Original research

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

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A B S T R A C T

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 popular football codes in Australia: Australian football and rugby league.

Methods: Cross-sectional survey.

Results: Personal norms and self-efficacy were significant predictors of intention to use concussion guidelines, although the relationship between self-efficacy and intention was stronger among Australian football coaches than rugby league coaches. Analysis of the salient beliefs that underpin self-efficacy found that coaches, irrespective of football code, felt less familiar (χ² = 25.70, p < 0.001) and less experienced (χ² = 31.56, p < 0.001) than sports trainers in using the concussion guidelines. At the same time, Australian football personnel, irrespective of their team role, felt that they had insufficient time (χ² = 8.04, p < 0.01) and resources (χ² = 12.31, p < 0.001) to implement the concussion guidelines relative to rugby league personnel.

Conclusions: Programmes aimed at increasing the intended use of sport concussion guidelines should focus on enhancing self-efficacy and leveraging personal norms. Increasing coaches’ familiarity and experience 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.

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1. Introduction

In recent years, considerable media and clinical attention has focused on the risk and management of concussion in sport. An 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.1–3 Prior to 2013, the Australian Football League (AFL) and the National Rugby League (NRL) used the 2008 International Concussion Consensus Statement on Concussion in Sport2 to develop concussion management guidelines for Australian football (AF)4 and rugby league (RL)5, respectively. These guidelines outlined evidence-based best practices for the management of concussion in community-level AF and RL and recognised the role that community clubs, coaches, and other support staff play in ensuring that players with a suspected concussion are managed correctly.6 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.4,5 While the AFL and NRL do not require coaches and sports trainers to attend education sessions specifically pertaining to the use of these guidelines, such education is increasingly being included in other training and accreditation programmes conducted by these sporting bodies.

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Two groups that play a critical role in contributing to the management of diagnosed sport-related concussions in AF and RL are coaches and sports trainers. Coaches are responsible for managing team strategy and the performance of players, while sports trainers are qualified to provide first-aid assistance. 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. Additional research is therefore required to understand the factors that influence coaches’ and sports trainers’ intentions to use these guidelines.

The theory of planned behaviour (TPB), one of the most widely applied models of decision-making in the health and injury prevention literature, provides one means for understanding the factors associated with intention to use concussion guidelines. According to the TPB, intention to enact a given behaviour 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, 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, a number of extensions have been proposed to expand the model’s predictive power. 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. Thus, the purpose of this study was to apply an extended TPB model to understand the factors associated with the intended use of AFL/NRL concussion guidelines by coaches and sports trainers affiliated with community-level AF and RL clubs.

2. Methods

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. Online recruitment took place between 9 May and 31 August 2012, inclusive. 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 (SMA), 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 SMA’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 SMA’s Smartplay eflash, a sport safety and injury prevention programme, and sent to registered users of SMAs Sports Injury Tracker. Ethics approval for this study was obtained from the Monash University Human Research Ethics Committee.

The TPB survey construction guidelines were used to develop scales for intention (three items; Cronbach α = 0.84), attitude (nine items; Cronbach α = 0.88), subjective norm (one item), and self-efficacy (three items; Cronbach α = 0.88). The personal norm scale (six items; Cronbach α = 0.81) was constructed following a previously published procedure. 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.

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 provided a means for identifying the beliefs that are personally salient to each participant. The study questionnaire was assessed for content and face validity by the research team prior to the commencement of recruitment. The research team included a registered AF coach (AD) as well as experts on concussion in sport (MM, GAD, SJS, HS).

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 (refer to Table 1 for a complete delineation of the second- and third-order interactions that were tested). Following standard procedures for examining interactions, attitude, subjective norm, self-efficacy, and personal norm were mean centred prior to being analysed. That is, the mean for each variable was subtracted from every value in that variable. Statistical probing of significant interactions was conducted using the slope difference test.

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. The funding
organisation was not involved in the collection, analysis, or interpretation of data, nor was it involved in any decisions regarding the publication of data.

3. Results

In 2012, there were 17,382 and 33,390 registered RL coaches and sports trainers across Australia, respectively. There were also approximately 25,000 registered AF coaches, and while the total number of AF sports trainers is unknown, it is likely that every community club would have at least one sports trainer. The response rate for this survey was therefore approximately 1% of the total estimated eligible population of 100,000 AF and RL coaches and sports trainers, with 934 individuals opening the survey link and meeting 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. While this response rate was low, the absolute number of completed surveys was large, providing confidence in the robustness of the results outlined below.

The multiple linear regression model was significant ($F(19, 597) = 81.45, p < 0.001$, adj. $R^2 = 0.65$), 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.

The significant 3-way interaction between self-efficacy, football code, and team role was probed using the slope difference test (see Fig. 1). Six pair-wise slope comparisons were conducted. The slope between self-efficacy and intention differed significantly between AF coaches and RL coaches ($t(597) = 2.94, p < 0.01$). No other significant slope differences were observed.

While self-efficacy significantly predicted intention, attitude and subjective norm did not. The multiway frequency analysis of the salient beliefs 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 identified 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 ($\chi^2(616) = 17.75, p < 0.001$). 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 ($n = 54, 15.3\%; \chi^2(616) = 8.04, p < 0.01$). 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 ($n = 49, 15.7\%; \chi^2(616) = 4.95, p < 0.05$).

The notion that “I don’t have the resources needed to use the AFL/NRL concussion guidelines” was more commonly selected by AF personnel ($n = 176, 57.9\%$) than RL personnel ($n = 137, 43.8\%; \chi^2(616) = 12.31, p < 0.001$). 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 this as being personally salient ($\chi^2(616) = 31.56, p < 0.001$). 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 ($n = 104, 39.5\%; \chi^2(616) = 25.70, p < 0.001$). However, the significant 2-way interaction between this belief and football code was not significant when probing used chi square tests of independence ($p = 0.05$).

4. Discussion

Recent analysis of hospital admissions data suggests that the incidence of sport-related concussion in Australia is rising. This study, the first to our knowledge to examine the factors 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

![Graph showing the relationship between self-efficacy and intention using AFL/NRL concussion guidelines by football code and team role.](image-url)
those who play key roles in supporting the management of players suspected of having sport-related concussions.

Two specific decision-making constructs were identified as having a particular influence on the intended use of the AFL/NRL concussion guidelines: personal norms and self-efficacy. In other words, intentions to use the concussion guidelines were greater among coaches and sports trainers who 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). These results suggest that strategies to increase the intended use of concussion guidelines among AF and RL coaches and sports trainers should focus on targeting personal norms and self-efficacy.

Personal norm refers to the evaluation of a specific behaviour through the lens of one’s moral values. If, during the course of this evaluation, an individual perceives that the behaviour will violate their moral values, then the prospect of enacting that behaviour will give rise to the anticipation of regret. As such, there are two ways that personal norms could be leveraged to encourage the use of concussion guidelines: by making the moral dimensions of concussion guideline usage salient or by highlighting the feelings of regret that could arise from failing to make use of the concussion guidelines. In effect, these approaches highlight either the social or personal consequences of using/not using the concussion guidelines. Research from other health domains suggest that helping individuals understand the social consequences of their actions can be a particularly powerful motivator of behaviour change, although it remains to be seen whether this approach would be equally effective in a community sport setting. Irrespective, either approach could form the basis of a targeted social marketing campaign aimed at encouraging the uptake of concussion guidelines among coaches and sports trainers. The relevance of using social marketing as a behaviour change framework lies in the fact that it involves developing targeted campaigns aimed at addressing the motivations of specific groups. Thus, a social marketing campaign could be developed to highlight the importance of adhering to the concussion guidelines to safeguard the health and wellbeing of players (social consequences) or the personal feelings of regret that club personnel could feel for failing to effectively enforce the guidelines among their players (personal consequences).

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, with the slope between intention and self-efficacy significantly greater for AF coaches than RF coaches. It is conceivable that this difference may have arisen as a result of variations in how the AFL and NRL disseminated their respective concussion guidelines, although associated factors, such as concussion knowledge, were equivalent across the two sporting codes. Whatever their cause, these findings point to the impact that enhancing concussion guideline self-efficacy could have on increasing the intended use of concussion guidelines among AF coaches. It should also be noted that self-efficacy had a main effect on intention, so efforts to enhance concussion guideline self-efficacy are also likely to have some effectiveness among other AF and RL personnel.

Several approaches could be used to enhance self-efficacy. According to Bandura, self-efficacy arises from mastery experiences, vicarious experiences, verbal persuasion, and physiological or affective states, with mastery and vicarious experiences exerting the greatest influence on self-efficacy. Mastery experiences arise when an individual succeeds in performing a particular action, so providing coaches and sports trainers with hands-on training regarding the use of concussion guidelines could provide an effective means for enhancing their concussion guideline self-efficacy. Vicarious experiences, in contrast, occur when others are observed to have succeeded in implementing that action. Translated to a community sporting context, such experiences could arise from observing club personnel implement the guidelines in training or match-day settings. To facilitate such vicarious exposure, selected coaches and sports trainers from each club could receive intensive hands-on training to increase their own self-efficacy and then act as ‘ambassadors’ for the use of concussion guidelines once they return to their clubs.

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. The AFL could therefore provide additional support to assist AF personnel implement the concussion guidelines or work with AF personnel to find ways to more efficiently 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 but were instead those who had responded to a widely disseminated study invitation notice. This might limit the extent to which the results can be generalised to the broader population of AF and RL coaches and sports trainers as it is not known how representative of the broader population the survey responders were. Nevertheless, the sample was sufficiently large to minimise the extent of any such biases. A second limitation was that the outcome variable examined in this study was a measure of intention, not behaviour. Intention is a central construct in decision-making and one that is worthy of examination in its own right. For example, in line with numerous models of decision-making, increasing coaches and sports trainers’ intention to use concussion guidelines should increase the likelihood that they will ultimately use these guidelines. However, not all individuals with a positive intention to perform a particular behaviour will go on to enact that behaviour. Future research measuring coach and sports trainers’ actual use of concussion guidelines would therefore be useful for demonstrating that the current findings are also applicable to explaining the enactment of behaviour.

5. 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 inhibiting the intended 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 interventions aimed at encouraging the use of the AFL/NRL concussion guidelines among these groups of sport personnel.

6. Practical implications

- Efforts to increase the intended use of concussion guidelines among coaches and sports trainers should target personal norms and self-efficacy.

• Programmes 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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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jsams.2013.10.240.

References