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Theoretical Integration and the Psychology of Sport Injury Prevention

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Abstract

Integrating different theories of motivation to facilitate or predict behaviour change has received an increasing amount of attention within the health, sport and exercise science literature. A recent review article in *Sports Medicine*, by Keats, Emery and Finch presented an integrated model using two prominent theories in social psychology, self-determination theory (SDT) and the theory of planned behaviour (TPB), aimed at explaining and enhancing athletes' adherence to sport injury prevention. While echoing their optimistic views about the utility of these two theories to explain adherence in this area and the virtues of theoretical integration, we would like to seize this opportunity to clarify several conceptual principles arising from the authors' integration of the theories. Clarifying the theoretical assumptions and explaining precisely how theoretical integration works is crucial not only for improving the comprehensiveness of the integrated framework for predicting injury prevention behaviour, but also to aid the design of effective intervention strategies targeting behavioural adherence. In this article, we use the integration of SDT and TPB as an example to demonstrate how theoretical integration can advance the understanding of injury prevention behaviour in sport.

1. Introduction

The growing number of psychological theories and models applied to the promotion of health-related-behaviour has increased the complexity and sophistication of theory-based, behaviour-change interventions in the last decade.[1-5] The innovative review paper by Keats et al.[6] has extended this trend to the context of sport injury prevention. In their paper, Keats and co-workers attempted to bring together the variables from self-determination theory (SDT)[7,8] and the theory of planned behaviour (TPB)[9,10] to explain athletes' adherence to sport injury prevention behaviour (e.g. neuromuscular training). We appreciate the authors' creativity and efforts in this regard because such theoretical development has the potential to enhance the comprehensiveness and predictive power of psychological models aimed at explaining the processes underpinning sport injury prevention, a relatively new area of research.[11] Nevertheless, theoretical integration is not simply a mixture of psychological variables from multiple theories, rather, it is a systematic and evidence-based process that aims to highlight the essential psychological variables and mechanisms of predicting and explaining health

behaviours,[1,5] so we feel that some clarification is needed regarding the basis of their approach as potential questions concerning the utility of theoretical integration may be raised. In this article, we aim to highlight that evidence-based theoretical integration can offer a comprehensive and effective model to help explain sport injury prevention. Consistent with the theoretical framework adopted by Keats and colleagues,[6] we use the integration of SDT[7,8] and the TPB[9,10] to illustrate our ideas.

2. Rationale for Theoretical Integration

A number of social psychological theories have been applied to explaining the complex processes involved in health-related behaviour.[3,4] SDT[7,8] and the TPB[9,10] have been prominent in the health-related literature and research applying these theories has demonstrated that they are each effective in explaining unique variance in health behaviours, particularly physical activity.[12-14] Although the psychological antecedents of sport injury presents a comparatively new area of research, researchers and practitioners may benefit from the application of these well evidenced theoretical approaches to delineate the psychological factors related to injury reduction and prevention.[11,15,16]

A recent trend in the literature on the application of social psychological theories to predict and explain health behaviour is the adoption of an integrated approach, which involves the adoption of multiple theories that provide complementary explanations of behaviour.[1-4,17] A recent report also documents an intervention study (iPlay)[18] that applies both the TPB and social learning theory[19] to prevent sport injury among primary school students, thus showing that the trend has been extended to sport injury prevention. A key reason for adopting an integrated, multi-theory approach is that research frequently demonstrates that a substantial amount of the variance in health behaviour remains unexplained by single-theory approaches.[20,21] Furthermore, the predictive ability of the theories has been found to be attenuated when past behaviour is taken into account.[12] The inclusion of variables from multiple theories tends to offer a solution to these shortcomings. Research adopting multi-theory approaches often leads to better prediction, in terms of variance explained, of health behaviour but, most importantly, demonstrates how one theory may assist in addressing the shortcomings of another and reveal a more effective and comprehensive explanation of the processes that lead to health behaviour. Given the success of such integrated approaches in the prediction of health-related behaviour and the complexity of the interacting effects between external and internal factors on sport injury prevention,[11] the adoption of an integrated approach may also be useful for the prediction of sport-related injury prevention.[22-24]

Despite the advantages of theoretical integration, it is important to note that theoretical integration must be performed systematically; researchers aiming to use theoretical integration need to pay keen attention to remaining true to the hypotheses of the component theories and to base their integration on evidence and logical derivation. Simply combining the concepts from different theories presents an element of risk for including overlapping constructs or potential dissonance between the constructs from the component theories.[1] It is important that researchers and practitioners fully articulate the theoretical assumptions and evidence for the integration of theories so that the integrated model offers a more precise and complete understanding of the motivational process of the health behaviour.[1,23] This is one of the key prerequisites for successful theoretical integration.[1,5] The integration of the SDT and TPB in the context of sport injury prevention is no exception and it is important that the precise processes for integration are clearly delineated as part of the conceptual development of the integrated model.

3. The Integration of Self-Determination Theory (SDT) and the Theory of Planned Behaviour (TPB)

Hagger and coworkers[25-27] have established a strong theoretical foundation to support the theoretical integration of SDT and TPB in health-related contexts based on their theoretical reviews and supporting empirical tests. They have provided a clear rationale for their integrated model with due consideration paid to the assumptions,

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limitations and strengths of the component theories and their integration. In the next sections, we outline the important tenets of the component theories, the shortcomings and limitations of the theories, the rationale for integration based on overcoming the limitations and how such an integrated model would be effective in explaining sport injury prevention.

3.1 SDT

SDT[7] is recognized as a leading approach for the explanation of motivated behaviour in health-related contexts, including sport injury,[28,29] and has demonstrated efficacy in identifying the motivational factors that underpin social behaviour and how social factors in the environment (e.g. support for self-determined motivation by significant social agents) may give rise to these factors. However, it has been proposed that SDT is limited in two ways.[26] First, the theory does not explicitly illustrate the proximal effect of some important belief-based social cognitive factors like the impressions, social norm and controllability of the behaviour perceived by the individuals.[25,26,30] Second, action plans and commitment play a major role on the actual execution of future behaviours,[31] but these processes have not been specifically addressed in SDT. Although the original outline of SDT made reference to social cognitive factors as mediators of the effects of self-determined motivation and support for self-determined motivation on intention and behaviour, these specific processes have not been formally outlined within the theory nor have they been tested empirically within the framework of SDT.

3.2 The TPB

The TPB, on the other hand, is explicit in identifying and explaining the processes by which key belief-based social cognitive variables like attitudes, subjective norms and perceptions of control, influence intentions to perform a given behaviour in the future and actual behaviour. In particular, according to the TPB,[9,10] intention (the effort one plans to invest toward engaging in a particular behaviour in the future) is regarded as the most proximal predictor of future behaviour, but it is also proposed to be a function of three belief-based factors: attitudes (subjective evaluations of the behaviour), subjective norms (perceived social appropriateness of the behaviour) and perceived behavioural control (PBC; confidence and ability toward engaging in the behaviour). However, a limitation of the TPB highlighted in previous research[26] is that the origins (i.e. social and psychological antecedents) of attitude, subjective norm and PBC are not clearly detailed within the TPB framework.[32]

3.3 The Basis of Theoretical Integration

Integrating constructs from both theories may combine the strengths and compensate for the weaknesses of both theories. However, the integrated model does not posit that all of these variables form direct relationships with behaviour. Hagger and colleagues[25-27] hypothesized a nested hierarchical relationship between the SDT constructs and the TPB variables. In particular, it was hypothesized in the integrated model that self-determined forms of motivation from SDT act as distal factors that exert their effects on behaviour through the mediation of the proximal factors from the TPB (i.e. attitude, subjective norm, PBC and intention; see figure 1). In other words, the integration formalizes the hypotheses of SDT with respect to the pathways by which self-determined motivation impacts beliefs regarding future behavioural engagement, and utilizes the TPB to make the role of social cognitive mediators explicit in the relationship between self-determined motivation and intentional behaviour. Such motivational consequences may improve the comprehensiveness and precision of the prediction by charting the exact pattern of effects involved in the relationships between variables from SDT and TPB. However, the utility of the proposed integrated model to explain behaviour in a specific context (e.g. sport injury prevention) will require further research to be validated.

4. Evidence for Theoretical Integration

While there is a dearth of research testing integrated models of SDT and the TPB, and also

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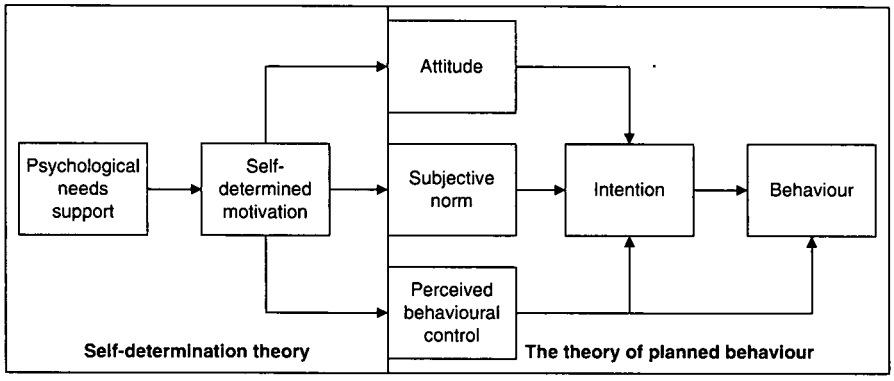


Fig. 1. The integrated model of the self-determination theory and the theory of planned behaviour.

other psychological and behavioural theories and models,[11] in sport injury prevention, there is a considerable amount of evidence supporting the utility of each theory individually in predicting behaviour in other health context areas such as sport injury rehabilitation, and such research might pave the way for the adoption of integrated approaches. For example, SDT and the TPB have been independently applied to predicting and understanding rehabilitation adherence, the pivotal behavioural outcome in the prevention of re-injury in sport.[33] Studies of recreational and professional athletes have illustrated that self-determined motivation is positively correlated with adherence to home-based physiotherapy,[29] intentions to attend rehabilitation sessions[28] and adherence to the prevention of sport injuries.[34] Similarly, a few studies have provided supporting evidence for the application of the TPB to explain the behaviour of individuals in safety and injury prevention in sport. For instance, attitude, subjective norm and PBC have been shown to exert positive effects on intentions to wear safety gear among skaters,[35] and the future behavioural adherence to using cycling-helmets.[36-38] A recent study among female junior netball players found that their intention to learn correct safe landing techniques could be significantly predicted by attitude and subjective norm.[39]

Despite evidence from a single theoretical perspective, the potential efficacy of developing and applying an integrated model (based on the premises of SDT and the TPB) in a sport injury prevention context has been informed by corresponding research in other health contexts. In particular, Hagger and Chatzisarantis[25] meta-analysed the results of 37 studies that integrated these theories in various health-related contexts including exercise, dieting, breast-feeding and condom-use. Results showed that self-determined motivation from the SDT exerted significant effects on attitude, subjective norm, PBC and intention from the TPB. Furthermore, the relationship between self-determined motivation and intention was fully mediated by attitude, subjective norm and PBC.[25] Cross-cultural studies have also supported the generalizability of the pattern of effects in integrated SDT and TPB models in data from numerous national groups.[40,41]

The integrated model has also received preliminary support within injury prevention contexts, including elite sport[22] and occupational[24] contexts. For example, a cross-sectional study on police officers revealed that the positive effect of self-determined motivation on intention for injury prevention was fully mediated by attitude, subjective norm and PBC as hypothesized.[24] The motivational effects were confirmed in a follow-up study among professional athletes.[22] Overall, research adopting integrated SDT and TPB models support the proposed pattern of effects from many health-related contexts, and the recent cross-sectional studies by Chan and associates[22,24,28] suggest that the model appears to be promising in the explanation of sport injury prevention.

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5. From Theory to Practice

The theoretical evidence is important to theorists as it provides useful information on the psychological processes leading to motivated behaviour in health contexts.[2,3,5] It is also very meaningful to sport practitioners,[3,4] particularly for promoting compliance to safety or injury prevention behaviours in sport and exercise.[11,42] For instance, a careful theoretical integration may verify, unify and simplify concepts from multiple theories to avoid excessive, contradictory or non-evidence-based information being delivered to sport practitioners. Thus, the model could be very useful in informing coaching practice through the development of intervention strategies to foster the motivation and beliefs of athletes with respect to injury prevention and, in turn, affect behavioural adherence. An evidence-based theoretical integration approach like the integrated model of SDT and the TPB, therefore, may inform the application of intervention mapping[3,4,43] in sport injury prevention. The mapping process aims to systematically identify the determinants of health behaviours and the associated techniques that will change these determinants from multiple theories to produce interventions that are the most effective for changing behaviour.[44]

In particular, integrated models are advantageous in helping the development of more effective interventions by providing numerous pathways and strategies that are likely to have effects on intentions and behaviour.[45-48] In the integrated model of SDT and the TPB, interventions that target change in the constructs from both theories that have been shown in empirical research to have significant direct or indirect effects on intentions to engage in sport injury prevention behaviours, are more likely to be met with success. Clearly, the cross-sectional research using the integrated approach has identified pervasive effects of self-determined forms of motivation from SDT and attitudes and perceived behavioural control from the TPB on injury prevention intentions and behaviour.[22,24] This means that hybrid interventions with strategies that promote autonomous motivation (e.g. autonomy supportive behaviours by the coach or physiotherapist), attitudes (e.g. promoting the advantages of doing the behaviours important to the sample) and perceived behavioural control (e.g. providing experiences of success with rehabilitation exercises and helping overcome barriers) in a single intervention will lead to changes in all of the variables linked to intention change. In accordance with the integrated model, changes in these variables, as a result of the interventions, will have a knock-on effect in increasing intentions to engage in injury-preventive behaviours in the future and, as a consequence, a concomitant change in the target behaviour.

A 'hybrid' intervention would include compo nents targeting constructs from both behavioural-change theories (SDT and the TPB), which would act in modifying behaviour through the differing motivational processes. Furthermore, the techniques to change the variables from each component theory are quite different. SDT intervention techniques to promote autonomous motivation usually involve the style of presentation and language chosen by social agents involved in helping athletes prevent injury (e.g. coaches, trainers, physiotherapists). Such agents would use techniques such as avoiding controlling language (words like 'should' or 'must') when describing preventive techniques (e.g. safe landing), offering athletes opportunities for choice and chances to ask questions, providing a clear and unambiguous rationale related to personally held values and providing competence-related feedback.[49] In contrast, the TPB interventions usually involve the provision of content that targets salient personal (attitudes) and control-related (perceived behavioural control) beliefs about the behaviours and actions surrounding injury prevention. This would involve information targeting the advantages of performing the behaviour (e.g. not to get injured, quicker recovery) and how it can be done effectively (e.g. demonstrating technique, dispelling barriers). The techniques can be integrated in a single intervention by presenting the belief-related information in conjunction with the SDT techniques like choice and rationale. This has been successfully achieved in previous interventions in a physical activity context.[50] However, it is important that such hybrid interventions are implemented in a sport injury prevention context, particularly when using fully factorial, randomized controlled designs so that the efficacy of

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the intervention arm using the hybrid approach in changing behaviour could be scientifically compared with the effects of the intervention arms using techniques from each component theory alone.

A word of caution should be offered when applying the integrated model to inform practice because the cross-sectional evidence (or findings from case-control studies) means that we are unable to draw definite conclusions with respect to the causal effects and temporal sequence of the variables within the integrated model.[51,52] Adopting longitudinal designs (e.g. a cross-lagged panel design or a cohort study), and experimental designs (e.g. randomized controlled trials) manipulating each of the variables within the integrated model are possible solutions for testing these causal and temporal effects, but they will present real challenges for future research.[47] Longitudinal research is challenging because of the need to collect data at multiple timepoints from the same participants without a prohibitively large attrition rate; experimental research is difficult given the need to carefully manipulate the target variables while holding other variables constant, and collecting data from sufficient control groups while bearing in mind potential artifacts of error such as non-compliance,[5] intervention fidelity,[53] mere-measurement effects[54] and a number of personal (e.g. injury history, sensation seeking and personality) and external (e.g. injury risk, safety resources and the effectiveness of intervention delivery) confounding factors of injury prevention behaviours. Last, but not the least, evidence gathered from elite athlete samples might limit our ability to generalize the integrated model to recreational-level athletes, so researchers and practitioners should be aware of the competitive level and sporting context of the participants when utilizing the model for future research or developing interventions.

6. Conclusions

The integration of multiple theoretical concepts into a unified model presents a new research horizon for sport scientists to provide a comprehensive explanation of the process by which the personal, social and environmental factors of athletes' behaviours contribute to the reduction of sport injury. Using an integrated model of SDT and the TPB, we have demonstrated that theoretical integration may provide more comprehensive explanations of behaviour in sport injury prevention contexts by addressing the shortcomings or gaps in the research that adopts either of the theories alone. Such an endeavour is also promising in the development of effective theory-based interventions delivered by significant others, such as coaches and physiotherapists, which will lead to successful adherence of sport injury prevention behaviours. We hope our analysis will have raised the awareness of researchers and practitioners for the benefits of adopting integrated theoretical approaches in the context of sport injury prevention. We also hope researchers will be inspired to adopt integrated approaches in their research and approach to this endeavour, with critical but open mindsets toward a vision of a more comprehensive understanding of athletes' adherence to injury prevention behaviours.

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