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Article in *Journal of Applied Sport Psychology* · June 2019

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To cite this article: Gavin Breslin, Stephen Shannon, Tandy Haughey, Nyasha Sarju, Drew Neill, Gerard Leavey & Martin Lawlor (2019): Athlete and Non-Athlete Student Intentions to Self-Manage Mental Health: Applying the Integrated Behaviour Change Model to the State of Mind Programme, Journal of Applied Sport Psychology, DOI: [10.1080/10413200.2019.1629547](https://doi.org/10.1080/10413200.2019.1629547)

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Athlete and non-athlete Intentions to Self-Manage Mental Health: Applying the Integrated
Behaviour Change Model to the State of Mind Programme

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Athlete and Non-Athlete Student Intentions to Self-Manage Mental Health: Applying the Integrated Behaviour Change Model to the State of Mind Programme

Abstract

University students are vulnerable to mental health issues, and stigma remains a barrier to engagement with mental health care services (O'Neill, Mc Lafferty, Ennis, Lapsley, Bjourson, Armour, Murphy, Bunting, & Murray, 2018). It has been argued that student athletes may be less likely than non-athletes to seek help (Donohue et al, 2018), partly due to a sport culture that celebrates mental toughness, winning at all costs, and not showing weakness (Bauman, 2016). To our knowledge, theory-based psychoeducational programmes that promote self-management are lacking for athletes (Breslin and Leavey, 2019). The present study is in response to the lack of theory-based interventions, with two aims: (1) to determine whether a mental health awareness and self-management psychoeducational programme called State of Mind Ireland (SOMI) could improve intentions to self-manage mental health for both athletes and non-athletes; and (2) to apply the Integrated Behaviour Change Model (IBCM) framework to determine what mechanisms inherent within IBCM contributed to self-management of mental health. Two hundred students (Mean age = 21.10 years, SD=3.73, male = 53%) took part, 146 received the SOMI intervention programme (101 athletes and 45 non-athletes), while 54 (38 athletes and 16 non-athletes) were an inactive control group. Baseline and post-intervention motivation and belief-based measures were collected via a self-report questionnaire. Two regression models subscribing to IBCM processes were specified. In comparison to the control group, the intervention group showed an increase in self-management intentions ($p < .05$), which was facilitated indirectly through the intervention's direct changes in autonomous ($\beta = .13, p < .05$) and controlled motivation ($\beta = .18, p < .05$), and direct ($\beta = .28, p < .05$) and indirect ($\beta = .14, p < .05$) changes in the attitude

factor of the Theory of Planned Behaviour. Model 1 (autonomous motivation) and 2 (controlled motivation) explained $R^2=.20$ and $R^2=.23$ of the variance predicting self-management intentions respectively. This is the first study to incorporate the IBCM into a mental health promotion intervention among student athletes.

Lay Summary

We wanted to determine whether the State of Mind Ireland Programme can improve intentions to self-manage mental health, and to explain any changes through the Integrated Behaviour Change Model. Those who received the programme showed an increase in intentions to self-manage their mental health, through improved autonomous and controlled motivation, and attitudes towards self-managing mental health. The programme can be integrated into athlete and non-athlete service provision as a prevention method.

Accepted Manuscript

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Mental health encompasses psychological, social and emotional well-being whereby individuals can realise their potential, can work productively, cope with life-stressors, and contribute to their community (Keyes, 2005; World Health Organisation (WHO), 2014). In the United Kingdom (UK) between 17% (Macaskill, 2012) and 27% (YouGov, 2016) of university students report a mental health issue. Moreover, recent research in Northern Ireland indicated that one fifth of students with a mean age of 21 years old experience depression or anxiety during a 12-month period, with females consistently reporting higher mental health concerns than males, and females being more likely to be mental health service users (McLafferty et al., 2017; Thornley, 2017; O'Neill, Mc Lafferty, Ennis, Lapsley, Bjourson, Armour, Murphy, Bunting & Murray, 2018). Researchers have revealed student-athletes and non-athletes show similar mental health disorder prevalence (Sudano, Collins & Miles, 2017). However, student-athletes present a higher clinical and sub-clinical risk (Moreland, Cox & Yang, 2017; Donohue et al., 2018) during times of sport adversity (i.e., injury, transition, retirement) and intense competition compared to times when they are not experiencing adversity.

Few theory-informed, implemented and evaluated mental health interventions have been made available to university athletes (Moreland, Cox & Yang, 2017; Breslin, Shannon, Ferguson, Devlin, Haughey & Prentice, 2018; Donohue et al, 2018). There has however been increasing interest in mental health awareness programmes in sport particularly among elite athletes (see also Rice et al, 2016), and it appears that the vast majority of programmes are not theoretically informed, but rather experiential or theme based highlighting the need for standardisation in design and reporting outcomes. Recent attempts to ensure the content of mental health awareness programmes for athletes are theory-informed have been emphasised

by Breslin and Leavey (2019), wherein minimum requirements for contents of mental health awareness programmes have been highlighted. The development of consensus statements have been also established for elite athlete clinical service provision (Schinke et al, 2017; Moesch et al, 2018), and more recently a consensus statement is forthcoming on mental health awareness programmes for those who participate in sport beyond elite levels (Breslin et al, 2018). Within each of the statements the authors' recommended further theory and evidence based programmes to incorporate within mental health self-management strategies.

Self-management is an individual's confidence in monitoring their mental health and making informed decisions on actions for care and improvement (Sterling, von Esenwein, Tucker, Benjamin & Gordon, 2010). This can include the utility of resources and skills for recognising and preventing mental health disorders, and promoting positive mental health through resilience, positive emotions and mental fitness training (Huppert, 2009). Despite support for self-management interventions for athletes, a similar concern to the above is a dearth of studies using behaviour change theory in the design and analyses of programmes (Panagioti et al., 2014; Shannon et al., 2019).

Psychological behaviour change theories that have their origins in social and cognitive sciences, explain how and why individuals engage in intentional health behaviours (Hagger & Chatzisarantis, 2014; Craig et al., 2013). By integrating psychological behaviour change theory into the development of self-management programmes, the mechanisms of behaviour change can be more clearly operationalised in practice to ensure programme effectiveness (National Institute for Health and Care Excellence, 2018). The Theory of Planned Behaviour (TPB; Ajzen 1991) and Self-Determination Theory (SDT; Ryan & Deci, 2017) have demonstrated predictive value in the mental health domain, but when integrated within the Integrated Behaviour Change Model (IBCM; Hagger & Chatzisarantis, 2014), can account for more of the variance of intentions for a variety of health behaviours, including

mental health (Shannon et al., 2019). The IBCM has been integrated and applied in the current study using the State of Mind Ireland programme (Breslin et al, 2018).

The TPB is an attitudinal based theory with three predictive factors. The theory specifies that an individual's attitudes (i.e. instrumental and affective evaluations), subjective norms (i.e. descriptive and injunctive norms) and perceived behavioural control (i.e. perceived personal control and external/internal facilitators) interact to predict intended health behaviours (Ajzen & Fishbein, 1977; Ajzen 1991). A small number of TPB studies have explored the role of intentions for using mental health services through TPB constructs with university students (Bohon et al., 2016). Although the authors revealed support for attitudinal and behavioural control predictors of mental health intentions, the predictive utility of the full TPB has been questioned. In Ajzen's (1991) theorising of the TPB, the motivational origins of the belief-based TPB constructs were not delineated, therefore an alternative theory where motivation is described is Self-Determination Theory (SDT, Deci and Ryan, 1985; Ryan and Deci, 2000; 2017). Through SDT, Ryan and Deci (2000) argue motivational type and quality are predictive factors in explaining what initiates and sustains health behaviours. Motivation is hypothesised to exist along a continuum in which five distinct motivational types are considered as forms of self-regulation for a given behaviour (Ryan & Deci, 2017). Along this continuum, intrinsic motivation, and integrated and identified regulation are proposed as autonomous forms of motivation, in which one engages in a behaviour for reasons including inherent satisfaction (i.e. intrinsic), synthesis within one's self (i.e. integrated) or for personal benefit (i.e. identified). Conversely, externally motivated individuals also on the continuum engage with a behaviour for reasons including, to receive approval from others (i.e. introjected) or to avoid punishment/achieve rewards (i.e. external). The continuum has been recently tested in a meta-analysis providing support for the self-determination structure (Howard, Gagné, & Bureau, 2017).

Applying an SDT perspective to mental health behaviours one could self-manage their mental health through autonomous or controlled motives, with autonomous forms proposed to facilitate self-directed, sustainable behaviours for mental well-being (Ryan & Deci, 2017). Systematic reviews (Teixeira et al., 2014) and meta-analyses (Ng et al., 2012) show small-to-moderate positive correlations for autonomous motivation predicting health behaviour change. This is reassuring, however, the research has largely focused on behaviours aligned to physical health (Ng et al., 2012), and unfortunately mental health in athletes has not been considered. Similar to the criticisms of the TPB, whilst SDT specifies the motivational origins of health behaviours, Ryan and Deci (2000) did not formally hypothesise the processes by which motivational orientations are converted into intentions (Hagger & Chatzisarantis, 2014).

To overcome the predictive limitations of the TPB and SDT, Hagger and Chatzisarantis (2009; 2014) have included components of both SDT and the TPB in the development of an Integrated Behaviour Change Model (IBCM) (Hagger & Chatzisarantis, 2014). According to Hagger and Chatzisarantis (2014) intentions are the function of attitudes, subjective norms and perceived behavioural control (components of TPB), with motivation functioning as the antecedent for those belief-based variables (component of SDT). Specifically, the IBCM model specifies that when one holds an autonomous motive (choice over what to do), they are more likely to align and hold an adaptive belief (i.e. attitudes, subjective norms, perceived behavioural control) towards a behaviour. Contrastingly, when one holds a controlled motive (feeling pressured or coerced in what they do), they are less likely to hold an adaptive belief towards a behaviour. The predictive validity of the IBC theory has received support in a cross-sectional survey of mental health in student athletes (Shannon et al. 2019), however, it remains to be tested with student athletes and non-athletes receiving a self-management intervention programme.

The State of Mind Ireland (SOMI) programme (Lawlor et al., 2015) is an evidence-based student athlete mental health awareness and self-management intervention (Breslin et al., 2017). Despite the positive effects of the programme on increasing athlete's awareness of mental health (Breslin, Haughey, O'Brien, Caulfield, Robertson & Lawlor, 2018), it remains uncertain whether SOMI could improve intentions to self-manage one's own mental health in non-athletes, and what mechanisms of IBCM contributed to these changes, if any. For the first time, an IBCM model (Hagger & Chatzisarantis, 2014) will be applied to the SOMI programme in a sample of university students that includes athletes and non-athletes.

In accordance with the IBCM model (Hagger & Chatzisarantis, 2014, see Figure 1) two models were tested assessing self-management intentions as the dependent variable (Y), SOMI intervention as the independent variable (X) and motivation (i.e. autonomous and controlled motivation [M1]), and TPB variables of attitude [M2], social norms [M3] and perceived behavioural control [M4] as mediating variables. In Model 1, the SOMI intervention was hypothesised to directly and positively predict autonomous motivation (Hypothesis 1, H1), and positively predict attitudes, subjective norms and behavioural control (Hypothesis 2, H2). As a mediating variable, autonomous motivation was hypothesised to partially explain the effects of the intervention on attitudes, subjective norms and behavioural control (Hypothesis 3; H3). We hypothesised that intentions to seek help would be determined through singular mediating effects in which both autonomous motivation and TPB variables exerted an indirect role (e.g. intervention > autonomous motivation > intentions; Hypothesis 4; H4). Furthermore, we hypothesised that intentions to seek help would be mediated through serial mechanisms reflective of autonomous motivation in sequence with TPB variables (e.g. intervention>autonomous motivation>attitudes> intentions; Hypothesis 5; H5). In Model 2, all of the above hypotheses were repeated, replacing the mediating variable autonomous motivation with controlled motivation.

However, controlled motivation was hypothesised to exert a weaker effect than autonomous motivation.

Method

Participants

Two hundred participants took part, 146 were in the intervention (athletes=101, non-athletes=45), and 54 (athletes=37, non-athletes=16) control. The mean age of the sample was 21.10 years ($SD=3.73$), in which 53% percent were male. Eighty seven percent of the sample participated in team-based sports, while 12.3% were individual sport athletes. In their respective sports, the following were represented: Gaelic Games (42%), Football (22.5%), Rugby (5.8%), Hockey (5.1%), Basketball (3.6%) and others (e.g. netball, golf, archery, rowing; 21%). The participants were enrolled in various university courses including sport science/studies (35.9%), computer science/technology (31.5%), and others (e.g. accounting, community development; 32.6%). There was no attrition during the intervention.

Research Design

The study is in keeping with the Transparent Reporting of Evaluations with Non-Randomised Designs (TREND) statement (Des Jarlais, Lyles & Crepaz, 2004). Following ethical approval from Ulster University, a convenience sample of students was recruited through email, and matched alongside a control group. A 2 (groups) x 2 (time-points) non-randomised controlled trial was conducted. The research team was trained using the study protocol and under supervision, collected standardised baseline and post-intervention measurements. The study took place during March 2017, and both intervention and control group participants completed the same questionnaires. Participants were invited to the State of Mind Ireland (SOMI) workshop as part of student mental health and well-being awareness support, with the workshop taking place during class time. To reduce the potential for

contamination, participants in the control group were selected, matched by year group from university courses that did not undertake the workshop or contain any intervention participants. Three themes were introduced in the SOMI programme: (i) symptoms and signs of stressors (e.g. exam pressures, sporting commitments) and their impact mental health; (ii) how to self- manage difficult mental health symptoms; and (iii) to identify self-management resources and strategies. Components of the IBCM model (Hagger & Chatzisarantis, 2014) were integrated within the behaviour change techniques utilised during the SOMI programme. The non-active control group did not receive any information on the SOMI programme.

The SOMI programme was co-delivered by experienced mental health and well-being tutors in partnership with student support services and student mentees. Activities were delivered through a visual presentation, introduction to mindfulness and breathing exercises, vignettes of athletes who have experienced mental illness and subsequently self-managed and sought help, group discussions on managing pressures, and open-ended questions that supported participants' autonomy in solving problems (Stone, Deci & Ryan, 2009). The programme lasted 75 minutes. Consistent with SDT (Ryan & Deci, 2000), the open-ended questions and active participation were co-designed to facilitate an autonomy-supportive environment emphasising choice. Hence, the information and activities were tailored to promote students' autonomous motives to self-manage mental health which is associated with adaptive coping management styles (Ryan & Deci, 2017). Examples included a list of 45 ways to engage in self-management (e.g., practice mindfulness, run/walk, ask for help, read a book, listen to music). Furthermore, consistent with improving the belief-based TPB constructs in the IBCM, the advantages (of) and disadvantages (of not) regarding self-managing stress were outlined (i.e. attitudes); videos and profiles of athlete role models championed the information (i.e. subjective norms); and resources were made available, such

as self-help audit tools, websites and free downloadable mental health mobile applications (i.e. perceived behavioural control).

Measures

A validation study and cross-sectional analyses was conducted on the measures used within the present sample (time point 1 data), and good psychometric properties were found (e.g. confirmatory factor fit indices). Specific psychometric information and a version of the questionnaire is available (see Shannon et al., 2019). The same measures were adopted for the pre-and-post analyses in the present study, and included an adapted eight-item version of the Treatment Self-Regulation Questionnaire (TSTQ) to measure motivation to self-manage mental health. Two four-item scales reflecting autonomous and controlled motivation began with the stem: ‘The reason I would manage my mental health is...’, and were scored on a 7-point Likert scale ranging from ‘not at all true’ to ‘very true’. The Cronbach’s alpha values within the sample were .85 (autonomous) and .70 (controlled).

An adapted TPB questionnaire was used to assess students’ attitudes, subjective norms, perceived behavioural control and intentions regarding self-managing mental health. *Attitudes* (7 items) were included, with the item stem: ‘For me, managing my mental health is...’, and responses ranged from negative (i.e. 1 point) to positive (i.e. 7 points). One’s perceptions of approval from others (i.e. friends, family, other students and other important people) comprised the 4-item *Subjective norms* scale. *Perceived behavioural control* (5 items) reflected students’ perceived internal and external control (e.g. barriers) to self-manage mental health. Lastly, *intentions* (6 items) reflected one’s willingness to self-manage mental health in the next four weeks. All scales were scored on a 7-point Likert scale. Higher scores across all TPB scales indicated a better belief regarding self-managing mental health. Cronbach’s alpha values for the TPB scales were as follows: .92 (attitudes), .87 (norms), .73 (behavioural control) and .94 (intentions).

Data management

After raw data were entered into the Statistical Package for Social Sciences (SPSS version 22), ten percent of inputted participant data was checked by a trained researcher to ensure accuracy of entry. The full dataset was then assessed for outliers and missing responses. Between 1-3% of the data was missing at random for each scale, confirmed with Little's Missing Completely at Random (MCAR; Little, 1988) test ($p \geq 0.05$). Therefore, the Expectation Maximisation (EM) algorithm was conducted on each independent scale, using inter-correlated items to predict the remaining missing data (Field, 2013).

Statistical analyses

Descriptive statistics were calculated for each of the study outcomes with the total sample, and student-athletes and non-athletes at baseline and included in Table 1. Independent samples t-tests were also calculated to determine if differences were present between student-athletes and non-athletes at baseline. The mean and standard deviation scores for each outcome variable at baseline and post-intervention were calculated for the intervention and control group. Prior to testing the study hypotheses, univariate statistical analyses were specified at the group level by conducting a series of mixed ANOVA's with repeated measures to compare changes in the intervention and control groups' mean scores from baseline to post-intervention. Alpha significance was set to $p < .05$, and partial eta squared (η^2) was calculated as a measure of effect size considering small, medium or large effect sizes as .01, .06 or $>.14$, respectively (Field, 2013). Both the mean scores, and time*group interaction values were included in Table 2.

The study hypotheses were tested through two causal models subscribing to IBC processes (Hagger and Chatzisarantis, 2014), which have been previously validated in mental health domain (Shannon et al., 2019). The purpose of testing the two models was to

determine if, through the intervention, a positive effect on student intentions to self-manage mental health was either: (a) directly found; (b) indirectly facilitated through singular changes in autonomous motivation or TPB variables (attitude, subjective norms and perceived behavioural control); or (c) changes in autonomous motivation and TPB variables in serial mediation.

For estimating the models' parameters, the independent variable (X) was coded as dichotomous (control= 0 and intervention= 1) and regressed onto difference values. Difference values were created through subtracting each outcome variable's baseline score from its post-intervention score (Cerin, 2010). In Model 1, *self-management intentions* was coded as the dependant variable (Y); Mediator 1 (M1) as autonomous motivation; Mediator 2 (M2) as subjective norms; Mediator 3 (M3) as attitudes; and Mediator 4 (M4) as perceived behavioural control. In Model 2, *controlled motivation* was allocated as M1, as Shannon et al., (2019) have shown positive pathways between controlled motives and self-management intentions. Hypothesised models 1 and 2 are depicted in Figure 1.

Hayes' (2015) PROCESS macro for SPSS was used to test the models, with 5000 bootstrapped samples implemented to improve parameter accuracy (Byrne, 2013). Analyses included one direct effect between X on Y, and seven singular or serial indirect effects between X on Y through M1, M2, M3 and M4. The model also examined four direct and three indirect effects between X on the four mediators. Indirect effects were determined statistically significant on the basis of their respective confidence intervals not crossing zero (Field, 2013). To visually illustrate the findings, two figures were produced detailing unstandardized beta (β) coefficient values for each direct path, and the R^2 value showing the proportion of total variance predicted for self-management intentions.

Results

At baseline student-athletes and non-athletes did not significantly differ on any of the outcome variables. Table 1 details the mean and standard deviation scores for each of the outcome variables at baseline for the IBC variables, categorised by athlete status. Table 2 reports on the intervention and control group, with respect to their mean scores at baseline and post-intervention. Univariate statistical analyses revealed that the intervention group significantly improved their autonomous and controlled motivation, perceived behavioural control, attitudes and self-management intentions in comparison to the control group (all $p < .05$), but not for subjective norms ($p = .07$). Autonomous motivation exhibited a moderate-to-large effect size ($\eta_p^2 = .09$), whereas all of the remaining significant variables displayed small-to-moderate effects (η_p^2 ranging from .02 to .06).

Model 1: Autonomous Motivation

When integrating all of the study outcomes into a multivariate statistical model, a number of the study hypotheses were supported. Specifically, supporting H1 and H2, results from Model 1 confirmed that in comparison to the control group, athletes and non-athletes that took part in the SOMI intervention enhanced their autonomous motivation (M1; $\beta = .20$, $p < 0.001$), attitudes (M3; $\beta = .35$, $p < .001$) and perceived behavioural control (M4; $\beta = .20$, $p < 0.05$), but not subjective norms (M2; $\beta = .02$, $p > .05$). When exploring the indirect effects of the intervention on M2, M3 and M4, autonomous motivation exerted an indirect positive effect on attitudes (M3; $\beta = .14$, $p < 0.05$), and subjective norms (M2; $\beta = .15$, $p < 0.05$), but not behavioural control (M4; $\beta = .05$, $p > .05$). In support of H3, the direct effect of the intervention on attitudes remained significant alongside the indirect effect of autonomous motivation, suggesting partial mediation of attitudes through autonomous motivation. In support of H4, the intervention indirectly enhanced self-management intentions through singular mediation of autonomous motivation (M1; $\beta = .13$, 95% CI [.007 to .203], $p < .05$), and attitudes (M3; β

=.28, 95% CI's [.040 to .221], $p < .05$), but not subjective norms (M2; $\beta = .01$, 95% CI [-.004 to .054], $p > .05$). A lack of support was found for H5, in that no serial indirect effects were present through autonomous motivation and any of the TPB variables in sequence (M2, $\beta = .01$; M3, $\beta = .02$; M4, $\beta = .00$; all $p > .05$). Lastly, the direct effect of the intervention on self-management intentions was not significant when controlling for the mediator's effects ($\beta = .05$, $p > .05$). Factoring in the IBC mediators resulted in a significant proportion of variance predicted for self-management intentions ($R^2 = .20$), and all effects were realised indirectly. See Figure 2 for a visual description of Model 1, including specific beta coefficient values for significant pathways.

Model 2: Controlled Motivation

Similar to Model 1, results from Model 2 confirmed that, in comparison to the control group, taking part in the SOMI intervention directly enhanced controlled motivation (M1; $\beta = .15$, $p < 0.05$), attitudes (M3; $\beta = .42$, $p < 0.001$) and perceived behavioural control (M4; $\beta = .22$, $p < 0.05$), but not subjective norms (M2; $\beta = .02$, $p > .05$). A lack of support was found for H2, as when exploring the indirect effects of the intervention on M2, M3 and M4, controlled motivation only exerted an indirect positive effect on subjective norms (M2; $\beta = .09$, $p < .05$), but not attitudes (M3; $\beta = .06$, $p > .05$) and perceived behavioural control (M4; $\beta = .04$, $p > .05$). Therefore, due to no pre-existing direct effect of the intervention on subjective norms, there was no full or partial mediating role exerted by controlled motivation on any of the TPB factors.

In support of H4, the intervention indirectly enhanced self-management intentions through controlled motivation (M1; 95% CI [.009 to .143], $p < .05$), and attitudes (M3; 95% CI's [.040 to .123], $p < .05$), but not subjective norms (M2: $\beta = .01$, 95% CI's [-.007 to .090], $p > .05$) or perceived behavioural control (M4; $\beta = .03$, 95% CI's [-.014 to .142], $p > .05$). No

serial indirect effects for the intervention through controlled motivation in sequence with the TPB variables were present (M2, $\beta=.00$; M3, $\beta=.00$; M4, $\beta=.00$; all $p>.05$), showing a lack of support for H5. Alike model 1, the direct effect of the intervention on self-management intentions was not significant when controlling for the mediators' effects ($\beta=.05$, $p>.05$). Factoring in the IBC mediators resulted in a significant proportion of variance predicted for self-management intentions ($R^2=.23$), demonstrating that all effects were realised indirectly. Model 2 predicted a slight percentage (3%) more variance than model 1 for self-management intentions. See Figure 3 for a visual description of Model 2.

Discussion

The participants who received the State of Mind intervention showed increases in autonomous and controlled motivation, attitudes, and perceived behavioural control for self-managing mental health when compared to a control group, which in turn resulted in students (both athletes and non-athletes) reporting improved intentions to self-manage mental health. By tailoring interventions around IBCM-based constructs, specific mechanisms underpinning self-management behaviours could be identified. Our findings are in support of the view that theory-informed mental health intervention programmes can improve self-management of mental health in students with co-existing academic, social and sporting demands (Donohue, Pitts, Gavrilova, Ayarza, & Cintron, 2013). We also noted some unexpected findings worth discussing in relation to the IBCM model, and make recommendations to advance mental health interventions for student athletes and non-athletes.

Univariate statistical analyses (see Table 2) revealed that SOMI demonstrated a positive effect on all of the study outcomes aside from subjective norms, with small-to-moderate, and moderate-to-large effects. As shown in several mental health awareness interventions among athletes (Breslin et al. 2017), these findings demonstrate that existing

programmes such as SOMI, can significantly improve factors (e.g. perceived control, attitudes, self-management intentions) that offer a preventative measure against common stressors that athletes face (Schnyder, Panczak, Groth & Schultze-Lutter, 2017). However, in view of the critique that most existing programmes lack application of an underpinning theory in their design and analyses (Breslin et al., 2017), our study sought to integrate the IBCM in order to explain the how and why of the intervention's effects. The comparison of the results between the univariate analyses with the multivariate models, showed that when controlling for the mediators' effects on self-management intentions, the direct effect was not significant and instead, indirectly realised through the mediators. As such, the study findings further underscore the importance of testing interventions through theoretically-driven pathways, to the extent that the mechanisms of behaviour change can be attributed (Mathieu & Taylor, 2006). (Michie, Johnston, Abraham, Lawton, Parker & Walker, 2005).

Specifically, direct effects were found for the intervention group on autonomous and controlled motivation, attitudes, and perceived behavioural control. Therefore, autonomy-supportive behaviours provided by SOMI tutors was significant during intervention delivery, such that the student-centric delivery style satisfied the needs of the students (Ryan & Deci, 2017). To clarify the interpersonal significance of service providers, future studies may consider designing interventions that are underpinned by increased needs-supportive principles (Teixeira et al., 2014), and measuring components of the social environment (i.e. provision of autonomy-support).

Furthermore, autonomous motivation partially mediated the effects of the intervention on attitudes and perceived behavioural control, suggesting autonomous motives for self-management exert a role in improving attitudes and perceived control (Hagger & Chatzisarantis, 2014). Such findings are in line with SDT theorising, and meta-analytic findings of the IBCM model (Hagger & Chatzisarantis, 2009) that when one develops an

autonomous motive towards a domain of action, they are more likely to display positive beliefs for their engagement with it, in this case self-management of mental health. Although the improvements in attitudes and perceived behavioural control were not partially explained by controlled motivation, the effect of the intervention on controlled motivation resulted in an indirect effect on subjective norms, which again aligns with IBCM theorising. For example, controlled motives are to satisfy others, and subjective norms reflect others' encouragement or discouragement (Iyengar & Lepper, 1999). The lack of an indirect effect on attitudes and perceived behavioural control through controlled motivation is difficult to explain. We speculate that the lack of effects through controlled motivation, may be due to participants putting an importance externally on how others may look after their mental health. In effect this process of waiting to see what others do may be a manifestation of social stigma. In line with the recommendation above, future studies may consider further testing whether autonomous or controlled motivation either partially or fully mediate the effect of autonomy-supportive communication in mental health self-management interventions, and to consider the role of stigma in moderating self-management intentions and behaviours.

Hypothesis 4 was partially supported in both models given the intervention was effective at increasing intentions to self-manage mental health through singular mechanisms reflective of autonomous and controlled motivation, and attitudes; but not for subjective norms or perceived behavioural control, despite the pre-existing direct and indirect effects on those variables. Such findings lead us to suggest that those involved in the design of mental health interventions for student athletes and non-athletes may consider promoting autonomous motives and beliefs regarding self-management, to eventually improve their intentions for self-managing (Schomerus, Matschinger & Angermeyer, 2009; Bohon et al., 2016), but also place emphasis on additional content and support including, perhaps, the co-delivery of the intervention by prominent athletes (i.e. to improve subjective norms) and

further workshops on the use of self-management resources (e.g. mobile applications, mindfulness) to improve behavioural control. Future studies may consider assessing student-athletes intentions and actual engagement with a specific self-management behaviour (e.g. mindfulness), as in the case of SOMI, the intervention focused on a range of potential strategies student-athletes could avail of (e.g. managing stress, relaxation, speaking to others, seeking professional help). It was positive to see that the sporting examples used in SOMI were also beneficial to student non-athletes.

We found no evidence for serial indirect effects for the intervention predicting intentions to self-manage mental health through autonomous or controlled motivation in sequence with the TPB variables. For example, while the intervention's effects on motivation may have resulted in participants aligning their beliefs with their corresponding motives, those effects in sequence were not large enough to interact, and exert a role in facilitating further improved intentions for self-management behaviours, possibly due to an underpowered sample, or the potential need for a one-to-one person centred session.

A further finding was that both autonomous and controlled motives appear to be predictive of the increase in a students' intention to self-manage, at least in the short term (Iyengar & Lepper, 1999). This may indicate that irrespective of orientation (i.e. relatively autonomous or controlled), motivation was low initially, and both motives can be useful in initiating intentions in the first instance. This may appear somewhat not in keeping with offering free choice or autonomy, and while we acknowledge autonomous motives are more sustainable, we argue that given the high stigma associated with seeking help, controlled motivation is useful in facilitating individuals who want to externally display self-management behaviours to others important to them, such as close family, friends, tutors, coaches and teammates. Therefore, we suggest that developing both motives at first is a positive step, especially in the mental health domain where, regardless of less optimal mental

health states (i.e. mental illness, languishing, moderate mental health) (Keyes, 2005), many are amotivated to engage with mental health-promoting strategies because of societal stigma.

The novel contribution of this study was the application of the IBCM to an already established mental health awareness programme for university students (Breslin et al, 2017), and that a theory informed 75 minute intervention with sporting examples can be useful for student athletes and non-athletes. Both models show how autonomous and controlled motivation, and attitudes can predict mental health self-management intentions. There are some limitations to the current study. The lack of a follow-up prevents determining whether the SOMI programme had any long term effects. The process of randomisation of participants to groups did not take place which could be considered in future studies. Finally the tutors, staff in student support services and students were all volunteers to delivering the programme, it cannot be ruled out that the programme was effective due to their motivations to volunteer and make a contribution to student mental health. A future study could take the above limitations into account.

In conclusion, a short 75-minute student-athlete mental health awareness programme can increase student athlete and non-athlete intentions to self-manage mental health. For the first time, the IBCM framework has been applied to a student mental health intervention responding to a gap in the literature highlighting the need for theory-informed programmes in sport settings (Breslin et al, 2017). Overall, the findings suggest that improving autonomous and controlled motives, along with attitudes, can be facilitative of self-management intentions. Further research is required into what components of this sport based intervention could be modified to go beyond self-management intentions, specifically around assessing the efficacy of focused management strategies for improving resilience and well-being in student athletes and non-athletes.

Acknowledgments

The authors would like to thank the students for taking part, and the State of Mind Ireland team for the training in the programme. We would also like to pay particular acknowledgment to the late Dr. Martin Lawlor, co-founder of the SOMI programme and advocate of mental health.

Declaration of interest statement

Nothing to declare

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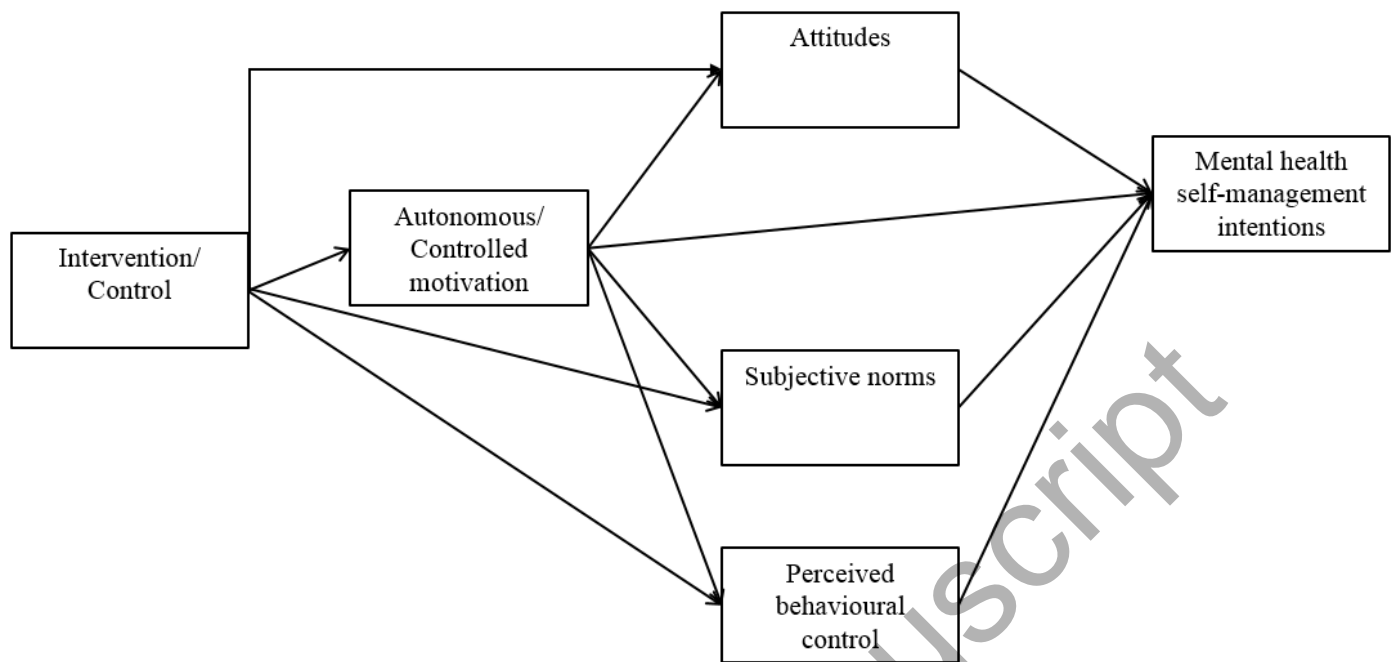
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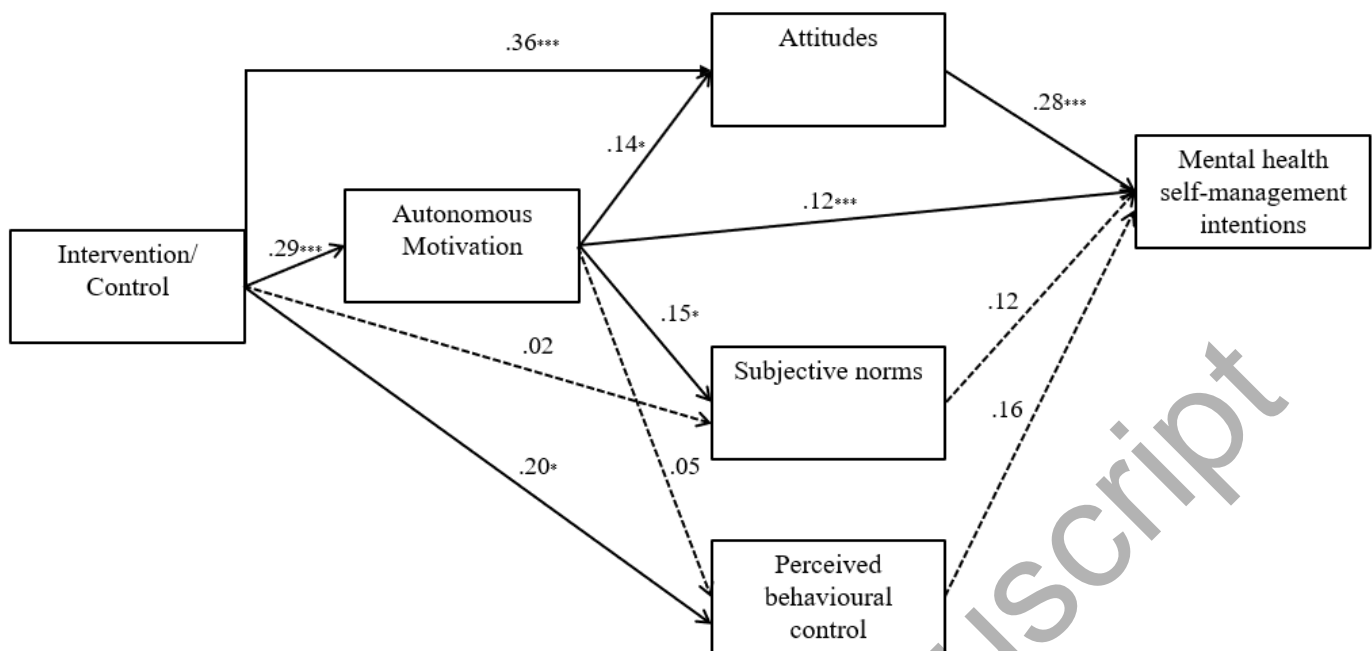
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Figure 1. Model 1 (autonomous motivation) and 2 (controlled motivation) showing the hypothesised direct and indirect effects of the intervention through IBC mediators.



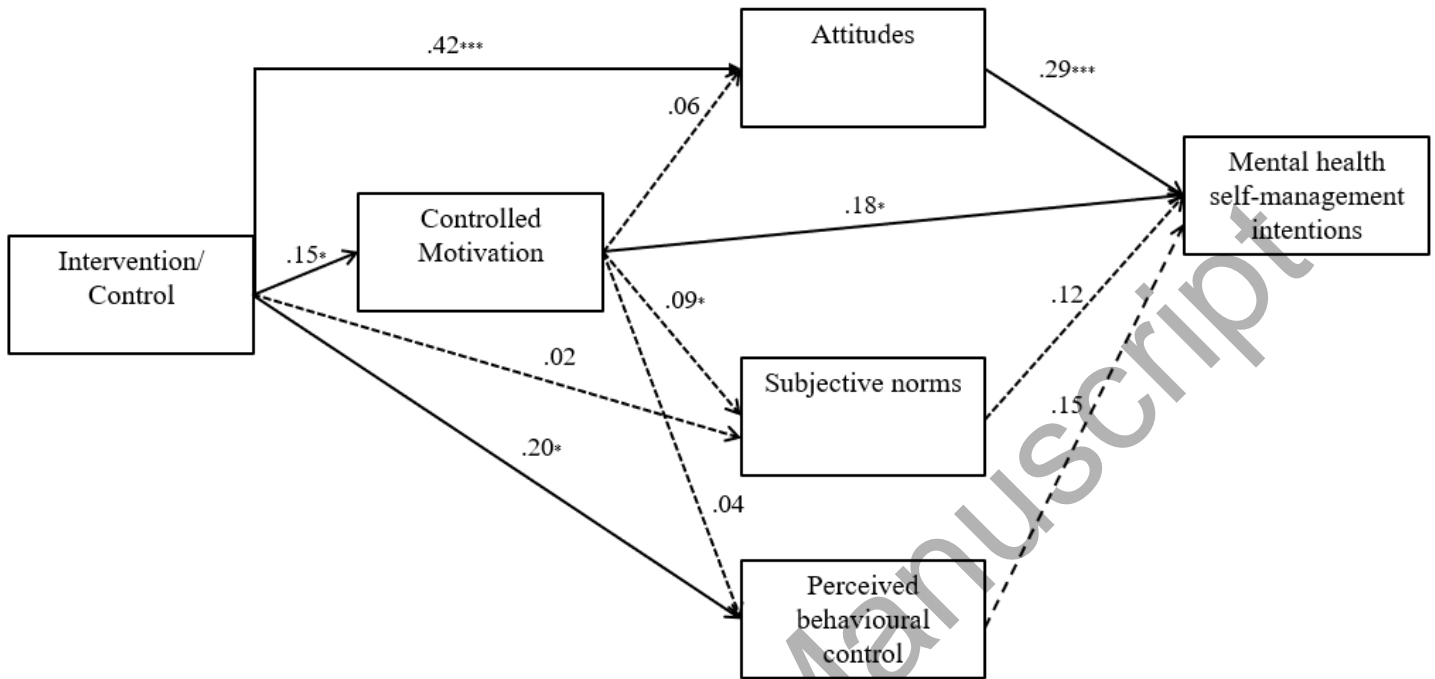
***Note:** To analyse the effects of the intervention in the model, the Intervention group was coded as 1, and Control group as 0.

Figure 2. Model 1 (autonomous motivation) illustrating the direct and indirect effects of the intervention on IBC variables and self-management intentions



Note:** To analyse the effects of the intervention in the model, the Intervention group was coded as 1, and Control group as 0. $^* = p < .05$; $^{**} = p < .01$; $^{} = p < .001$; complete arrows indicate significant pathways; dashed arrows indicate non-significant pathways

Figure 3. Model 2 (controlled motivation) illustrating the direct and indirect effects of the intervention on IBC variables and self-management intentions on IBC variables and self-management intentions



Note:** To analyse the effects of the intervention in the model, the Intervention group was coded as 1, and Control group as 0. $^* = p < .05$; $^{**} = p < .01$; $^{} = p < .001$; complete arrows indicate significant pathways; dashed arrows indicate non-significant pathways

Table 1. Mean scores and standard deviations for athlete and non-athletes for each of the IBC framework scales.

	Autonomous motivation	Controlled motivation	Attitudes	Subjective Norms	Perceived Behavioural Control	Intentions
Sample	5.37 (1.14)	3.75 (1.19)	5.68 (1.06)	5.88 (.90)	5.01 (.80)	5.04 (1.13)
Athlete	5.36 (1.10)	3.72 (1.19)	5.63 (1.11)	5.90 (0.86)	5.08 (0.83)	5.09 (1.12)
Non- Athlete	5.38 (1.23)	3.83 (1.19)	5.78 (0.92)	5.82 (0.98)	4.86 (0.72)	4.91 (1.15)

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Table 2: Descriptive statistics describing mean and standard deviations for each outcome measure for the intervention and control groups at baseline and post intervention.

<i>Variables</i>	<i>Intervention M (SD)</i>	<i>Control M (SD)</i>	<i>Time*Group F(p); Np2</i>
<i>Autonomous motivation</i>			
<i>Baseline</i>	5.23 (1.16)	5.74 (.98)	18.389 ($p < .001^*$); .085
<i>Post</i>	5.63 (1.03)	5.55 (.99)	
<i>Controlled motivation</i>			
<i>Baseline</i>	3.71 (1.13)	3.88 (1.33)	4.605 ($p < .05^*$); .023
<i>Post</i>	4.28 (1.33)	4.12 (1.29)	
<i>Subjective norms</i>			
<i>Baseline</i>	5.77 (.91)	6.18 (.80)	3.298 ($p = .07$); .016
<i>Post</i>	5.95 (.79)	6.17 (.90)	
<i>Attitudes</i>			
<i>Baseline</i>	5.54 (1.06)	6.06 (.96)	11.822 ($p < .001^*$); .056
<i>Post</i>	6.09 (.97)	6.16 (.97)	
<i>Perceived behavioural control</i>			
<i>Baseline</i>	4.99 (.81)	5.07 (.79)	9.915 ($p < .01^*$); .048
<i>Post</i>	5.32 (.69)	5.08 (.80)	
<i>Self-management intentions</i>			
<i>Baseline</i>	4.90 (1.19)	5.40 (.88)	5.967 ($p < .05^*$); .029
<i>Post</i>	5.30 (1.01)	5.48 (.90)	

Note: all scale items were scored on 7-point Likert scales; standard deviations are presented in brackets beside scale means; * = $p < .05$ as measured by a repeated measures anova test.