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著者	SAMIRA Razavi, GUIDO Geisler, GRETCHEN Kerr
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Coping Mechanisms of Japanese Intercollegiate Athletes in Response to Athletic Injury

SAMIRA Razavi [*] , GUIDO Geisler [**] and GRETCHEN Kerr [*]

Abstract

This exploratory study investigated the coping mechanisms of Japanese intercollegiate athletes in response to athletic injury. Participants were 12 athletes from four types of team sports (baseball, rugby, soccer, and American football) who were undergoing rehabilitation after sustaining injuries which prevented them from training or competing. Data were collected through semi-structured interviews and analyzed via conceptual content analysis. The results indicated that the athletes used both problem-focused and emotion-focused coping to an equal extent, but showed a preference for approach coping over avoidance coping strategies. Moreover, they employed physical intervention practices (such as swinging a bat while sitting), physical distraction strategies (such as core conditioning and training body parts unrelated to the injury), reliance on trainers, and acceptance of the situation to manage the recovery process. Overall, the findings reflect four concepts that could be interpreted as uniquely Japanese, which suggests the possibility that certain coping methods are derived from culturally-specific thinking.

Key words: injury, coping, intercollegiate sport, content analysis, Japan

Competitive athletes spend a significant amount of time training, often as much as four or five days per week, in preparation for weekend competition. The corresponding physical demands can increase levels of fatigue and the incidence of athletic injury, which in turn may prompt feelings of stress and adverse emotional states (Saez de Heredia, Munoz, & Artaza, 2004). Stress is defined as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). Lazarus and Folkman add that the *stress response* is triggered when a personal stake is identified in the outcome of the situation (deemed "primary appraisal") and when the individual lacks the necessary coping mechanism to deal with that situation ("secondary appraisal"). Thus, in sports contexts, the personal stake that athletes associate with injury is manifested in the disruption to routine and the consequent inability to train and compete (primary appraisal), which is likely to have a negative effect on well-being. The degree to which the athlete feels able to cope (secondary appraisal) will then determine the extent of the stress response.

Lazarus and Folkman's (1984) stress-coping framework forms the basis of the more specific stress-injury model proposed by Williams and Andersen (1998), which extends the process specifically to the realm of sports injuries. The stress-injury model stipulates that athletes with a history of stressors, personality characteristics that exacerbate stress, and inadequate coping resources for stressful situations are more likely to appraise injuries as stressful and exhibit greater physiological arousal as well as deficits in attention (Williams & Andersen, 1998). Support for the stress-injury model is provided by Hanson, McCullagh, and Tonymon (1992), who found a negative linear relationship between negative life stress and greater severity of injury whereas positive life stress coincided with reduced frequency of injury. As noted, the stress-injury model provides a useful means of linking athletic injury with the stress response while taking into account such pre-injury variables as personality, history of stressors, and coping resources, but its weakness lies in the fact that it fails to consider post-injury issues. Moreover, it is most applicable to acute injuries and concomitant

[*] University of Toronto

[**] University of Tsukuba

acute stress while paying little attention to the effects of chronic injury (Williams & Andersen, 1998). Therefore, to obtain a clearer picture of the stress-injury process, it is also necessary to examine the post-injury (or recovery) phase of athletes.

Wiese-Bjornstal, Shaffer, and Morrey (1998) addressed this need by expanding the stress-injury model to include injury recovery factors. Their revised perspective, suitably named the Integrated Model of Sports Injury, identifies pre-injury variables and post-injury outcomes that influence psychological responses. The model acknowledges that psychological responses can and do change dynamically over time, and that recovery (both physical and psychological) is the eventual and desired outcome of the process (Wiese-Bjornstal et al., 1998). More specifically, an individual's first response to injury is to engage in cognitive appraisal (how he/she perceives the problem). This cognitive appraisal then influences subsequent emotions, which in turn affect individual behaviour (Wiese-Bjornstal et al., 1998). The model also accounts for personal and situational factors that influence cognitive appraisal, including individual differences such as history of stressors, coping resources, gender, age, ethnicity, and pain tolerance (Wiese-Bjornstal et al., 1998). It is important to note that the model's core elements—cognitive appraisal, emotional response, and behavioural response—are bi-directional in that reverse influences are also possible (Wiese-Bjornstal et al., 1998). Thus, it utilizes the basic principles of Lazarus and Folkman's (1984) stress and coping mechanism as well as Williams and Andersen's (1998) stress-injury model, and in all cases, coping mechanisms act as the moderating factor to either trigger or reduce the stress response.

Coping in sport is defined as "the process by which an individual consciously responds to stressful situations experienced during sport participation" (Anshel & Kaissidis, 1997, p. 263). Lazarus and Folkman (1984) note that coping behaviour is dynamic to the extent that individuals may at times rely more on one type of coping over another, and that this process is a result of changes in appraisal and re-appraisal of the person-environment relationship. The two main strategies of coping proposed by Lazarus and Folkman are *problem-focused* and *emotion-focused* coping. The former can be defined as coping directed at alleviating the environmental stimulus causing the stressor, such as seeking medical information, engaging in rehabilitation routines, and rehearsing or imagining a stressful event (Anshel & Anderson, 2002). Such problem-focused coping is typically used when a situation is appraised as controllable (Anshel, Williams, & Williams, 2000). Emotion-focused coping, on the other hand, is defined as coping directed at regulating the emotional response to a problem (Lazarus & Folkman, 1984). Examples of emotion-focused coping include denial, acceptance, and emotional-social support (Hoedeya & Anshel, 2003), and is used primarily in situations that are appraised as uncontrollable (Anshel et al., 2000). Coping mechanisms can be further broken down into *approach* (dealing directly with the problem) and *avoidance* (looking for distractions) behaviour.

Studies on coping responses to injury have often focused on long-term injuries (requiring a lengthy recovery process) and the psychological changes that occur throughout recovery. Longitudinal research by Langford, Webster, and Feller (2007), for example, showed that as athletes progressed through their rehabilitation, they experienced fewer negative emotions and felt more positive about returning to play. More importantly, the athletes' attitudes about returning at 6 and 12 months into recovery were related to whether or not they would be able to resume training and competition at 12 months post-surgery. Interestingly, all participants in the Langford et al. study had been cleared to return at that point but only 51% resumed full competition, which suggested that psychological factors played a role in the timing of the athletes' return to sport. Qualitative research by Johnston and Carroll (1997) traced athletes' specific emotions throughout rehabilitation and found frustration and depression to be most prominent, but as rehabilitation progressed, the reasons behind the emotions changed. In the early stages, frustration and depression resulted from disruptions to typical routines, while at the half way point, depression was associated with negative appraisal of progress and consequent poor adherence. During the final stages, it was impatience to return that fueled the athletes' feelings of frustration and depression (Johnston & Carroll, 1997). Saez de Heredia et al. (2004) used the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971) to create a more detailed profile of emotional responses to injury and recovery. They noted that among those athletes with the best adaptation, the experience of depression, vigor, fatigue, and confusion at different points of recovery (initial, middle, and final) followed the same iceberg profile as the pattern frequently associated with successful athletic performance (see Morgan, 1980); namely, high levels of vigour and below

average levels of the other (negative) mood states.

Emotions thus play a role in adherence to injury rehabilitation and eventual recovery, and effective coping resources are required in those cases where stress responses result in emotions that hinder the process (Albinson & Petrie, 2003). Carson and Polman's (2008) study into the specific coping mechanisms of an injured rugby player demonstrated that a variety of different coping strategies were used at different stages of rehabilitation. During his pre-surgery phase, for instance, he relied on information gathering, social support, avoidance, and both emotion- and problem-focused coping. The use of problem-focused coping in particular provided the athlete with a sense of control over recovery whereas avoidance coping was utilized to withstand the physical pain that the athlete was experiencing (Carson & Polman, 2008). During his return to play phase, however, he made use of goal setting, social support, avoidance, and problem-focused coping.

Coping also has been associated with adherence to rehabilitation following more severe injury. Udry (1997) examined injured athletes following surgery and showed that instrumental coping (alleviating the source of stress through information seeking) was the most frequently used coping strategy during all phases of rehabilitation. Coping behaviour was found to be highest at three weeks after surgery, indicating that the athletes had reappraised the situation as stressful at that point in time and increased their coping efforts to reduce the stress (Udry, 1997). Overall, variation in coping strategies throughout an athlete's recovery supports the notion of coping as a process, with frequent changes in the person-environment relationship and ongoing moments of re-evaluation (Lazarus & Folkman, 1984).

The studies described thus far have addressed Western athletes and their responses to athletic injury, but Anshel (2001) asserts that cultural factors play an important role in the coping methods that people select. While cross-cultural research exists in regard to coping with acute stressors (e.g., Anshel, Williams, & Hodge, 1997; Williams, Anshel, & Quek, 1997; Hoedaya & Anshel, 2003), those studies have typically focused on differences between Western populations (e.g., Australia, New Zealand, and USA) and have rarely examined patterns among East Asian athletes. One of the few Asian studies within the extant literature compared Indonesian and Australian athletes on the effectiveness of their coping strategies in response to stressful events, both prior to and during competition, and found that Indonesian athletes used denial, restraint, and active coping to a greater extent than their Australian counterparts (Hoedeya & Anshel, 2003). Yoo (2001) examined one specific East Asian culture, and demonstrated that elite Korean athletes showed a tendency to use more problem-focused and transcendental coping methods than non-elite athletes. He defined transcendental coping as "a culturally specific psychological control mechanism used by Koreans when dealing with adversity" (Yoo, 2001, p. 291).

Yoo's findings suggest the possibility of other culturally-specific coping mechanisms, but research into coping amongst East Asian populations has focused primarily on workplace stress (O'Connor & Shimizu, 2002; Shimizu & Kosugi, 2003). In a sport-specific context, Yamada and colleagues (Yamada et al., 2006) investigated the stress-coping styles of Japanese athletes and found that males involved in team sports tended not to employ any types of coping strategies. Another study by Nakashima and Yamada (2007) looked at the effects of depression in response to performance stagnation and the associated coping methods amongst Japanese intercollegiate athletes. The research indicated that emotion-focused coping helped to reduce effects of the immediate stressor, but it failed to resolve the performance stagnation issue, which ultimately contributed to further depressive tendencies. Problem-focused coping, on the other hand, was found to address the root of the problem and was associated with increased levels of self-worth (Nakashima &Yamada, 2007). Beyond the aforementioned research, however, there is a dearth of studies on the coping responses of Japanese athletes in response to sports injuries.

Thus, the primary purpose of this study was to address this apparent knowledge gap. Although the research was exploratory in nature, the findings could be helpful to medical professionals, athletic therapists, and practicing coaches in dealing with the needs of Japanese athletes during the injury recovery process. Benefits to athletes include enhancing their ability to reflect upon this process. By talking about their coping behaviours, athletes can learn what is and is not personally beneficial in dealing with injury. This could help them to make appropriate adjustments for future occurrences as a means toward better psychological functioning and a smooth return to competition.

Method

Participants

A total of 14 Japanese intercollegiate team-sport

athletes were recruited for the study. All of the participants were undergraduate students between the ages of 19 and 22 years (M = 20.4, SD = 0.94), and were drawn from competitive university teams in baseball, rugby, soccer, and American football at one university in the Kanto region. Inclusion in the research was restricted to athletes who had sustained injuries during training or competition, were currently out of action, and undergoing injury rehabilitation. With respect to gender, one participant was female while the rest were male. However, the female athlete was a member of the men's baseball team (the sole female on the team) and was therefore included in the study. The range of playing experience was between 2 and 15 years (M = 9.7, SD = 4.43). Given the standard of play for all of the sampled sports, it is reasonable to classify the participants as intermediate-advanced competitive athletes.

Table 1 shows the injuries that were represented in the investigation as well as information on players' ages and years of competitive experience. Elite athletes (i.e., members of the national team and/or part of professional sporting organizations) were excluded so as to maintain consistency in the participants' level of competition. Therefore, although 14 participants were recruited and interviewed, participant #14 (male) was omitted from the analysis because he was subsequently selected for the national team in American football and was thus deemed to be "elite" in comparison with the other participants in the study. Participant #1 (male) was also omitted; this is due to the fact that his interview served as a pilot study for the investigation (since changes were made to the nature and wording of certain questions after this first set of data collection). As a result, the data from 12 participants were included in the final analysis, with an age range of 19-21 years (M = 20.2, SD = 0.72) and playing experience of 2-15 years (M = 9.7. SD = 4.31).

Measures

Data were collected through interviews carried out by the principal investigator. Each interview lasted approximately 20 minutes and involved 12 open-ended, semi-structured questions with room for follow-up when deemed necessary. In addition to collecting demographic information, the questions aimed to ascertain the athletes' stress appraisals, emotional responses to injury, and the coping mechanisms that they implemented during recovery. Sample questions included the following: "What were your initial reactions to the injury?" "How did you deal with your injury? Please tell me everything you did immediately after the injury and in the period of time until you returned to action." The interview questions were written and conducted in Japanese by the principal investigator, who spent most of her childhood in Japan and is fluent in both Japanese and English.

Table 1 Overview of Participants, Sports, Playing Experience, and Types of Injury Represented

Participant	Age / Gender	Sport / Experience	Type of Injury
#1	***22 / Male***	***Soccer / 15 years***	***ACL tear***
#2	20 / Male	Soccer / 10 years	Groin pull
#3	20 / Male	Rugby / 5 years	ACL tear
#4	19 / Male	Rugby / 5 years	Chronic back pain
#5	21 / Male	Rugby / 7 years	Ankle sprain
#6	21 / Male	Baseball / 15 years	Ankle ligament tear
#7	21 / Male	Baseball / 15 years	Wrist fracture
#8	20 / Male	Baseball / 10 years	Knee bone contusion
#9	19 / Male	Baseball / 13 years	2nd degree ankle sprain
#10	21 / Male	Baseball / 8 years	ACL tear & meniscal tear
#11	20 / Male	Baseball / 14 years	ACL tear & meniscal tear
#12	20 / Female	Baseball / 12 years	Peroneal tendon dislocation
#13	20 / Male	American Football / 2 years	Partial ACL tear
#14	***22 / Male***	***American Football / 5 years***	***Groin pull***

Note: Bold/italicized entries were not included in the data analysis.

Procedure

The participants were recruited through purposive sampling. They were referred by team alumni, athletic trainers, and university faculty with whom the principal investigator was acquainted. Initial contact was made via email, which outlined the aims, method, and terms of the study. The email also asked recipients to confirm or decline their participation; all agreed, and meeting times were then coordinated for each participant. The interviews were conducted at the arranged meetings and involved the participant and primary investigator only. Each interview took place in a private room. All of the interviews were recorded and the data were transcribed verbatim for the purpose of data analysis. They were then translated into English by the principal investigator, and to avoid translation errors, another bilingual individual with a background in research procedures examined the transcripts and made necessary changes where needed. Participants were assured of confidentiality in the treatment of data and reporting of the research results.

Data Analysis

The interview data were analyzed through the conceptual analysis variant of content analysis, an inductive process which allows researchers to categorize respondents' statements into conceptual clusters through links to specific concepts or frameworks (Patton, 1990; Sanders & Pinhey, 1983). Participants' responses formed the raw data, and consensus was reached by the investigator and aforementioned bilingual assistant on the organization of these raw data into common higher-order themes. Thus, instances of certain statements (raw data themes) were counted as individual meaning units of the corresponding conceptual clusters (higher-order themes) that emerged and provided a means of numerical expression for each cluster. These higher-order themes were then separated into problem-focused, emotion-focused, approach, and avoidance coping strategies (as per Lazarus & Folkman, 1984). As a final step, Japan-specific themes were extracted from the data as a means of interpreting the findings from a culturally-oriented perspective.

Results

Athletes did not have a clear preference between emotion-focused or problem-focused coping, but there was a distinct tendency toward approach strategies. Table 2 shows all of the relevant clusters that emerged, plus the corresponding number of scoring units and percentages for each. Four higher-order themes (coping mechanisms) emerged that were endorsed more frequently than the others; these could be classified as *using physical intervention*, *accepting the situation*, *using physical distraction*, and *reliance on trainer*.

Table 2 Mechanisms of Coping with Injury as Reported by the Players

Cluster (Coping Mechanism)	No. of Scoring Units	Percentage (%)	Coping Strategies
Used physical intervention	12	16.4	Problem-focused (Approach)
Accepted the situation	11	15.1	Emotion-focused (Avoidance)
Used physical distraction	10	13.7	Emotion-focused (Avoidance)
Relied on trainer	10	13.7	Problem-focused (Approach)
Used positive thinking	5	6.8	Emotion-focused (Approach)
Used emotional distraction	4	5.5	Emotion-focused (Avoidance)
Talked with others	4	5.5	Emotion-focused (Approach)
Used goal setting	4	5.5	Problem-focused (Approach)
Used the situation as motivation	4	5.5	Emotion-focused (Approach)
Increased effort	3	4.1	Problem-focused (Approach)
Relied on specific treatments	2	2.7	Problem-focused (Approach)
Regulated/adjusted lifestyle	2	2.7	Problem-focused (Approach)
Relied on team/social support	2	2.7	Emotion-focused (Approach)
Total	73	99.9	

Using physical intervention was defined as routines that athletes engaged in to treat their specific injuries. Prescribed rehabilitation exercises served as examples of such physical intervention. Other examples included swinging a baseball bat while sitting on a chair and picking up balls for the pitcher.

A*ccepting the situation* was underlined by focusing on what lay ahead, focusing on what one could do (as opposed to what one could not do) and getting stronger, and simply letting time pass to let the injury heal.

U*sing physical distraction* was characterized by routines that athletes followed and which did not involve the injured area. Examples included taking the opportunity to concentrate on training other body parts, core and abdominal exercises, and general weight training.

Reliance on trainer was reflected in commentary such as "Listening to my trainer", "Trainer was the best psychological crutch for me", and "Trainer's devotion to my recovery kept me from giving up".

It should also be noted that most of the athletes did their rehabilitation routines during regular training hours, either at the field (with the team) or at a different indoor location. Regular team training typically lasted 2-3 hours, which meant that the athletes had to engage in some sort of additional activity for that time span since rehabilitation routines rarely took that long to complete. Physical distraction, as described above, was typically used to fill the extra time.

Lastly, further inspection of the findings elicited four broader and culturally-specific concepts that could be interpreted as uniquely Japanese and which help to expound the overall patterns. Those concepts are broken down into *commitment to the team* and the Japanese concepts of *gaman (我慢), on (恩),* and *amae/giri (甘え／義理)*.

Discussion

This study attempted to provide insight into the thinking and coping practices of Japanese athletes with regard to athletic injury. Before discussing the findings, several research limitations must be acknowledged. First, it must be stated that the study provided only descriptive information that offers insights into the patterns of Japanese team-sport athletes. Those insights can be useful in the formulation of follow-up research initiatives, but they do not allow for objective conclusions to be drawn. In addition, the sample size was rather small, and for both reasons, the results should not be generalized beyond the current subset. Future research on the stress and coping experiences of injured athletes might also consider the influence of playing status on competitors. Specifically, researchers should investigate the differences between starters, or those who receive significant playing time, and athletes with predominantly supportive roles (as substitutes or practice players). In the current study, no such distinctions were made, but they may have a significant effect on the way that competitors with different roles respond. Similarly, players' ages and years of competitive experience could potentially influence coping behaviour as well, and should be factored into follow-up studies as additional variables of interest. Further to the participants, only one female athlete was recruited and grouped together with the males, but the extant literature suggests that there may be gender differences in athletes' coping mechanisms (see Williams et al., 1997). Future research should thus make efforts to study a greater number of female participants. Finally, the lack of a culturally-distinct comparison group raises difficulties in determining the extent to which the proposed cultural nuances are functions of a unique Japanese identity.

Overall, participants reported the use of both emotion-focused and problem-focused coping strategies. This conflicts somewhat with O'Connor and Shimizu's (2002) observations of a Japanese tendency toward emotion-focused coping, and with Yamada et al.'s (2006) finding that Japanese male team-sport athletes did not report any particular coping mechanisms. In simple terms, the equivocal nature of current and previous results indicates that research on the injury experiences of Japanese athletes is far from complete, and to that end, the following sections attempt to elucidate the present findings specifically and to shed further light on Japanese coping processes. This is done through four broad concepts that are drawn from the data and which are believed to underscore a mindset that is characteristic of athletes in Japan.

Commitment to the Team

The notion of commitment is linked with the hierarchical structure of Japanese groups and institutions, and in the current study, was illustrated by comments such as "By getting injured I failed to contribute to the team". Japanese society is commonly described as collectivistic in nature (see Kerr, Kawaguchi, Oiwa, Terayama, & Zukawa, 2000; Kim & Gill, 1997; Markus & Kitayama, 1991; Moy, 1992; O'Connor & Shimizu, 2002), which means that individual goals are sacrificed

for the greater goals of the group (Nakasago & Furuta, 1996). This mindset is maintained by the hierarchical structure inherent in Japanese social groups, including athletic teams (Nakasago & Furuta, 1996). The coach naturally occupies the top of the hierarchy, followed by trainers, seniors, juniors, and so on down the line, but the entire team adopts the larger goals and objectives that best serve the group. Being injured, however, sets athletes back in terms of their (obligatory) contribution toward those goals and, thus, encourages the athletes' adherence to rehabilitation routines (so that they can once again contribute to the team) in a problem-focused and approach-focused manner—the roots of which might be more prevalent than in the West.

Gaman (我慢)

"Accepting the situation" was the cluster that received the second-highest endorsement from the athletes in this study. It is well-known to residents of Japan that a common response to adverse or bleak circumstances is "gaman," which simultaneously means to accept, tolerate, and be patient and which represents a way of thinking that is seen as a source of strength. As Dunn (2006) points out, "gaman" helps Japanese people to maintain a sense of calm patience and poise in the face of stressful circumstances; the individual accepts his or her lot as unchangeable. This suggests that the Japanese athletes here maintained a low level of concomitant anxiety by accepting their injuries as something that must be endured. Through the acceptance that circumstances were beyond their control, the athletes could perhaps engage more easily in approach-oriented coping behaviours.

On (恩)

The players' reliance on their trainers presumably led to feelings of obligation to those same trainers. This can most likely be explained by the concept of "on", defined as a special obligation, gratitude, and dedication toward a superior who has bestowed benevolent care and favour upon a subordinate (Lebra & Lebra, 1986). To put this into context, "on" most surely played a role in the athletes' adherence to their rehabilitation routines given the "benevolent care, dedication, favour", and time that trainers invested in the athletes' recovery processes. In turn, the athletes acknowledged those efforts and attempted to return the "on" by doing their utmost to resume playing as quickly as possible. Thus, through compliance and a concerted effort, the athletes could reduce the sense of debt (or duty, obligation) to their trainers. Of course, "on" is not the only reason that players would adhere to their rehabilitation routines, nor is it the most important. However, it bears mentioning because such thinking is not commonplace in the athlete-trainer relationship within most Western sport settings.

Amae and Giri (甘えと義理)

Further to the above, the concept of "amae" provides an explanation for the athletes' tendency to rely on their trainers during recovery. "Amae" is the ability and prerogative of an individual to presume or depend upon the benevolence of another, such as the dependence that a child feels toward his or her mother (Doi, 1956). In Japanese society, such relationships have become institutionalized to the extent that such "dependent" relationships can be seen between students and teachers and between doctors and patients (Doi, 2005). With regard to sport contexts, a similar tone of "amae" is found in relationships between trainers and athletes, as the athlete depends on the trainer to be by his or her side throughout the recovery process. This is often an unconscious act of dependence in that the athletes are not necessarily aware of it, but the direction is clearly from athlete to trainer. Moreover, the trainer-athlete relationship is not complete without the trainer feeling a sense of "giri", described as a type of social order consisting of a set of social norms that assign every status holder a certain role (Lebra & Lebra, 1986). The trainers are obligated to attend to the athletes' needs, and in this case, the direction is from trainer to athlete. Both parties benefit from the relationship, as it helps the athlete successfully return to play and once again contribute to the overall team goals. Again, reciprocal benefits between athletes and trainers are not exclusive to Japan, but much like the concept of "on" described above, the underlying motives run deeper/are stronger than those in most Western sport contexts.

In closing, this exploratory investigation revealed the coping strategies of a sample of intercollegiate team-sport athletes in Japan. The findings provide a backdrop for further research by outlining the role of athletic trainers, physical intervention, physical distraction, and the acceptance of circumstances in the strategies of this under-studied demographic. Furthermore, a handful of culturally-specific themes were proposed that may separate Japanese athletes from their Western counterparts; these included commitment to the team and the Japanese concepts of "gaman", "on", and "amae-

giri", all of which are underscored by a collectivistic and hierarchical societal structure. Given these insights, follow-up research is recommended that addresses a wider array of sports and possible differences between male and female competitors. The findings of such enquiry can be of benefit to coaches, trainers, medical staff, and athletes themselves—both in Japan and in multicultural environments with Japanese personnel.

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