • What impact does an athlete's injury have on you? What coping strategies do you
533 have to meet these demands?
- 534 • Has an athlete's injury affected you (or another coach you know) psychologically?
- 535 • What policies and practices within your organisations are available to support you?

536 **Implications for Future Research**

537 Given the limited research focus on understanding whether coaches impact and can be
538 impacted by injury, there is a vast array of potential avenues for future research. In particular,
539 future researchers should be careful in only focusing on and accounting for one level of
540 analysis; rather they should be more critical on identifying and understanding the forces that
541 shape coach behaviours and attitudes towards injury. In recent years, a rich body of literature
542 has emerged on head injury and concussion in sport (Podlog, 2016). Yet, what sets this body
543 of literature apart from much of the psychology of sport injury research is the recognition of
544 the important role that sport coaches have in concussion recognition, management, and
545 resolution. Indeed, while similar cultural values, such as the minimization of pain, are evident,
546 the literature in this area also focuses on the importance of educating coaches and disseminating

547 concussion information to coaches (Covassin, Elbin, & Sarmiento, 2012). Such an approach,
548 which recognizes the challenges, but provides meaningful solutions would be valued for all
549 types of sports injury research.

550 As suggested within this chapter, without a policy level focus on coach education,
551 coaches may be forced to rely on recycled rather than developed approaches to injury. As
552 Werthner and Trudel (2009) have suggested, coach learning is generally developed from five
553 learning situations: past experiences as an athlete, formal education (schooling), coaching
554 courses, mentoring from other coaches, and ‘constantly thinking’ about coaching. Where topics
555 such as injury are absent from coaching courses, it is important to understand the idiosyncrasies
556 of these other learning paths. For example, how do coaches past experiences of injury as an
557 athlete impact on their current responses to injury as a coach? Do mentor coaches encourage
558 conformity to a culture of risk? Finally, we would encourage future researchers to be creative
559 in their approaches to understanding injury. In particular, qualitative methods that use stories
560 as discussion prompts may encourage coaches to speak more openly about their injury
561 experiences. Methods such as story completion (Braun & Clarke, 2013) and the use of non-
562 fictional vignettes (Callary, Werthner, & Trudel, 2016) may prompt written disclosure or
563 interview discussions about injury. Furthermore, researchers should also consider how this new
564 knowledge is disseminated in more creative ways that are accessible to sports coaches.
565 Examples might include the use of creative non-fiction (Smith, McGannon, & Williams, 2015),
566 ethnodrama (Cassidy, Kidman, & Dudfield, 2012), and blogging (Burdon & Clarke, 2015),
567 poetry (Sparkes & Douglas, 2007). Many of these represent exciting and unfamiliar terrains
568 for the psychology of sport injury literature.

569 **Conclusion**

570 The psychology of sport injury is an established field of research that offers
571 practitioners working with injured athletes a rich-resource to inform their practice. Yet, it is
572 now time to expand our knowledge by going above and beyond an intrapersonal unit level of
573 analysis to further contextualise the wider social-organisational-cultural influences and the web
574 of relationships with significant others that impact the sport injury process. In this chapter we
575 propose a new conceptual model that extends current theorising: *Multilevel Model of Sport*
576 *Injury* (MMSI). By doing so, the MMSI provides a platform for future research by illustrating
577 how injury can be influenced at multiple levels (and vice versa). We also provided a population-
578 specific example of the MMSI by critically examining whether coaches impact and can be
579 impacted by injury. We conclude that answers to these questions are complex and need to be
580 considered across multiple levels before reaching any definitive conclusion and informing
581 policy. Practical recommendations and future research avenues are discussed, which represent
582 exciting and unfamiliar terrains for the psychology of sport injury literature.

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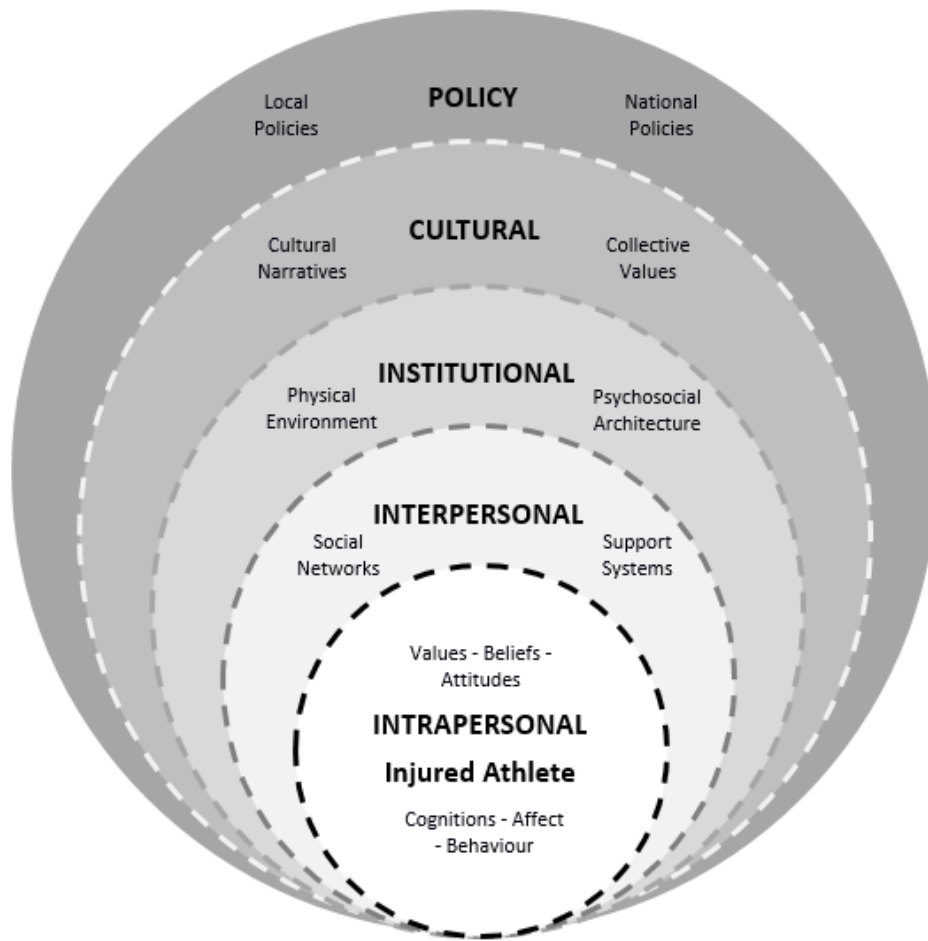
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817 Figure Caption



818

819 *Figure 1.* Multilevel Model of Sport Injury (with examples)