**Manuscript**

1. **Background**

Mental health refers to a state of well-being, wherein each individual realises their potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to their community (World Health Organisation; WHO, 2014). Optimal emotional, social and psychological well-being is considered positive mental health (Keyes, 2005), which is associated with autonomous self-management of health, and resilience to adversity (Ryan & Deci, 2017). However, few people fall into the positive mental health category, with a significant proportion of people being diagnosed with, or at risk, of mental illness (i.e. languishing; Keyes, 2005). During a given year, an estimated 300 million individuals experience depression (WHO, 2017), and one in four report a mental health problem (McManus, Meltzer, Brugha, Bebbington & Jenkins, 2009). Individuals are prone to mental health problems during life transitions, such as the progression through from teenage years into early adulthood (i.e. 18-25 years), which for many corresponds with their time at Higher Education (HE; i.e. university or college) (McLafferty et al., 2017).

HE students are at risk for mental health problems due to increased life stressors such as study demands, uncertain career transitions, financial concerns and living away from home (Pitt, Oprescu, Tapia, & Gray , 2017). In the United Kingdom (UK) between 17% (Macaskill, 2012) and 27% (YouGov, 2016) of students reported a mental health problem. Moreover, recent research in Northern Ireland (McLafferty et al., 2017) indicates that one fifth of students will experience depression or anxiety during a 12-month period. Females consistently report higher mental health problems than males, but also are more likely to avail of mental health services (McLafferty et al., 2017; Thornley, 2017). While scant research has examined student-athletes in the UK, studies in the United States indicate that student-athletes and non-athletes show similar prevalence estimates for mental health disorders (Sudano, Collins & Miles, 2017). However, student-athletes present a higher clinical and sub-clinical risk of substance misuse, gambling, sexual risk-taking and eating disorders (Moreland, Cox & Yang, 2017; Donohue et al., 2018). Ninety four percent of universities have reported an increase in demand for counselling services (Thornley, 2017). There is a need, therefore, for student mental health interventions (Huppert, 2009).

Existing interventions for those with a mental illness, including counselling and cognitive behavioural therapy yield small-to-moderate positive effects for improving mental health (Spijkerman, Pots & Bohlmeijer, 2016; Steinert, Munder, Rabung, Hoyer & Leichsenring, 2017). However, the prevention (rather than cure) model can be used to empower both healthy students, and those with early or chronic mental illness symptoms, in improving their mental health-related circumstances (Huppert, 2009). Successful prevention programmes have been designed for student-athletes (Breslin et al., 2018) and non-athletes (Stanley, Horm & Joiner, 2018). However, most programmes focus on concepts more aligned to mental health disorders, such as stigma-reduction, rather than paying attention to the management of daily life stressors, or indeed to positive mental health conceptions such as well-being. One construct that can be readily applied in interventions, and encompasses a more holistic view of mental health (Keyes, 2005), is mental health self-management (Wolf, 2011).

Applied to health broadly, self-management refers to self-monitoring how one’s health is impacting upon personal functioning, emotions and interpersonal relationships and engaging with strategies that protect and promote health (Center for the Advancement of Health, 1996). Referring specifically to mental health, Wolf (2011, pg4) defines mental health self-management as empowerment with “strategies that range from improving coping with and managing the stressors of daily living, via preventing and managing milder psychiatric conditions, such as burn-out or mild depression, up to prevention of, or intervening in severe psychiatric conditions”. Whilst self-management is a relatively new construct in mental health (Wolf, 2011), some evidence suggests that self-management interventions may be efficacious in improving mental health outcomes (Panagioti et al., 2014). For this reason, irrespective of their current mental health state (i.e. flourishing, moderate, or mentally ill; Keyes, 2005), students may benefit from mental health self-management skills to empower them in prevention and promotion strategies.

Despite being aware of experiencing university (Graham, Rogers & Yassin, 2003) and sport-related (Gulliver, Griffiths, & Chrisenisen, 2012) stressors many student-athletes and non-athletes do not self-manage their mental health, resulting in maladaptive coping styles. For example, student-athletes are reluctant to self-manage mental health challenges, with many balancing their academic demands alongside striving for high sporting performance under stress, resulting in many presenting a positive appearance whilst hiding insecurities (Brown, Hainline, Kroshus & Wilfert, 2014; Sudano, Collins & Miles, 2017). Reasons for such maladaptive coping styles range from society-derived stigma perceptions, to a lack of social support, personal resources, and tailored mental health interventions (Gulliver, Griffiths & Christensen, 2010). Theories of health behaviour have been useful in delineating the psychological and social processes underpinning mental health promotion strategies.

Health behaviour theories that are social-cognitive in origin, seek to explain how and why individuals engage in intentional health promotion or illness prevention strategies, and have been successfully applied to predict a range of health contexts (e.g. diet, physical activity, medication intake; Hagger & Chatzarantis, 2014). The Medical Research Council outline that theory-based interventions demonstrate larger effects on health than interventions not underpinned by a theory (Craig et al., 2013). Although multiple theories are available (see Michie, S., Johnston, Francis, Hardeman & Eccles, M, 2008), the Theory of Planned Behaviour (TPB; Ajzen 1991) and Self-Determination Theory (SDT) (Ryan & Deci, 2017) have been applied to the mental health domain with some positive results.

The TPB specifies that an individual’s perceived behavioural control (i.e. perceived personal control and external/internal facilitators), attitudes (i.e. instrumental and affective evaluation) and subjective norms (i.e. descriptive and injunctive norms) regarding a behaviour interact, which then predicts their intentions for future health behaviours (Ajzen & Fishbein, 1977; Ajzen 1991). Intention is considered the most proximal social cognitive variable for predicting behaviour change (Arjen, 1991) and a few studies (Mo & Mak, 2009; Schomerus, Matschinger & Angermeyer, 2009; Bohon et al., 2016) support TPB hypotheses for attitudinal and behavioural control predictors of mental health professional help-seeking intentions. However, the motivational origins of the belief-based TPB constructs are not outlined by Arjen (1991), which has led authors Hagger & Chatzarantis, (2009; 2014) to propose the integration of SDT.

In SDT (Ryan & Deci, 2000), motivation is hypothesised to exist along a continuum in which five distinct motivational types are considered. Intrinsic motivation, and integrated and identified regulation are proposed as autonomous forms of motivation, in which one engages in behaviours for reasons such as finding inherent satisfaction and enjoyment (i.e. intrinsic motivation), finding the behaviour is congruent within one’s sense of self (i.e. integrated regulation), or for seeing the personal benefit that the behaviour brings to the individual (i.e. identified regulation). Conversely, externally motivated individuals seek approval from others when engaging with a behaviour (i.e. introjected regulation), or to avoid punishment/achieve rewards (i.e. external motivation). Thus, in the context of mental health, one could self-manage their mental health for broadly autonomous or external reasons. Indeed, systematic reviews (Teixeira et al., 2014) and meta-analyses (Ng et al., 2012) show small-to-moderate positive correlations for autonomous motivation predicting health-promotion behaviours (e.g. physical activity, diet). However, in current research the motivation regulations largely focus on behaviours relating to physical, rather than mental health (Ng et al., 2012). Therefore, the above findings cannot be extrapolated to mental health regulations, warranting a motivational analysis of mental health self-management.

Additionally, 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 beliefs and intentions through their original theorising (Hagger & Chatzarantis, 2014). To overcome the predictive limitations of the TPB and SDT, Hagger and Chatzarantis (2009; 2014) have combined SDT and TPB components within the Integrated Behaviour Change model (IBCM; Hagger & Chatzarantis, 2014). According to the IBCM model, individuals with autonomous motives towards behaviours are more likely to be motivated to perform the behaviour compared to those that hold controlled motives. As a consequence, autonomously motivated individuals will strategically align their beliefs (i.e. subjective norms, perceived behavioural control and attitudes) and intentions with their motives in order to pursue the behaviour in the future. In this view, IBCM hypotheses are consistent with SDT principles to the extent that autonomous motives are considered to be more adaptive than controlled motives with respect to forming positive cognitive representations (e.g. attitudes to engage) of future actions. Hence, intentions are the function of attitudes, subjective norms and perceived behavioural control, but autonomous and controlled motivations function as antecedents for those belief-based variables. The IBCM has received empirical support for predicting behaviours related to physical health (Hagger & Chatzarantis, 2009), including sugar consumption (Hagger et al., 2017), but has not yet been psychometrically tested, nor validated, for the mental health domain.

With the increasing demand on student mental health services across HE institutions (Thornley, 2017; Storie, Ahern & Tucket, 2010; McLafferty et al., 2017), effective theory-based mental health interventions are needed, a view shared in the Guidelines for Student Mental Health Policies and Procedures for Higher Education (UK Universities, 2015). Theoretical application is lacking in current student mental health interventions (Lo, Gupta, & Keating, in press; Breslin et al., 2018, Donohue et al., 2018; Stanley, Horm & Joiner, 2018), with limited knowledge of the techniques to be used in the context of designing and conducting interventions (Goodheart, Kazdin, & Sternberg, 2006). Furthermore, there are no programmes focusing on improving mental health self-management which, if promoted, may empower students with strategies ranging from managing daily stressors, through to promoting well-being and prevention of mental illness (Wolf, 2011).

Hence, theory-informed approaches are required to tailor self-management interventions for the needs of student athletes and non-athletes within university contexts. Applying the IBCM (Hagger & Chatzarantis, 2014) to the mental health domain for the first time offers a potential guide for the development of interventions (Demyan & Anderson, 2012). To ensure measurement and predictive validity, a two-step model-building approach (Byrne, 2001) was implemented. The aims were to, firstly, assess the factorial validity of IBCM constructs through confirmatory factor analysis (CFA), and; secondly, to predict self-management intentions though integrating IBCM constructs in a path analysis model. The findings will provide theory-informed and empirically-guided recommendations for those seeking to promote mental health through self-management approaches.

*1.2 Study hypotheses*

In accordance with the behavioural processes described in the IBCM (see Figure 1 below) and extant research, autonomous and controlled motivation were, respectively, hypothesised to positively and negatively predict attitudes, subjective norms and behavioural control (Hypothesis 1; H1). Autonomous and controlled motivation were also respectively proposed to directly positively and negatively predict mental health intentions (Hypothesis 2; H2). Hypothesis 3 (H3) refers to the significant and positive relationship between attitudes, subjective norms and behavioural control linked with mental health self-management intentions. Autonomous motivation was hypothesised to indirectly predict self-management intentions through attitudes, subjective norms and behavioural control (Hypothesis 4; H4). Lastly, gender and athlete status were included as control variables.

***Please insert Figure 1****: Integrated Behaviour Change model (IBCM) detailing predictors of mental health behaviour intentions.*

**2.0 Materials and Methods**

This study was reported using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

***2.1 Study design, size, setting and participants***

Ethical approval was granted from Ulster University. A cross-sectional design was conducted, with data collected at campuses. A convenience sample of undergraduate student-athletes and non-athletes was recruited via university email and personal correspondence with schools situated within the Health and Life Sciences Faculty.

***2.2 Variables and measurement***

*Demographic variables*

Students reported their gender (i.e. male or female), and athlete status (i.e. athlete or non-athlete) through a question consistent with the definition of sport: ‘are you an athlete involved in a structured, competitive physical activity’ (Rejeski & Brawley, 1988).

Consistent with Wolf’s (2011) definition, mental health self-management was operationally defined in the questionnaire as: becoming aware of how you are feeling, and using strategies such as speaking to others or seeking professional help for your mental health, or using self-help strategies such as mindfulness, relaxation and exercising. The full questionnaire including IBCM variables is available as supplementary source.

*Motivation to self-manage mental health*

An adapted eight-item version of the validated Treatment Self-Regulation Questionnaire (TSRQ; Ryan & Connell, 1989) was used to assess Self-Determination Theory-derived (Ryan & Deci, 2000) autonomous and controlled motivation scales. Items were worded to reflect one’s motivation to self-manage their mental health. Items began with the stem: ‘The reason I would manage my mental is’, and were scored on a 7-point likert scale ranging from ‘not at all true’ to ‘very true’. Four items reflected autonomous motivation (e.g. ‘because managing my mental health is an important choice I want to make’) and four items reflected controlled motivation (e.g. because I want others to see I can manage my mental health’). The Cronbach’s alpha values within the sample were .85 (autonomous) and .70 (controlled).

*Attitudes, norms, perceived behavioural control and intentions*

Theory of Planned Behaviour (TPB) variables were measured using an adapted version of the validated Pearce, Rickwood and Beaton’s (2003) TPB questionnaire. For measuring the variables of interest within the present study, items were adapted to reflect students’ beliefs about self-managing mental health.

*Attitudes* (7 items) were assessed using a 7-point likert scale, in which items ranged from Negative (i.e. 1 point) to Positive (i.e. 7 points), with higher scores reflecting a more positive attitude. *Subjective norms* (4 items) were measured in relation to one’s perceptions of approval from others (i.e. friends, family, other students and other important people) for self-managing mental health. Items were scored on a 7-point likert scale ranging from ‘Definitely Disapprove’ (i.e. 1 point) to Definitely Approve (i.e. 7 points) wherein higher scale scores indicated more approval from others. *Perceived behavioural control* (5 items) was assessed on a 7-point likert scale to determine students’ perceived level of internal and external control to self-manage mental health. Higher scores indicated better levels of perceived behavioural control for mental health behaviours. Lastly, *intentions* (6 items)to self-manage mental health in the next four weeks was measured using a 7-point likert scale ranging from ‘Strongly Disagree’ to ‘Strongly Agree’. Cronbach’s alpha values for the TPB scales were as follows: .92 (attitudes), .87 (norms), .73 (behavioural control) and .94 (intentions).

***2.3 Statistical methods and bias***

*Data management*

Raw scores from the questionnaire were entered into Statistical Package for Social Sciences (SPSS version 22). Ten percent of the manually entered data was checked by a trained researcher to ensure consistency. Little’s Missing Completely at Random (MCAR; Little, 1988) test was conducted on each subscale to determine if the data was missing in random order. The MCAR test revealed the data was missing at random for each scale (p≥05), with between 1-3% of missing data found for each scale. As such, the Expectation Maximisation (EM) algorithm was conducted to estimate missing data on each scale, using inter-correlated items as predictors of the missing data (Field, 2013).

*Data analyses*

Mean scores and standard deviations were computed for each scale to provide an average which ranged between 0 and 7 on each IBCM factor. A series of independent samples T-Tests were performed to determine if there were significant differences between males and females, and athletes and non-athletes on each of the factors. Alpha significance was set to p<.05, and Cohen’s *d* was calculated as a measure of effect size considering, effect sizes of .20, .50 and .80 as small, moderate and large, respectively (Field, 2013). SPSS Version 22 was used to analyse the T-Tests.

Given the sample size of 200, a full structural equation model was not decided upon for testing the study hypotheses, as there was not a sufficient ratio of subjects to model parameters to assume robustness in the model estimates (Schumaker & Lomax, 1996). Hence, a two-step approach for modelling was conducted using the maximum likelihood methodology, entailing: (i) examining the factorial validity of the constructs through Confirmatory Factor Analysis (CFA), and; (ii) treating the confirmed factors as observed variables within a structural path analysis model (Byrne, 2001). Goodness-of-fit indices recommended by Hu and Bentler (1999) were used to assess the fit of the CFA and path models. The Chi-Square (χ2) value was reported with a non-significant χ2 statistic indicating good model fit. However, this value was approached with caution given that large sample sizes tend to result in statistically significant Chi-Square values (Schumaker & Lomax, 1996). The comparative fit index (CFI), the Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA) were reported. CFI and TLI with values of >.90, and RMSEA values of <0.08, considered as acceptable model fit.

For the CFA analyses, two separate models were specified. First, a two-factor motivation model was tested in which the four autonomous and four controlled items were regressed onto their respective factors (i.e. autonomous motivation and controlled motivation). Consistent with Ryan and Deci’s (2000) conceptualisation of motivation, a covariance path was applied between the two factors. Second, a four factor TPB model was tested, specifying attitudes, subjective norms, perceived behavioural control and intentions as the four latent factors sharing covariance (Ajzen, 1991). A table was created detailing each of the goodness-of-fit indices, and factor-loading ranges within each model.

Results of the CFA were successful and the factors did not require any further modifications (reported below). To this end, the mean scale scores were treated as observed variables, and the covariance paths in the CFA models were re-specified in the path model to test the study hypotheses (H1, H2, H3, H4 and H5, see Figure 1). For H4, indirect effects of autonomous motivation on mental health intentions through attitudes, subjective norms and perceived behavioural control were assessed. As statistical controls, Gender (males= 0, females= 1) and athlete status (non-athlete=0, athlete =1) were coded as dichotomous variables and regressed onto each of the IBCM factors. A figure was produced specifying beta (β) coefficient values for each direct path, and a *R2* value related to the proportion of total variance predicted for mental health self-management intentions. In both the CFA and path analysis models, Bollen-Stine bootstrapping was conducted with 5000 samples to improve the accuracy of parameter estimates and fit indices (Byrne, 2001). AMOS Version 21 was used to analyse the CFA and path models. In the interests of open science (McKiernan et al., 2016), we included outputs from the AMOS software as a supplementary source.

# **Results**

***3.1 Preliminary Analysis***

Two hundred participants consented and completed the questionnaire. The mean age of the sample was 21.10 years (SD=3.73); 53% percent were male and 69% were athletes. Table 1 presents the descriptive statistics regarding scale means, categorised by gender and athlete status. The only significant difference found between genders was for self-management intentions to the extent that females (M=5.24; SD: .94) scored higher than males (M: 4.85: SD: 1.26) yielding a small-to-moderate effect size (*d*=0.34; *t* (198) = 2.43, *p*<.01). No significant differences were found for athlete status.

***Please insert Table 1:*** *Mean scores and standard deviation for sample, gender and athlete status are presented for each of the IBCM framework scales.*

***Please insert Figure 2:*** *Results of IBCM detailing predictors of self-management intentions*

**3.2 *Main results***

The fit indices and factor loadings for CFA models are detailed in Table 2. All factor correlations were positive and statistically significant (*p* < .05). For both the SDT and TPB CFA models, the goodness-of-fit indices were all above the recommended cut-off points outlined by Hu and Bentler (1999), justifying the specification of the path model to test the study hypotheses.

Estimation of the path model revealed an acceptable fit to the data in relation to the cut-off points outlined by Hu and Bentler (1999). The χ2 statistic was not significant (*p* ***>*** .05), both the RMSEA (0.062) and CFI (0.969) displayed satisfactory fit indices, whilst the TLI value (0.893) was close to the recommended value of 0.90. Table 2 details specific covariance values between the factors, and fit indices for the path model.

In view of the study hypotheses tested, H1 was supported as autonomous motivation directly and positively predicted all TPB variables, with the standardised β values ranging from .40 (attitudes, *p* < .001), .33 (subjective norms, *p* < .001) to .15 (perceived behavioural control, *p* < .05). In contrast, controlled motivation did not exert a significant influence on any TPB variables. Support was also found for H2, as autonomous motivation directly and positively predicted mental health self-management intentions (β=.29, *p* < .001). In a lack of accordance with the study hypotheses, controlled motivation also exerted a significant positive (albeit smaller than autonomous) influence on mental health self-management intentions (β=.13, *p* < .05). Of the three TPB variables predicting self-management intentions, only perceived behavioural control exerted a statistically significant positive effect (β=.12, *p* < .05). When testing the effect of autonomous motivation and controlled motivation on self-management intentions through the TPB variables (H4), no statistically significant indirect effects were present in the path model.

With regards to the control variables, females displayed higher scores than males on just one factor within the model, namely, mental health self-management intentions (β=.14, *p* < .05). The second control variable, athlete status, did not exert a significant effect on any variables. Overall, the model predicted a significant proportion of variance for mental health self-management intentions (*R*² =.30).

***Please insert Table 2:*** *Summary of Fit Indices and Factor Loadings for the CFA and Path Model*

**Discussion**

***Key results and interpretation***

Self-management interventions may offer the opportunity to empower the student population with skills to manage life stressors and mild symptoms, right through to preventing mental illness and promoting well-being (Wolf, 2011). The aim of the current study was to test predictors of mental health self-management intentions in student-athletes and non-athletes using components of the IBCM framework (Hagger & Chatzarantis, 2009; 2014). The structural validity of the IBCM was supported through CFA, and IBCM variables made a significant contribution to the variance explained (*R*² =.30) for self-management intentions, with some support found for the study hypotheses. Consistent with the IBCM (Hagger & Chatzarantis, 2014) autonomous motivation directly predicted adaptive mental health attitudes, subjective norms and perceived behavioural control (H1), and self-management intentions (H2). However, unexpectedly perceived behavioural control was the only TPB construct to predict intentions (H3), and the autonomous motivation-intention relationship was not mediated by TPB variables (H4). We now discuss the findings and provide theoretically-informed recommendations for those seeking to design and implement self-management mental health interventions with students.

Sixty nine percent of the sample were athletes, and athlete status (i.e. athlete or non-athlete), did not exert a significant influence on self-management intentions. Whilst self-management encapsulates a broader range of strategies than accessing professional mental health services (e.g. speaking to others, relaxation), our findings are similar to recent studies reporting likewise intentions to utilise mental health services among student-athlete and non-athletes (Brown, Hainline, Kroshus & Wilfert, 2014; Barnard, 2016). Earlier studies (Watson, 2005) did report a higher mental health service willingness in non-athletes in comparison to student-athletes, however recent improvements in athlete help-seeking have been likely facilitated through campaigns and interventions about mental health that are championed by prominent athletes and leaders (Barnard, 2016; Kern et al., 2017).

Lopez and Levy (2013) reported a strong student-athlete preference for psychotherapists that have familiarity with sports. As such, adopting a strength-based style of mental health provision may be warranted for student-athletes in which practitioners are attune to their needs, including their co-existing academic and sporting demands, and adoption of high performance sporting norms (Donohue, Pitts, Gavrilova, Ayarza, & Cintron, 2013). By tailoring interventions around such recommendations, mental health interventions will be more fitting for the student-athlete population (Goodheart, Kazdin, & Sternberg, 2006). Therefore, we propose that universities may consider employing and/or training service providers in sporting norms, alongside accounting for other factors discussed in the present study, such as gender.

Females reported significantly better intentions than males to self-manage their mental health (H5), which replicates current studies among the general population (Clement et al., 2017; McLafferty et al., 2017; Thornley, 2017). Females and males, both non-athletes (Clement et al., 2015) and athletes (Breslin et al., 2017), are differently attentive to particular mental health messages. Therefore, in keeping with our proposals for better engagement with student-athletes, the use of gender-relatable mental health advocates may also help improve mental health self-management in students (Storie, Ahern & Tucket, 2010; Lopez & Levy, 2014; Lo, Gupta, & Keating, in press). Beyond the demographic findings, the sequences from the IBCM framework highlighted significant psychosocial factors that may be considered.

CFA confirmed acceptable factorial validity for both SDT and TPB constructs, alongside acceptable model fit indices when integrated into a path analysis model. Contrary to our hypotheses, we noted a positive (albeit small) effect for controlled motivation on self-management intentions. This finding may be explained by students wanting to demonstrate self-management behaviours to satisfy external agents (e.g. close family member, teammate, coach), which from an adaptive point of view, may be because given the individual perceives them to be acting within their best interests (Iyengar & Lepper, 1999). Whilst not disregarding the value of such relationships, and more aligned to sustainable motives in SDT hypotheses, the larger effect exerted by autonomous motivation on self-management intentions (H2) suggests that autonomous (rather than external) forms of motivation should be promoted in order to facilitate more effective and sustainable mental health self-management among students (Hagger & Chatzarantis, 2014; Ryan & Deci, 2017). Promoting autonomous motivation also complements the aforesaid optimisation, and strengths-based approach for the student-athlete population (Donohue et al., 2016).

Autonomous motivation can be achieved when those involved in shaping the social environment (e.g. service providers, coaches) offer psychological needs-support (i.e. competence, autonomy and social relatedness) through helping individuals explore barriers, and develop personally-valued pathways to wellness (Ryan, Patrick, Deci & Williams, 2008). Indeed, increased needs-support from intervention deliverers has been shown to increase autonomous motivation for a range of health behaviours, and needs satisfaction exerts discrete direct effects on mental and physical health (Ng et al., 2012; Teixeira et al., 2014). As the present study did not encompass needs support measures, we recommend the inclusion of needs-support and satisfaction components in further IBCM studies to improve the prediction of mental health self-management (see Hagger, Chatzarantis and Harris’s, 2006 model for a guide). Such research may help clarify the interpersonal significance of those involved in delivering mental health awareness programmes to students, and guidance can be provided on how best to satisfy the needs of the student population, which may augment positive change, and promote well-being (Ryan & Deci, 2017).

Replicating meta-analytic findings testing the IBCM model for health behaviours (Hagger & Chatzarantis, 2009), our study showed that autonomous motivation exerted statistically significant positive effects on the three TPB variables of perceived behavioural control, attitudes and subjective norms (H1). This finding suggests that cognitive beliefs about the utility of self-managing mental health can be facilitated more effectively when one has autonomously identified and internalised the importance of self-management. Surprisingly, perceived behavioural control was the only TPB variable to exert an effect on intentions (H3). This finding is in contrast to research (Hagger et al., 2017) testing the IBCM for sugar consumption in which perceived behavioural control was the only TPB variable to not directly predict intentions. Given the positive relationship between perceived behavioural control and intentions in the present study, we suggest that those involved in delivering mental health awareness messages to students promote fewer barriers for self-management, and greater internal control (Schomerus, Matschinger & Angermeyer, 2009; Bohon et al., 2016), which again may be complemented in the student-athlete population by the aforesaid optimisation approach (Donohue, Pitts, Gavrilova, Ayarza, & Cintron, 2013).

Also unexpectedly, all three TPB variables did not mediate the autonomous motivation-intention relationship. Our findings suggest that students are more likely to engage with self-management directly through autonomous motivation, rather than indirectly through belief-based TPB constructs. For example, when students have internalised the importance of self-management, they may not have to deliberatively consider the perceived benefits (i.e. attitudes), barriers (i.e. perceived behavioural control), or others (i.e. subjective norms) perceptions to enact the required intention for change. Whilst this finding refutes meta-analytic findings of the IBCM model on physical activity (Hagger & Chatzarantis, 2009), and research testing the IBCM for sugar consumption intentions (Hagger et al., 2017), the present study is the first to assess the IBCM research for mental health self-management intentions, which when enacted, may be less related to beliefs in comparison to motivation.

To conclude, the structural and predictive validity of the IBCM model was supported, and contributed to current understanding of the psychosocial factors that are salient for mental health self-management promotion among student-athletes and non-athletes. Our data leads us to suggest that autonomous motives and enhanced behavioural control may facilitate better intentions for mental health self-management. Therefore, practitioners may consider promoting autonomous motives through the IBCM, reflective of social environments that are conducive to psychological needs-support and greater internal control. To meet the needs of students, universities may also consider tailoring interventions to athlete norms, wherein practitioners are attune to the sporting environment, and adopt a strengths-based optimisation approach. The use of gender-relatable role models may also increase programme efficacy. Further research may assess the efficacy of such recommendations through a controlled research design that encompasses additional needs-support and satisfaction measures.

***Generalisability and limitations***

Whilst the present study explained a significant proportion of variance for mental health self-management intentions, we exclusively focused on students’ mental health, and as such, the IBCM model findings may not extrapolate to other populations (e.g. older adults, younger children). Further work testing the IBCM model may consider adhering to psychometric validity recommendations in order to ensure robust assumptions within that population (Hagger & Chatzarantis, 2009). In view of limitations, the present study was conducted using a cross-sectional design, and therefore we could not infer causality from the data. Studies adopting a longitudinal controlled design are needed to advance research on self-management. Moreover, athlete status was defined loosely and did not include information on the level of participation (i.e. elite, sub-elite, non-elite and recreational), and therefore future studies may consider developing a screening tool for better classification of athletic samples. While the use of CFA was advantageous for assessing factorial validity, other validity methods such as test-retest reliability and concurrent validity were not included in the present study, and may therefore be considered for future validation studies assessing the IBCM in the mental health domain (Hagger & Chatzisarantis, 2009). Finally, the model tested did not assess further IBCM variables such as needs-support, and implicit constructs, leaving gaps in our current theoretical understanding of students’ mental health self-management. To address such limitations ongoing research in our institute will to assess the IBCM with validated needs-support/satisfaction measures.   
**Acknowledgements**

We would like to thank the students that volunteered to participate in this study. We would like to acknowledgement Dr. Martin Lawlor’s contribution as co-founder of the State of Mind programme and advocate of mental health, and who is sadly is no longer with us.

**List of figures and tables**

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# **References**

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action-control: From cognition to behavior (pp. 11-39). Heidelberg, Germany: Springer.

Ajzen, I. (1991). The theory of planned behavior. Organizational behavior and human decision processes, 50(2), 179-211.

Barnard, J. D. (2016). Student-athletes’ perceptions of mental illness and attitudes toward help-seeking. Journal of College Student Psychotherapy, 30(3), 161-175.

Bohon, L. M., Cotter, K. A., Kravitz, R. L., Cello Jr, P. C., & Fernandez y Garcia, E. (2016). The Theory of Planned Behavior as it predicts potential intention to seek mental health services for depression among college students. Journal of American college health, 64(8), 593-603.

Byrne, B. M. (2001). Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument.*International Journal of Testing, 1*(1), 55-86. doi:10.1207/S15327574IJT0101\_4

Center for the Advancement of Health. (1996). An indexed bibliography on self-management for people with chronic disease. Center for the Advancement of Health.

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., ... & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. Psychological medicine, 45(1), 11-27.

Chew‐Graham, C. A., Rogers, A., & Yassin, N. (2003). ‘I wouldn't want it on my CV or their records': medical students' experiences of help‐seeking for mental health problems. Medical education, 37(10), 873-880.Conner, M., & Heywood-Everett, S. (1998). Addressing mental health problems with the theory of planned behaviour. Psychology, health & medicine, 3(1), 87-95.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2013). Developing and evaluating complex interventions: the new Medical Research Council guidance. International journal of nursing studies, 50(5), 587-592.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York, NY: Plenum Press.

Donohue, B., Pitts, M., Gavrilova, Y., Ayarza, A., & Cintron, K. I. (2013). A culturally sensitive approach to treating substance abuse in athletes using evidence-supported methods. Journal of Clinical Sport Psychology, 7(2), 98-119.

Donohue, B., O’Dowd, A., Plant, C. P., Phillips, C., Loughran, T. A., & Gavrilova, Y. (2016). Controlled evaluation of a method to assist recruitment of participants into treatment outcome research and engage student athletes into substance abuse intervention. Journal of Clinical Sport Psychology, 10, 272 -288. doi: 10.1123/jcsp.2015-0022

Donohue, B., Gavrilova, Y., Galante, M., Gavrilova, E., Loughran, T., Scott, J., Chow, G., Plant, C.P. and Allen, D.N. (2018). Controlled Evaluation of an Optimization Approach to Mental Health and Sport Performance. Journal of Clinical Sport Psychology, pp.1-42.

Field, A. (2013). Discovering statistics using IBM SPSS statistics. Sage.

Goodheart, C. D., Kazdin, A. E., & Sternberg, R. J. (2006). Evidence-based psychotherapy: Where practice and research meet. American Psychological Association.

Gordon, E. J., Prohaska, T., Siminoff, L. A., Minich, P. J., & Sehgal, A. R. (2005). Can focusing on self-care reduce disparities in kidney transplant outcomes? American journal of kidney diseases: the official journal of the National Kidney Foundation, 45(5), 935.

Gulliver, A., Christensen, H., & Griffiths, K. M. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. BMC psychiatry, 10(1), 113.

Hagger, M. S., Chatzisarantis, N. L., & Harris, J. (2006). From psychological need satisfaction to intentional behavior: Testing a motivational sequence in two behavioral contexts. Personality and social psychology bulletin, 32(2), 131-148

Hagger, M. S., & Chatzisarantis, N. L. (2009). Integrating the theory of planned behaviour and self‐determination theory in health behaviour: a meta‐analysis. British journal of health psychology, 14(2), 275-302.

Hagger, M. S., & Chatzisarantis, N. L. (2009). Assumptions in research in sport and exercise psychology. Psychology of Sport and Exercise, 10(5), 511-519.

Hagger, M. S., & Chatzisarantis, N. L. D. (2014). An integrated behavior-change model for physical activity. Exercise and Sport Sciences Reviews, 42, 62-69. doi: 10.1249/JES.0000000000000008

Hagger, M. S., Trost, N., Keech, J., Chan, D. K. C., & Hamilton, K. (2017). Predicting sugar consumption: Application of an integrated dual-process, dual-phase model. Appetite, 116, 147-156. doi: 10.1016/j.appet.2017.04.032

Huppert, F. A. (2009). Psychological well‐being: Evidence regarding its causes and consequences. Applied Psychology: Health and Well‐Being, 1(2), 137-164.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal, 6(1), 1-55

Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. Journal of Personality and Social Psychology, 76(3), 349-366.

Kern, A., Heininger, W., Klueh, E., Salazar, S., Hansen, B., Meyer, T., & Eisenberg, D. (2017). Athletes Connected: Results From a Pilot Project to Address Knowledge and Attitudes About Mental Health Among College Student-Athletes. Journal of Clinical Sport Psychology, 11(4), 324-336.

Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. Journal of consulting and clinical psychology, 73(3), 539.

Lo, K., Gupta, T., & Keating, J. L. (in press). Interventions to Promote Mental Health Literacy in University Students and Their Clinical Educators. A Systematic Review of Randomised Control Trials. *Health Professions Education.*

Lopez, R. L., & Levy, J. J. (2013). Student athletes' perceived barriers to and preferences for seeking counseling. Journal of College Counseling, 16(1), 19-31.

Liddle, S. K., Deane, F. P., & Vella, S. A. (2017). Addressing mental health through sport: a review of sporting organizations' websites. Early intervention in psychiatry, 11(2), 93-103.

Macaskill, A (2012). The mental health of university students in the United

Kingdom. British Journal of Guidance and Counselling, 41 (4), 426-441.

McKiernan, E.C., Bourne, P.E., Brown, C.T., Buck, S., Kenall, A., Lin, J., McDougall, D., Nosek, B.A., Ram, K., Soderberg, C.K. and Spies, J.R.. (2016). Point of view: How open science helps researchers succeed. Elife, 5, p.e16800.

McLafferty, M., Lapsley, C.R., Ennis, E., Armour, C., Murphy, S., Bunting, B.P., Bjourson, A.J., Murray, E.K. and O'Neill, S.M. (2017). Mental health, behavioural problems and treatment seeking among students commencing university in Northern Ireland. PloS one, 12(12), p.e0188785.

McManus, S., Meltzer, H., Brugha, T. S., Bebbington, P. E., & Jenkins, R. (2009). Adult psychiatric morbidity in England, 2007: results of a household survey. The NHS Information Centre for health and social care.

Mo P, Mak W. (2009). Help-seeking for mental health problems among Chinese: the application and extension of the theory of planned behaviour. Social Psychiatry Epidemiology. 44:675–684.

National Health Service (2016). Adult Psychiatric Morbidity Survey: Survey of Mental Health and Wellbeing, England, 2014. Accessed from: https://digital.nhs.uk/catalogue/PUB21748.

Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J. L., & Williams, G. C. (2012). Self-determination theory applied to health contexts: A meta-analysis. Perspectives on Psychological Science, 7(4), 325-340.

Panagioti, M., Richardson, G., Small, N., Murray, E., Rogers, A., Kennedy, A., ... & Bower, P. (2014). Self-management support interventions to reduce health care utilisation without compromising outcomes: a systematic review and meta-analysis. BMC health services research, 14(1), 356.

Pearce, K., Rickwood, D., & Beaton, S. (2003). Preliminary evaluation of a university-based suicide intervention project: Impact on participants. Australian e-Journal for the Advancement of Mental Health, 2(1), 25-35.

Pitt, A., Oprescu, F., Tapia, G., & Gray, M. (2017). An exploratory study of students’ weekly stress levels and sources of stress during the semester. Active Learning in Higher Education, 1469787417731194.

Quested, E., & Duda, J. L. (2010). Exploring the social-environmental determinants of well-and ill-being in dancers: A test of basic needs theory. Journal of Sport and Exercise Psychology, 32(1), 39-60

Rejeski WJ,. & Brawley LR. (1988). Defining the Boundaries of Sport Psychology. Sport Psychologist (2), 81-88.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: examining reasons for acting in two domains. Journal of personality and social psychology, 57(5), 749.

Rhodes, R. E., & Bruijn, G. J. (2013). How big is the physical activity intention–behaviour gap? A meta‐analysis using the action control framework. British journal of health psychology, 18(2), 296-309.

Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis. *The British Journal of Psychiatry*, DOI: 10.1192/bjp.bp.116.189464.

Schomerus G, Matschinger H, Angermeyer M. (2009). Attitudes that determine willingness to seek psychiatric help for depression: a representative population survey applying the Theory of Planned Behaviour. *Psychological Medicine (*39):1855–1865

Sheeran, P. (2002). Intention—behavior relations: a conceptual and empirical review. European review of social psychology, 12(1), 1-36.

Spijkerman, M. P. J., Pots, W. T. M., & Bohlmeijer, E. T. (2016). Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised controlled trials. Clinical psychology review, 45, 102-114.

Steinert, C., Munder, T., Rabung, S., Hoyer, J., & Leichsenring, F. (2017). Psychodynamic Therapy: As Efficacious as Other Empirically Supported Treatments? A Meta-Analysis Testing Equivalence of Outcomes. American Journal of Psychiatry, 174 (10), 943-953).

Stanley, I. H., Hom, M. A., & Joiner, T. E. (2018). Modifying mental health help-seeking stigma among undergraduates with untreated psychiatric disorders: A pilot randomized trial of a novel cognitive bias modification intervention. Behaviour research and therapy.

Storrie, K., Ahern, K., & Tuckett, A. (2010). A systematic review: students with mental health problems—a growing problem. International journal of nursing practice, 16(1), 1-6.

Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. Personality and Social Psychology Review, 8, 220-247

Sudano, L. E., Collins, G., & Miles, C. M. (2017). Reducing barriers to mental health care for student-athletes: An integrated care model. Families, Systems, & Health, 35(1), 77.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. International Journal of Behavioral Nutrition and Physical Activity, 9(1), 78.

Thorley, G. (2017). Not by Degrees: Improving student mental health. *Institute for Public Policy Research*. Available from: https://www.ippr.org/files/2017-09/1504645674\_not-by-degrees-170905.pdf.

United Kingdom Universities (2015). Student mental wellbeing in higher education: good practice guide. Accessed: http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Pages/student-mental-wellbeing-in-higher-education.aspx  
Vogel, D. L., Wade, N. G., Wester, S. R., Larson, L., & Hackler, A. H. (2007). Seeking help from a mental health professional: The influence of one's social network. Journal of clinical psychology, 63(3), 233-245.

Watson, J. C. (2005). College student-athletes' attitudes toward help-seeking behavior and expectations of counseling services. Journal of College Student Development, 46(4), 442-449.

Wolf, H. (1996). Self-management and mental health, in Bährer-Kohler, S. (2012). Social determinants and mental health. Nova Science Publishers.

YouGov (2016). One in four students suffer from mental health problems. Available from: <https://yougov.co.uk/news/2016/08/09/quarter-britains-students-are-afflicted-mental-hea/>.