Self-determined forms of motivation predict sport injury prevention and rehabilitation intentions

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Objectives: Two studies were employed to examine how motivational regulations from self-determination theory (SDT) influence athletes' intentions toward sport-injury rehabilitation (Study 1) and prevention behaviours (Study 2) using the theory of planned behaviour(TPB) as a framework.

Design: Cross-sectional survey

Methods:Elite athletes (Study 1: N = 214; Study 2: N = 533) completed the Treatment Self Regulation Questionnaire and psychometric measures of constructs from the TPB,with respect to their rehabilitation from sport injury in a hypothetical scenario (Study 1), or their injury prevention experiences (Study 2).

Results:Partial least squares path analytic models indicated acceptable fit of the hypothesized model in all samples, and consistently found in both studies that autonomous motivation from SDT was positively associated with attitudes, subjective norms, and perceived behavioural control from the TPB, and these three TPB variables positively-predicted intentions of injury rehabilitation and prevention. Controlled motivation from SDTwas, unexpectedly, positively-linkedto intentions, but the effect was smaller than that for autonomous motivation.

Conclusions:Motivational regulations from SDT might serve as sources of information that influence athletes' intentions through their impact on the attitude, perceived social norm and controllability of injury rehabilitation and prevention.

Keywords: self-determination theory; theory of planned behaviour; motivation; prevention and control; self efficacy;wounds and injuries

Introduction

Althoughbreakthroughs in technology have been shown to reduce the likelihood and severity of sport injury in clinicalcontexts, their effectiveness in the field dependsgreatly upon human factors (e.g., adherence to rehabilitation).[1, 2]Social psychological theories of motivated behaviour are considered important in this regard because they identify the malleable factors related to individual self-regulation of behaviour.[3, 4]The present investigation aims to integrate self-determinationtheory[5] and the theory of planned behaviour[6] to explain the psychological processes of sport injury rehabilitation and prevention.

Self-determination theory (SDT)[5] has been applied to explain athletes' motivation toward rehabilitation after experiencing sport injuries.[1, 2]A key prediction of SDTis that the quality of motivation, reflected in the reasons individuals engage in a particular activity, will predict behaviouralcommitmentand persistence.Behavioursdriven by intrinsic motivation (i.e., for interest, fun, and excitement), integrated regulation (i.e., to engage in behaviours that are consistent with psychological needs and a coherent sense of self), and identified regulation (i.e., to attain personally-valued goals) are considered to be regulated by autonomous forms of motivation. In contrast, behavioursdriven by external motivation (i.e., compliance to external demands, avoidance of punishment, and social pressure) and introjected regulation (i.e., to attain contingent self-worth, and avoid internal guilt and shame) are considered to be regulated by controlled forms of motivation.The fundamental distinction is that autonomous motivation emanates from one's sense of volition, self-satisfaction, or intrinsic values, and controlled motivation emerges from the experience of pressure, external demands, or defense of one's self-esteem and ego. Tests of SDT in sport injury contexts have demonstrated that these two forms of motivation explain substantial variance in athletes'

intention to follow the prescribed treatment protocols[1]and their actual adherence to treatment[2]. Autonomous motivation has been shown to be a positive predictor, and controlled motivation a negative[2] or non significant predictor[1], of these outcome variables.

The theory of planned behaviour (TPB)[6], on the other hand,posits that people's engagement ina given volitional behaviouris a function of three belief-based factors: attitudes (subjective evaluations on the behaviour), subjective norms (perceived social appropriateness of the behaviour), and perceived behavioural control (PBC; ones' perceived confidence in his/her ability to engage in thebehaviour).These three constructs are proposed to predict individuals' intention to perform the behaviour in the future. Behavioural intention reflects the direction and intensity individuals plan to invest effort in engaging in a given behaviour. Intention is viewed as the most proximal predictor of behaviourand is assumed to fully mediate the effects of attitude, subjective norm, and PBC on behaviour. The TPB has received considerable support in a variety of health contexts[7, 8], including safety [9-12] and rehabilitation [13, 14]. However, there has been a relative dearth of research applying the TPB into the sport injury prevention and rehabilitation of elite athletes[12], even though this group of individuals typically experienceshigher risk of sport injury.[15]

Although evidence has so far supported the utility of SDT and TPB in predicting injury-related behaviour, Hagger and colleagues[7, 16, 17] argued that both theories have short comings. First, SDT does not explicitly outline how proximal factors like beliefs,perceptions of control, planning, and commitment influence the actual execution of behaviours.[7, 18]Second,in the TPB, there is a lack of detail regarding the origins of attitude, subjective norm, and PBC,and it is unclear about how sources of information (such as general motives and global goal

orientations) may influence intentions via the mediation of the more proximal variables from the TPB.

Anintegrated model of SDT and TPB may, therefore,resolve the limitationsof both theoretical frameworks and provide a more comprehensive analysisofthe motivational and cognitive processes that influence intention formation, and subsequently behaviour. Based on the findings of Hagger et al.[19], autonomous and controlled forms of motivation are considered distal predictors of behaviour in the integrated model, while attitude, subjective norm, and PBC are viewed as proximal predictors. The reason for this proposed pattern of effects is that,in terms of both theoretical conceptualization and measurement aspects, constructs from SDT are operationalised as generalised motivational orientations toward acting in a specific context (e.g., injury prevention), while social cognitive variables fromthe TPB focus on a specific action (e.g., engaging in rehabilitation exercises provided by a physiotherapist). The SDT constructs should, therefore, be considered more generalised and trait-like in their conceptualization and have general influences on many specific behaviours, and the psychological antecedents thereof, in a given context. Taking this pattern of effects, the full motivational sequence of the integrated model of TPB and SDT is outlined as follows: The distal predictors (i.e., motivational orientationsfrom SDT) exert effects (positive for autonomous forms of motivation and negative for controlled forms of motivation) on the situation-specific, proximal predictors of intentions (i.e., attitude, subjective norm, and PBC in TPB), and the proximal predictors are positively related to intention and behaviour as proposed in the TPB.[7, 16, 17]

However, studies of the integration between SDT and TPB employed so far have been applied to only a limited set of health behaviours such as physical activity, dieting, breast feeding, and condom use, with a strong emphasis on physical activity,as shown in the meta-analysis of Hagger et al.[7] It remains unclear whether or not this model could be applicable to the rehabilitation and prevention of sport injury.On the other hand, a recent study has applied SDT and TPB into the prediction of injury preventive behaviours among police officers. It was found that the positive effect of autonomous motivation on the intention of occupational injury prevention significant, and was fully mediated by attitude and subjective norm[20]. While the injury is as well regarded as one of the key factors contributing to the risk of participation and premature retirement[15] as it is in some of the high-risk occupations, the motivational and social cognitive factors associated with injury in the workplaces might plausibly be relevant to the rehabilitation and prevention of injury in elitesport. Thereis, therefore, a need for further replications of this integrated model. Such replications have value[21] as they will not only serve to diversify the behaviours to which the model applies, but also serve to demonstrate whether the pattern of effects holds in a behavioural context that is removed from the behaviours in which the model has, thus far, been tested. This will provide evidence for the effects of key motivational factorsfrom two prominent social psychology theories on athletes' commitment to injury rehabilitation and prevention.

In this article, we report two quantitative studies conducted among elite athletes. In Study 1, we aimed to predict athletes' intentions to engage in injury *rehabilitationbehaviours* and inStudy 2, we focused on predicting athletes' intentions for injury *preventivebehaviours*. Based on the integrated model of SDT and TPB[7, 16, 17, 20], we proposed the following hypotheses: autonomous motivation and controlled motivation would form positive and

negative relationships, respectively, with intentionfor sport injury rehabilitation (Study 1) and prevention(Study 2). Wealso predicted that the effects of these motivational orientations on intentions would be mediated by attitude, subjective norm, and PBC.

Method

The study receivedprior approval from the Research Ethics Committee of the University of Nottingham(Ref: VC/HCF/260110). Questionnaire data was collected from 214 elite athletes (Mean age [19.3± 4.0 yr],43.0% male) for Study 1 and another group of 533 elite athletes(Mean age [16.8 ± 2.8], 50.3% male) for Study 2. They were international, national or regional level athletes from13 different sports (e.g., athletics, canoeing,cycling, soccer, and swimming), and received elite training for more than 1 year (Study 1[6.3 ± 3.8 yr], Study 2 [3.2 ± 2.2 yr]) in the Sichuan province of China. Approximately half of the participantsin both studies (52.3% for Study 1, 47.1% for Study 2) had experience of moderate-to-severe forms of sport injury (i.e., required twoweeks of medical attention or more) in the last two years. Prior to completing the 15-minute-long questionnaire, participants and their parents or guardian signed the consent forms to indicate that they understood the procedures of the study and their rights (i.e., voluntary nature of participation, confidentiality of data, and freedom to withdraw from the study at any time without prejudice).

The questionnaire comprisedpsychologicalmeasures ofmotivation from SDT andstandardised measures of attitude, subjective norm, PBC, and intentionfrom the TPB[22] with respect to injury rehabilitation(Study 1) and injury prevention (Study 2). In Study 1, participants responded the items that made referenceto a hypothetical scenariodeveloped in a previous study that was specifically designed to tap a typical sport injury experience forelite athletes.[1]

In the scenario, the participant was depicted as becoming injured during a training session one month before an important competition and described as experiencing increased pain from the injury over time. In Study 2, participants responded to the items according to their present experience of sport injury prevention.

The questionnaires in both studies were in Chinese, the firstlanguage of the participants. Items and instructions were either translated from their original English versions using the back-translation procedures described byHambleton[23] or adapted from their Chinese versions developed in previous studies[2].

In Study 1, the sport rehabilitation (Chinese) version of Treatment Self Regulation Questionnaire (TSRQ)[2], which measured autonomousand controlled motivation for sport injuryrehabilitation, was used. For Study 2, we adapted the items forautonomous and controlled motivationfrom the smoking-cessation version of TSRQ[24] by following theprotocol used ina previous study to adapt items to measure motivation toward occupational injury prevention[20]. For both studies, items assessing the TPB variables, including attitude, subjective norm, and PBC, were developed according to Ajzen's[25]guidelines. Example items and anchors of each scale are displayed in Table 1.

Insert Table 1 about here

Data Analysis

Variance-based structural equation modelling (VB-SEM; also known aspartial least squares path analysis) using the SmartPLS 2.0 statistical software[26] was used to examine the path

estimates and the “fit” of the hypothesized modelwith the data. We evaluated “model fit” using a number of indices focusing on the convergent and discriminant validity of the measurement model. Convergent validity is typically considered acceptable when the Cronbach’s alpha and the composite reliability of each dimension are higher than 0.70[27], the average variance extracted (AVE) for each factor is higher than 0.50[28], and the factor loading of each items on its corresponding factor is higher than 0.70[29]. Discriminant validity is adequate when the loading of an item on its own construct is higher than its loadings on the other constructs[29] and the square-root of the AVE of any construct is higher than its correlation with other constructs[28].In addition, a bootstrapping resampling technique with 5000 replications was utilized to reveal the significance level of the path estimates. Mediation analysis was conducted to reveal whetherthe TPB variables (i.e., attitude, PBC, and subjective norm) mediated the relationship between motivation and intention.Mediation was supportedwhen motivation exerted a significant direct and indirect effect (computed by the bootstrapping algorithm of Preacher and Hayes[30]) on intention, and the direct effect was not significant (indication of full mediation) or reduced to comparatively lower value (indication of partial mediation) when the three antecedents of intention were taken into account.[31]

Results

The variable distributions, zero-order correlation matrix,and specific fit indices of the variables for both studies are shown in Table 2. The convergent validity indices for both studies generally met the criteria foracceptable score reliability in VB-SEM. For the variables in Study 1, Cronbach’s alphas ranged from 0.67 to 0.81, composite reliability scores werebetween 0.82 and 0.89, AVE values were between .58 and .80, and factor loadings ranged from 0.76 to 0.89. For the variables in Study 2, Cronbach’s alphas ranged from 0.68

to 0.86, composite reliability scores werebetween 0.81 and 0.90, AVE values were between 0.59 and 0.71, and factor loadings ranged from 0.71 to 0.84. The Cronbach's alphas of 3 constructs (controlled motivation in Study 1 and subjective norm in both studies) were slightly lower than 0.70, but they all met the published criteria for internal consistency (i.e., 0.60[32]), and thus deemed acceptable. Similarly, the results also supported the discriminant validity of the scale dimensions in both studies. The factor loadings were higher than their cross loadings on the other factors by a average difference of 0.56 in Study 1 and 0.44 in Study 2. The square-root of the AVE of each construct was larger than the construct correlation with other factors by an average difference of 0.48 in Study 1 and 0.26 in Study 2.

Insert Table 2 about here

A consistent pattern of path estimates in keeping with hypotheses was obtained in both studies. Despite controlled treatment motivation positively predicting PBC in Study 1, and subjective norm and PBC in Study 2, the path estimates from the model of sport injury rehabilitation and the model of sport injury prevention were in line with our hypotheses: (a) autonomous motivation was significantly andpositively related to attitude, subjective norm, and PBC (i.e., the three TPB variables) in both studies; (b) the relationship between controlled motivation and the other TPB variables (attitude and subjective norm in Study 1; attitude in Study 2) were not significant;and (c) the three TPB variables were significantly and positively related to intention in both studies.The pattern of relations among the study variables for both studies is illustrated in Figure 1.

Insert Figure 1 about here

In terms of the mediation analyses,the direct effect of autonomous motivation on intention relationship wassignificant and positive, and was partially mediated by the TPB variables (attitude, subjective norm, and PBC) in Study 1 (total indirect effect = 0.21, $p<0.001$; direct effect without mediators = 0.47, $p<0.01$; direct effect when controlling for mediators = 0.30, $p<0.01$) and Study 2 (total indirect effect = 0.47, $p<0.001$; direct effect without mediators = 0.61, $p<0.01$; direct effect when controlling for mediators = 0.30, $p< 001$) as expected. The direct relationship between controlled motivation and intention was also fully mediated by the TPB variables (PBC in Study 1; subjective norm in Study 2) in Study 1 (total indirect effect = 0.15, $p<0.01$; direct effect without mediators = 0.19, $p<0.01$; direct effect when controlling for mediators = 0.03, $p>0.05$) and Study 2 (total indirect effect = 0.42, $p<0.001$; direct effect without mediators = 0.43, $p<0.01$; direct effect when controlling for mediators = 0.12, $p>0.05$), but the effects were, surprisingly, positivelyvalenced when they were expected to be negative.

Discussion

The present research extended the integrated model of SDT[5, 33] and TPB[6] in the area of sport injury rehabilitation and prevention. Results from both studiesrevealed a consistent pattern of relations among the key theoretical constructs from SDT and TPB congruent with the hypothesized model. In both studies, autonomous motivation was positively associated with intention via the mediation of attitude, subjective norm, and PBC, and these three TPB variables positively predicted intention. However, the pattern of effects for controlled motivationwasnot in line with our hypotheses. Controlled motivation for injury rehabilitation exerted a positive effect on intention through the mediation of PBC in Study 1, whereas controlled motivation for injury prevention had a positive effect on intention through the

mediation of subjective norm in Study 2.Overall the data supported 64.71% (14/22) of thehypothesized pathsand 66.67% (8/12) of the hypothesized mediation effects due to the contrasting patterns of results from autonomous motivationand controlled motivation. Overall, the motivational sequence shown in both studies was generally consistent with previousmeta-analytic findings forthe theoretical integration of SDT and TPB[7].

Motivation

In keepingwith the results of previous research[1, 2, 7, 20], the current studies yielded theoretically-consistentfindings for the effects of autonomous motivation on intentions in injury rehabilitation and preventioncontexts. Autonomous motivation was a significant and direct predictorof attitude, subjective norm, and PBCin both contexts.There was also asignificant and positive indirect effect of autonomous motivation on intention mediated by the three TPB variables. In other words, the more the athlete was motivated to engage in sport injury rehabilitation and prevention for autonomous reasons, the more likely they would positively evaluate the behaviour (attitudes), regard such actions asconsonant with social norms (subjective norms), endorse a belief that the behaviouris undertheir personal control (PBC), and committo engaging in the behaviour in future (intentions). Accordingly, these adaptive response patterns due to autonomous motivation are in line with the predictions of SDT[5, 33]:autonomous forms of motivation, (e.g., intrinsic motivation and twointernalised forms of extrinsic motivation, namely, identified motivation and integrated motivation) were expected to be associated with adaptive outcomes, such as enhanced psychological well-being[34], lower risk of burnout[35], and higher persistence[36]in sporting contexts. Our study indicates that these positive correlates of autonomous motivation could also be applied in sport injury rehabilitation and prevention contexts.

In contrast, our findings withregards to controlled motivationwere not consistent with our hypotheses and the tenets of SDT.[5, 33]Controlled motivation was significantly correlated with PBC and intention for sport injury rehabilitation (Study 1) and with subjective norm, PBC, and intention for sport injury prevention (Study 2). The relations were also in a positive direction instead the expected negative pattern according to our hypotheses. However, the strength of the effect of autonomous motivation onthe TPB variables was substantially greater than the effect of controlled motivation. In addition, controlled motivation did not significantly predict attitude and subjective norm in Study 1, and attitude in Study 2. Overall, our findings seemed to indicate that autonomous motivation had the strongest effects on intentions and on its antecedent variables relative tocontrolled motivation, and were consistent with previous research.[1, 2, 37] These findings are consistent with the central theoretical assumption of SDT which suggests that humans naturally seek out behaviours consistent with their basic psychological needs, particularly the need for autonomy,and this motivational orientation is more likely to result in behavioural perseverance and optimal functioning in comparison to controlled motivation.[5]

However, this does not mean that the effects of controlled motivation should be disregarded; it is important to discuss why controlled motivation predicted TPB variables in adirection opposite to our predictions. Controlled motivation for sport injury rehabilitation was not a significant predictor of treatment intention in the study of Chan and colleagues[1], and it was even found to be negatively associated with the treatment adherence among athletes who had received anterior cruciate ligament reconstruction.[2] Our results were in contrast to these previous findings, and, to speculate, this could be due to three reasons.

First, in the self-determination continuum proposed Ryan and Connell[38], the forms of motivation that make up controlled motivation do not fall into the most extrinsic category of extrinsic motivation. Controlled motivation comprises introjection, which isconsidered a less extrinsic form of extrinsic motivation than external regulation, the type of motivation located at the most extrinsic pole of the continuum and the stereotypical form of extrinsic motivation. Unlike external regulation, introjected regulation isnot directly driven by external contingency for actions. Rather, it is proposed to emanate from the perceived internal pressure to attain contingent self-esteem. Ryan and Connell[38] suggested that behavioural regulations (i.e., motivation) along the self-determination continuum were inter-correlated with different magnitudes and directions. Those adjacent to each other (i.e., introjected and identified regulation) would correlate more stronglyand withpositive valence than those farther apart (i.e., external regulation and intrinsic motivation). Consequently, it would be plausible that athletes with high introjected regulation might also carry identified and integrated regulation (i.e., autonomous motivation) to some extent, and the combined effects of all the behavioural regulations could be adaptive and result in an overall positive intention to engage in injury rehabilitation and preventionbehaviours. This phenomenon might be somewhat in agreement with Hagger and colleagues[18] who found significant effects of external regulation and introjected regulation on the TPB variables, but these effects were extinguished by the inclusion of intrinsic motivation.

Another possibility was that the intention measure used in this study did not differentiate between forced and volitional forms.[39] Controlled motivation might well establish a positive relationship with forced intention in which the behaviour and the formation of intention were

likely considered by the individual as a “must-do”. While autonomous motivation would still have a positive effect on volitional intention where individuals were truly willing to make the decision to undertake the behaviour itself, both types of motivation could bring together a positive effect on intention. This could, of course, be resolved by including separate measures of volitional and forced intentions in future research.

Last, the effect of controlled motivation might not necessarily be negative, and it could depend on the health context, length of the health program, and the background of the respondents (e.g., age, personality and culture)[1, 7]. A previous study on coronary heart disease patients’ rehabilitation also reported a positive association between controlled motivation and adherence to dieting.[40] Similarly, in a recent qualitative study on motivational interviewing for weight management, patients who perceived their counselors to be controlling and unsupportive to their psychological needs, still adhered to the program of physical activity and dieting, provided that adequate amount of social support was given to them.[41] Hence, further studies may look at the effects of controlled motivation when taking these potential moderators into account, and see how its effects on the behaviours in different health contexts might interact with that of autonomous motivation.

Theory of planned behaviour variables

Our findings with respect to the relationships among the TPB constructs, and with the SDT constructs, were in linewith our hypotheses. Although autonomous motivation was positively related to intention, the effect was partially mediated by attitude, subjective norm, and PBC. This indicates that athletes with autonomous reasons for sport injury rehabilitation and

prevention would tend to form positive attitudes, perceived controllability, and subjective norms for performing thebehavior in future.

The positive associations of these three TPB variables on intention were congruent with previous findings for the TPB[6, 8, 16] and previous studies applying the TPB in the context of rehabilitation[13, 14] and injury prevention[9-12, 42]. However, it is notable that the amount of variance in intention explained by these variables was apparently smaller in Study 1 in comparison to Study 2. Such findings could, arguably, imply that attitude, subjective norm, and PBC had more predictive power on intentions for sport injury prevention than they did on the intentions for sport injury rehabilitation. The smalleramount of variance explained for intention in Study 1 could be due to the fact that participants' responses were drawn upon a hypothetical situation rather than the actual experience. Although the injury scenario was tailored to match the experience of most athletes[1] and, more importantly, the severity or recovery of the injury was standardized in the presented scenario, the degree to which participants 'bought in to', and identified with, the scenario may have varied between individuals. This could plausibly heighten the error variances of the variables in Study 1 and lead to reduced predictive powerfor the TPB variables. Therefore, it would be important to direct further investigation among injured athletes and test the integrated model against different injury types, recovery length, and treatment effectiveness.

Limitations

In addition to the potential influence of the moderator or confounding variables mentioned above, we must also recognisea number of other limitations. First, even though the proposed pattern of relationships wassupported in both contexts, the cross-sectional design limited our

capacity to draw definite conclusions about the causal and temporal effects within the models. Moreover, intention typically explains a substantial amount of variance in behaviour[8, 16] and is often regarded as the most proximal indicator of future behaviour[6], but we could notmake assumptions regarding the effects of intentions on behaviour in the current study. Indeed, research has suggested that the effect of intentions on behaviourcan be relatively modest[8, 16], and interventions targeting changes in intentions do not lead to strong effects on behaviour[43]. Thus, it would be important to include objective measures of behaviour in the future research, and examine whether intention (together with the other TPB variables) mediated the relationship between motivation from self-determination theory and behaviour in a sport injury context. Furthermore, research will be further advanced by introducing reliable measures of injury outcomes, and so we can examine the nested model by which motivation from the SDT and the TPB variables predictthe incidence and recovery length of sport injury.[20]Additionally, it is important to note that our responses obtained from self-report measures could be subjected to social desirability, memory bias, and general response tendency (due to no reversed scored items in the inventories we used), and also the adapted version of the TSRQmay not warrant complete compatibility with the context of sport injury prevention even though the psychometric property of the scale was supported. Thereby, we shall interpret our findings with caution and instigate further testing and development of the measures of the psychological variables in our model. Finally, we did not investigate the social antecedents (e.g., autonomy support, controlling behaviour, and need thwarting) of the motivational and the TPB variables. Further studies with improved designs (e.g., experimental or longitudinal designs) should attempt to incorporate these factors into our integrated model within sport injury contexts.

Conclusion

Findings of the present investigation provide preliminary validation of an integrated model of SDT and TPB in the context of sport injury rehabilitation and prevention. The results generally supported the hypothesized motivational sequence in the model, suggesting that athletes' volitional orientations were closely related to intentions to engage in sport injury rehabilitation and prevention.

Practical implications

- Practitioners in sport science and medicine (e.g., coaches, support teams, physiotherapists) might be able to modify athletes' attitudes, perceived social norms, perceived controllability, and subsequent intentionsby fostering athletes' autonomous motivation toward injury rehabilitation and prevention.
- Reducing the rate of injury, re-injury, or non-compliance to rehabilitation could plausibly be achieved through psychological interventions to shape athletes' autonomous motivation such as providing support for personally-valued outcomes (e.g., getting back to a sport they value greatly), presenting rehabilitation tasks in an autonomy-supportive manner (e.g.,acknowledging commitment, providing a clear rationale, and providing choice), and fostering competence (e.g., providing clear feedback on successful preventive and rehabilitation exercises and strategies).

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Table 1: Instruments information.

Variable	Dimension	Example item	Anchors
		Study 1	
Motivation for injury rehabilitation	Autonomous motivation	I have been following the procedures of the rehabilitation because it is important to me that my efforts succeed	1 = not at all true, 7 = very true
	Controlled motivation	I have remained in treatment and carry out rehabilitation exercise because others would have been angry at me if I didn't	1 = not at all true, 7 = very true
TPB Variables	Attitude	Following the prescribed treatment protocols or guidelines for my rehabilitation in the forthcoming month is …	1 = valuable/ beneficial/ pleasant/ enjoyable/ good/ virtuous, 7 = worthless/ harmful/ unpleasant/ unenjoyable/ bad/ not virtuous
	Subjective Norm	The people in my life whose opinions I value would approve of my following the prescribed treatment protocols or guidelines for rehabilitation in the forthcoming month	1 = strongly disagree, 7 = strongly agree
	Perceived Behavioural Control	I have complete control over following the prescribed treatment protocols or guidelines for my rehabilitation in the forthcoming month	1 = strongly disagree, 7 = strongly agree
	Intention	I plan to engage in all the activities that are recommended by my physicians in the forthcoming month	1 = strongly disagree, 7 = strongly agree
		Study 2	
Motivation for injury prevention	Autonomous motivation	I want to prevent or avoid sport injury becauseI personally believe it is the best thing for my health	1 = not at all true, 7 = very true
	Controlled motivation	I want to prevent or avoid sport injurybecauseI would feel guilty or ashamed of myself if did not	1 = not at all true, 7 = very true
TPB Variables	Attitude	Following all required safety procedures to reduce the likelihood or severity of injury	1 = valuable/ beneficial/ pleasant/ enjoyable/ good/ virtuous, 7 = worthless/ harmful/ unpleasant/ unenjoyable/ bad/ not virtuous
	Subjective Norm	The people in my life whose opinions I value would approve of approve me to follow all required safety procedures to reduce the likelihood or severity of injury in the forthcoming month	1 = strongly disagree, 7 = strongly agree
	Perceived Behavioural Control	I have complete control over how to follow all required safety procedures to reduce the likelihood or severity of injury in the forthcoming month	1 = strongly disagree, 7 = strongly agree
	Intention	I plan to follow all required safety procedures to reduce the likelihood or severity of injury in the forthcoming month	1 = strongly disagree, 7 = strongly agree

Table 2: Correlations and fit indices among measured variables for Study 1 and Study 2

		Autonomous motivation	Controlled motivation	Attitude	Subjective norm	PBC	Intention
				Study 2			
Autonomous motivation	**Study 1**	1	0.63**	0.87**	0.53**	0.43**	0.64**
Controlled motivation		0.44**	1	0.59**	0.37**	0.39**	0.46**
Attitude		0.27**	0.02	1	0.42**	0.42**	0.51**
Subjective norm		0.53**	0.27**	0.23**	1	0.23**	0.59**
PBC		0.34**	0.33**	0.02	0.64**	1	0.43**
Intention		0.46**	0.15*	0.22**	0.46**	0.34**	1
Study 1	M	5.16	3.87	5.66	4.92	4.85	5.19
	SD	1.07	1.14	1.03	1.12	1.08	1.24
	α	0.73	0.68	0.81	0.67	0.71	0.75
	CR	0.85	0.88	0.89	0.82	0.83	0.89
	AVE	0.65	0.58	0.72	0.60	0.63	0.80
	FL	0.89	0.78	0.85	0.76	0.81	0.79
	CL	0.25	0.33	0.12	0.22	0.32	0.27
Study 2	M	4.86	3.73	5.32	4.78	4.68	4.64
	SD	1.34	1.3	1.46	1.41	1.32	1.32
	α	0.79	0.74	0.86	0.68	0.78	0.80
	CR	0.85	0.81	0.90	0.83	0.85	0.88
	AVE	0.59	0.65	0.59	0.61	0.63	0.71
	FL	0.74	0.71	0.77	0.78	0.73	0.84
	CL	0.28	0.31	0.29	0.35	0.33	0.27

Note: The correlation coefficients forStudy 1 are presentedbelow the principal diagonal and the correlation coefficients for Study 2 are presented abovethe principal diagonal.CR = composite reliability; FL = factor loading; CL = cross-loading.

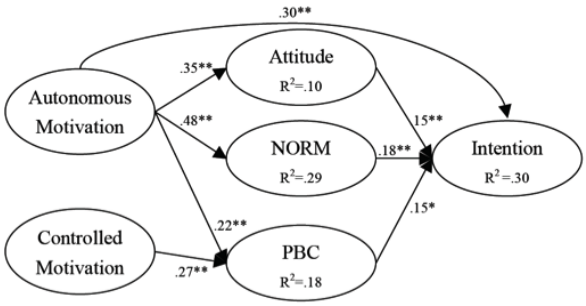
* $p<0.05$ for a two-tailed test, ** $p<0.01$ for a two-tailed test.

Figure legends

Figure 1: Path estimates in the model of sport injury rehabilitation from Study 1 (left) and prevention from Study 2 (right). NORM = subjective norm; PBC = perceived behavioural control. Non-significant paths were omitted from the diagram. * $p<0.05$ for a two-tailed test, ** $p<0.01$ for a two-tailed test.

1

Model of Sport Injury Rehabilitation (Study 1)



Model of Sport Injury Prevention (Study 2)