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Title

Intention to use sport concussion guidelines among community-level coaches and sports trainers

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Abstract

Objectives: Sporting bodies have developed guidelines for managing community-level players with suspected concussion in response to international consensus statements on concussion in sport. The purpose of this study was to examine the factors that influence the intended use of concussion guidelines among community-level coaches and sports trainers from two football codes in Australia: Australian football and rugby league.

Design: Cross-sectional survey.

Method: The survey, based on an extended theory of planned behaviour model, was completed by 183 Australian football coaches, 121 Australian football sports trainers, 171 rugby league coaches, and 142 rugby league sports trainers.

Results: Personal norms and self-efficacy were significant predictors of intention to use concussion guidelines, although the relationship between self-efficacy and intention norms was stronger among Australian football coaches than rugby league coaches. Analysis of the salient beliefs that underpin self-efficacy also revealed that coaches, irrespective of football code, felt less familiar (χ^2=25.70, p<0.001) and experienced (χ^2=31.56, p<0.001) than sports trainer in using the concussion guidelines. At the same time, Australian football personnel, irrespective of their team role, felt that they had insufficient time (χ^2=8.04, p<0.01) and resources (χ^2=12.31, p<0.001) to implement the concussion guidelines relative to rugby league personnel.

Conclusions: Social marketing campaigns aimed at increasing the intended use of sport concussion guidelines should focus on enhancing self-efficacy and leveraging personal norms. Increasing coaches' familiarity and experiencing in using the concussion guidelines would also be warranted, as would finding ways to overcome the perceived time and resource constraints identified among Australian football personnel.

Introduction

In recent years, considerable media and clinical attention has focused on the risk and management of concussion in sport. One important outcome of this attention has been the development and continued revision of international consensus statements regarding the definition, assessment, and management of sports concussion.[1] The latest of these, the Consensus Statement on Concussion in Sport,[2] was designed to be used by those involved in the treatment of injured athletes at all levels of competition, from physicians to community-level sporting personnel.

The Australian Football League (AFL) and the National Rugby League (NRL) have used the latest international consensus statement to develop concussion management guidelines for Australian football (AF)[3] and rugby league (RL)[4], respectively. These guidelines outline evidence-based best practice for the management of concussion in community-level AF and RL and recognise the role that community clubs, coaches, and other support staff play in ensuring that players with a suspected concussion are managed correctly.[5] The AFL and NRL have stated that those responsible for managing AF and RL players with concussion should adhere to these guidelines at all times.[3,4]

Two groups that play a critical role in managing sport-related concussions in AF and RL are coaches and sports trainers. Coaches are responsible for managing the strategy and performance of players, while sports trainers are tasked with providing first-aid assistance.[6] However, while these groups play an essential role in ensuring that AF and RL players with suspected concussion are managed correctly, the factors that influence their intention to use the AFL or NRL concussion guidelines remain unknown. Such information is essential for understanding the context in which the guidelines are being applied and in identifying opportunities for increasing guideline adoption.[7] Additional research is therefore required to

understand the factors that influence coaches and sports trainers' decisions to use these guidelines.

The theory of planned behaviour (TPB),[8] one of the most widely applied models of decision-making in the health[9] and injury prevention[10] literature, may provide one means for understanding the factors associated with intention to use concussion guidelines. According to the TPB, an intention is determined by three factors: attitude, subjective norm, and perceived behavioural control. Attitude refers to an evaluation of the possible outcomes that could arise if the behaviour was enacted, while subjective norm reflects the behavioural expectations of others. Finally, perceived behavioural control, which is often assessed under the guise of self-efficacy,[11] denotes an individual's confidence in their own ability to enact the behaviour being examined. Attitude, subjective norm, and perceived behavioural control are in turn influenced by behavioural, normative, and control beliefs, respectively. These beliefs reflect the views that individuals hold about the behaviour under examination and are integral to explaining why individuals may or may not intend to enact that behaviour.

While the TPB typically exhibits good predictive utility across a range of behavioural contexts,[12] a number of extensions have been proposed in an effort to expand the model's predictive power.[13] One extension that may have relevance to understanding intention to use concussion guidelines is personal norm. Personal norm refers to an individual's values regarding what constitutes appropriate and inappropriate patterns of behaviour as well as any feelings of regret that they may experience should those values be violated.[11] Thus, the purpose of this study was to apply an extended TPB model to understand the decision-making processes associated with the intended use of the current AFL/NRL concussion guidelines by coaches and sports trainers affiliated with community-level AF and RL clubs.

Methods

Ethics approval for this study was obtained from the Monash University Human Research Ethics Committee. Individuals were eligible to participate in the study if they were aged 18+ years and were a registered coach or sports trainer at a community-level AF or RL club. Recruitment took place between 9 May 2012 and 31 August 2012. Study recruitment notices for the AF arm of the project were placed in a range of electronic media, including the AFL community website, the website of the Victorian Branch of Sports Medicine Australia, the AFL School Ambassador Program eNewsletter, and the AFL Community Development eNewsletter. Details of the study were also emailed directly to registered AF coaches through the AFL development network and to registered users of Sport Medicine Australia's Sports Injury Tracker, an online sports injury surveillance system. In the RL arm of the project, study recruitment notices were emailed directly to coaches and sports trainers with active accreditation through the LeagueNet database. Details of the study were also included in Sport Medicine Australia's Smartplay eflash, a sport safety and injury prevention program, and sent to registered users of Sport Medicine Australia's Sports Injury Tracker.

Published TPB survey construction guidelines[14] were used to develop scales for intention (three items; Cronbach $\alpha = .84$), attitude (nine items; Cronbach $\alpha = .88$), subjective norm (one item), and self-efficacy (three items; Cronbach $\alpha = .88$). The personal norm scale (six items; Cronbach $\alpha = .81$) was constructed following the procedures outlined by Newton et al.[11] All TPB items were assessed using items measured on 7-point scales. A copy of the survey items can be found in the online supplementary material.

Insert Table 1 about here.

Participants were also presented with seven behavioural, 11 normative, and six control beliefs derived from a review of extant literature. For each set of beliefs, participants were asked to select the three that were most important to them. This process provides a means for identifying the beliefs that are personally salient to each participant.[15-16]

Analyses were conducted using SPSS version 20.0. Multiple linear regression analysis was used to assess whether the predictive utility of the extended TPB constructs vis-à-vis intention varied with respect to participants' football code and team role. Specifically, intention was regressed against attitude, subjective norm, self-efficacy, personal norm, football code (0 = RL, 1 = AF), team role (0 = sports trainer, 1 = coach), and the second- and third-order interactions associated with football code and team role. Following standard procedures for examining interactions,[17] attitude, subjective norm, self-efficacy, and personal norm were centred prior to being analysed. Statistical probing of significant interactions was conducted using the slope difference test.[18]

Multiway frequency analysis was used to determine whether the salience of behavioural, normative, and control beliefs differed by football code and team role. Significant second-order effects were probed using chi-square tests of independence.

Results

In total, 934 individuals opened the survey link and met the selection criteria. Of these, 617 participants completed all TPB construct items and were retained for analysis. These participants comprised 183 AF coaches, 121 AF sports trainers, 171 RL coaches, and 142 RL sports trainers.

The multiple linear regression model was significant ($F(19, 597) = 81.45$, $p < 0.001$, adj. $R^2 = .65$), with self-efficacy and personal norms having significant main effects on intention (see Table 1). The 2-way interaction between football code and self-efficacy was

also a significant predictor of intention, as was the 3-way interaction between football code, team role, and self-efficacy. No other main or interaction effects were significant, including those associated with attitude and subjective norm.

Insert Table 1 about here.

The significant 3-way interaction between self-efficacy, football code, and team role was probed using the slope difference test (see Figure 1). Six pair-wise slope comparisons were conducted. Results revealed that the slope between self-efficacy and intention significantly differed between AF coaches and RL coaches ($t = 2.94$, $p < 0.01$). No other significant slope differences were observed.

Insert Figure 1 about here.

While self-efficacy significantly predicted intention, attitude and subjective norm did not. The multiway frequency analysis of the salient beliefs reported in this paper was therefore restricted to control beliefs as these beliefs conceptually underpin self-efficacy and may consequently provide insights into how self-efficacy could be enhanced. The multiway frequency analysis results for behavioural beliefs (which underpin attitude) and normative beliefs (which underpin subjective norm) can be found in the online supplementary material.

The multiway frequency analysis revealed significant 2-way interactions for five of the six control beliefs (see Table 2). For example, coaches (n = 112, 31.6%) were more likely than sports trainers (n = 44, 16.7%) to identify "I'm not responsible for using the AFL/NRL concussion guidelines" as a salient belief ($\chi^2 = 17.75$, $p < 0.001$). Conversely, sports trainers (n = 64, 24.3%) were more likely to nominate "I don't have the time needed to use the

AFL/NRL concussion guidelines" as salient than coaches (n = 54, 15.3%; $\chi^2 = 8.04$, $p < 0.01$). The salience of this belief was also found to vary by football code, with AF personnel (n = 69, 22.7%) more likely to nominate it as salient than RL personnel (n = 49, 15.7%; $\chi^2 = 4.95$, $p < 0.05$).

Insert Table 2 about here.

The notion that "I don't have the resources needed to use the AFL/NRL concussion guidelines" was more likely to be selected by AF personnel (n = 176, 57.9%) than RL personnel (n = 137, 43.8%; $\chi^2 = 12.31$, $p < 0.001$). Differences were also observed for the belief that "I do not have much experience using the AFL/NRL concussion guidelines", with coaches (n = 295, 83.3%) more likely than sports trainers (n = 167; 63.5%) to nominate it as being personally salient ($\chi^2 = 31.56$, $p < 0.001$). Finally, coaches (n = 213, 60.2%) were more likely to identify "I am not familiar with the AFL/NRL concussion guidelines" as salient than sports trainers (n = 104, 39.5%; $\chi^2 = 25.70$, $p < 0.001$). However, the significant 2-way interaction between this belief and football code was marginally not-significant when probed using chi square tests of independence ($p = 0.05$)

Discussion

Recent analysis of hospital admissions data suggests that the incidence of sport-related concussion in Australia is rising.[19] This study, the first to our knowledge to examine the decision-making processes associated with intended concussion guideline use among community-level sporting personnel, is therefore of particular importance as it provides key insights for promoting the use of such guidelines among those who play key roles in managing sport-related concussions.

Two specific decision-making constructs were identified as having a particular influence on intention to use the AFL/NRL concussion guidelines: personal norms and self-efficacy. That is, coaches and sports trainers were more likely to intend to use concussion guidelines if they linked the use of the guidelines to their personal values about what constitutes appropriate and inappropriate patterns of behaviour (personal norms) and felt confident in their ability to use the guidelines (self-efficacy). As such, social marketing campaigns[20] aimed at enhancing personal norms and self-efficacy could increase the intended use of concussion guidelines among AF and RL coaches and sports trainers.

One means for enhancing personal norms would be to encourage individuals to anticipate the feelings of regret that could eventuate should they fail to make use of the concussion guidelines. These feelings of regret could stem from considering the legal repercussions associated with mismanaging a player with suspected concussion or from reflecting on the longer-term effects that a mismanaged concussion could have on the health and wellbeing of players. Highlighting these potential sources of regret in social marketing campaigns aimed at increasing the use of concussion guidelines may therefore provide a powerful motivational impetus for using these guidelines. This approach is likely to be equally effective among coaches and sports trainers given that the predictive utility of personal norms did not differ between these two groups.

Self-efficacy was also identified as a significant predictor of intention. Unlike personal norms, however, the predictive utility of this construct with respect to intention was found to differ by sporting code and team role. Specifically, the slope between intention and self-efficacy was significantly greater for AF coaches as opposed to RF coaches, suggesting that interventions aimed at increasing self-efficacy to use concussion guidelines will be most effective at increasing the intended use of these guidelines among AF coaches. It should be noted, however, that self-efficacy also had a main effect on intention. Thus, while social

marketing interventions that focus on enhancing self-efficacy may be especially effective among AF coaches, they are also likely to be effective among other AF and RL sporting personnel.

Several means are available for enhancing self-efficacy. For example, following Bandura[21], self-efficacy could be bolstered by providing opportunities for coaches and sports trainers to vicariously experience others making use of concussion guidelines. Such vicarious experience could help to convince individuals that making use of concussion guidelines falls within their personal capabilities, especially if observers believed that they were similar to those seen to be implementing the guidelines. Online knowledge-based training programs have also been found to increase coaches' self-efficacy to respond to and manage sport-related concussions.[22]

Further insights into how self-efficacy could be enhanced were found by analysing the salient control beliefs held by AF and RL coaches and sports trainers. In particular, AF and RL coaches were more likely than their sports trainer counterparts to nominate beliefs that implicated their inexperience and lack of familiarity with using the concussion guidelines as barriers to using these guidelines. These findings point to a need for additional skills training among coaches from both football codes to increase their confidence in using the concussion guidelines. Conversely, AF personnel, irrespective of their team role, were more likely than their RL counterparts to perceive time and resource constraints to using concussion guidelines. Efforts to promote the concussion guidelines among AF personnel should therefore seek to remedy these issues by identifying ways to more effectively integrate the use of these guidelines into their training and match-day activities.

As with all research, a number of limitations were associated with the current study. One limitation was that participants were not randomly recruited, limiting the extent to which the results can be generalised to the broader population of AF and RL coaches and sports

trainers. Nevertheless, the sample was sufficiently large to minimise the extent of any such biases. A second limitation was that previous exposure to, and use of, the AFL/NRL concussion guidelines was not recorded. As a result, it is unclear whether the decision-making processes associated with using the concussion guidelines may differ as a function of previous guideline use. Future research employing more generalizable recruitment strategies and which records prior use of concussion guidelines is therefore required.

Conclusion

Application of an extended TPB model identified several factors associated with coaches and sports trainers' intended use of the AFL/NRL concussion guidelines, including self-efficacy and personal norm. Moreover, analysis of the salient beliefs held by coaches and sports trainers identified specific issues undermining the use of concussion guidelines, including time and resource constraints and perceived inexperience and unfamiliarity in using the guidelines. These findings provide useful insights for the development of social marketing interventions aimed at encouraging the use of the AFL/NRL concussion guidelines among these cohorts.

Practical implications

- Social marketing campaigns aimed at increasing the intended use of concussion guideline use should focus on enhancing personal norms and self-efficacy.
- Campaigns targeting self-efficacy may be particularly effective for Australian football coaches relative to rugby league coaches.
- Coaches, irrespective of football code, felt less familiar and experienced in using concussion guidelines than sports trainers.

- Australian football personnel, irrespective of their team role, perceived greater time and resource constraints in using concussion guidelines than their rugby league counterparts.

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Table 1

Multiple linear regression analysis of the extended theory of planned behaviour model.

Variable	*B*	*SE(B)*	β
Football code	-.17	.15	-.04
Team role	-.25	.13	-.06
Attitude	.02	.01	.08
Subjective norm	.07	.07	.06
Self-efficacy	.06	.03	.08*
Personal norm	.27	.04	.54***
Football code x Team role	.34	.20	.08
Football code x Attitude	.00	.02	.01
Football code x Subjective norm	.01	.10	.01
Football code x Self-efficacy	.20	.06	.19*
Football code x Personal norm	-.01	.05	-.01
Team role x Attitude	-.01	.02	-.01
Team role x Subjective norm	.14	.09	.10
Team role x Self-efficacy	.09	.05	.09
Team role x Personal norm	.03	.05	.05
Football code x Team role x Attitude	-.01	.03	-.02
Football code x Team role x Subjective norm	-.15	.14	-.07
Football code x Team role x Self-efficacy	-.23	.09	-.16*
Football code x Team role x Personal norm	.02	.07	.02

*$p < 0.05$; ***$p < 0.001$

Football code: 0 = RL, 1 = AF

Team role: 0 = sports trainer, 1 = coach

Table 2

Multiway frequency analysis second order effects for salient control beliefs.

Variable	Partial χ^2	Difference
Belief 1: I'm not responsible for using the AFL/NRL concussion guidelines		
Belief 1 x Football code	0.03	
Belief 1 x Team role	18.21***	Coach > trainer
Football code x Team role	1.82	
Belief 2: I don't have the time needed to use the AFL/NRL concussion guidelines		
Belief 2 x Football code	5.80*	AF > RL
Belief 2 x Team role	8.80**	Trainer > coach
Football code x Team role	2.79	
Belief 3: I don't have the resources needed to use the AFL/NRL concussion guidelines		
Belief 3 x Football code	12.30***	AF > RL
Belief 3 x Team role	0.00	
Football code x Team role	1.90	
Belief 4: I find the AFL/NRL concussion guidelines unclear and difficult to follow		
Belief 4 x Football code	0.79	
Belief 4 x Team role	0.01	
Football code x Team role	1.94	
Belief 5: I do not have much experience using the AFL/NRL concussion guidelines		
Belief 5 x Football code	0.49	
Belief 5 x Team role	30.88***	Coach > trainer
Football code x Team role	1.45	
Belief 6: I am not familiar with the AFL/NRL concussion guidelines		
Belief 6 x Football code	5.31*	
Belief 6 x Team role	27.32***	Coach > trainer
Football code x Team role	3.41	

*$p < 0.05$; **$p < .01$; ***$p < 0.001$

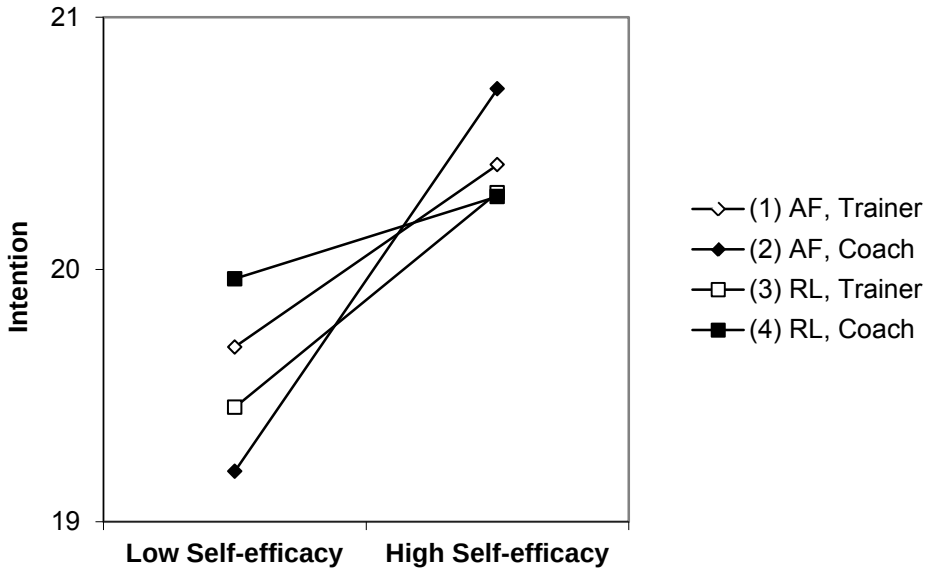

Figure 1
The relationship between self-efficacy and intention by football code and team role.