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Citation: Jooste, Julius, Wolfson, Sandy and Kruger, Ankebe (2023) Irrational Performance Beliefs and Mental Well-Being Upon Returning to Sport During the COVID-19 Pandemic: A Test of Mediation by Intolerance of Uncertainty. *Research Quarterly for Exercise and Sport*, 94 (3). pp. 802-8811. ISSN 0270-1367

Published by: Taylor & Francis

URL: <https://doi.org/10.1080/02701367.2022.2056117>
<<https://doi.org/10.1080/02701367.2022.2056117>>

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Irrational Performance Beliefs and Mental Well-being Upon Returning to Sport During the COVID-19 Pandemic: A Test of Mediation by Intolerance of Uncertainty

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The authors herewith, declare no probable conflict of interest with respect to the research, authorship, and/or publication of this article. No financial support for the research, authorship, and /or publication of this article was received.

12 Mar 2022, (Accepted/In press) In: Research Quarterly for Exercise and Sport. Taylor and Francis

Irrational Performance Beliefs and Mental Well-being Upon Returning to Sport During the COVID-19 Pandemic: A Test of Mediation by Intolerance of Uncertainty

Abstract

Purpose: This study examined the extent to which irrational performance beliefs and intolerance of uncertainty co-occur in relation to mental well-being among a sample of athletes and coaches ($N = 94$, M age = 31.99, $SD = 12.81$) upon their return to sport following COVID-19 disruptions. **Methods and Results:** Despite the parity in views, independent samples t -test results identified three significant differences in the tested variables between athletes and coaches, which suggested that athletes are more likely to entertain depreciative thoughts about performances, and react more aversively to uncertainty, whereas coaches reported a better mental well-being state. Pearson product-moment correlation analysis confirmed a significant positive relationship between composite irrational performance beliefs and intolerance of uncertainty scores, with both these variables being inversely related to mental well-being. Results from a simple atemporal mediation analysis using the PROCESS macro verified that intolerance of uncertainty fully mediated the adverse effect irrational beliefs exert on mental well-being. **Conclusion:** Sport psychology practitioners within the framework of REBT are advised to explore their orientation of modifying irrational beliefs aligned to clients' perceptions and tolerance of uncertainty in sport through the inclusion of IU-specific awareness and behavioral experiments.

Keywords: athletes, coaches, COVID-19, intolerance of uncertainty, irrational beliefs, mental well-being in sport

12 Mar 2022, (Accepted/In press) In: Research Quarterly for Exercise and Sport-Taylor and Francis

Introduction

Intolerance of uncertainty (IU) is regarded as a dispositional characteristic of a person to respond adversely at a cognitive, emotional, and behavioural level to uncertain events or situations (Birrell et al., 2011). Individuals who are intolerant of uncertainty, therefore, hold a negative set of beliefs about uncertain situations and its implications, which can cause them to react in an emotionally distressing and aversive manner (Dugas et al., 2007; Dugas et al., 2004). Although uncertainty is expected to be prevalent in different domains of one's everyday life, it is reasoned that people who show intolerance to ambiguous information or situations are likely to worry and are inclined to experience heightened levels of anxiety, panic, obsessive-compulsive tendencies, and psychological distress (Boswell et al., 2013; Dugas et al., 2001; Tolin et al., 2003). Uncertainty is customary in sport and functions as a unique precursor to challenge and threat perceptions of performance situations (Jones et al., 2009). In this respect, a revised conceptualisation of the Theory of Challenge and Threat States in Athletes (TCTSA-R) has acknowledged how uncertainty (demand appraisal) in sport competitions accompanied by a perceived lack of personal resources (resource appraisal), and sense of incongruency (primary appraisal) could entice participants to respond in a distressed state (Meijen et al., 2020).

The outbreak of the COVID-19 pandemic has led to major disruptions in training and competitions schedules in sport across the world (BBC Sport, 2020). The altered training and competition environments that followed have caused many coaches and athletes increased levels of uncertainty, which in some cases led to early/forced transition out of sport, budget cuts, diminished prospects of contract renewals, the missing-out on major competitions/career goals, loss of fitness, confidence, and overall motivation (Mann et al., 2020; Samuel et al., 2020). Heightened ambiguity elicited by such activating events is noted to increase anxiety that often culminates in excessive and uncontrollable worry regarding future events and outcomes, which serve as major risk factors for psychological functioning and mental ill-health (Purcell et al., 2019), especially among individuals with a high IU (Borkovec, 2002).

Due to its clinical nature, findings on IU among athlete samples are scarcely reported. However, Robinson and Freeman (2015) discovered that the inhibitory dimension of IU reveals to be a significant predictor of university athletes' performance anxiety and have, consequently, advised researchers to further explore its relevance to other aspects of performance in sport. On this topic, Håkansson et al. (2021) added that the challenge in dealing with prolonged uncertainty during and

after the current COVID-19 pandemic could be a pivotal factor in addressing athletes' well-being and mental health concerns. However, the ubiquity of these concerns in sport is not limited to athletes, as findings from a recent UK Sports Coaching Workforce survey revealed that 55% of 202 participating coaches reported a previous occurrence of mental illness while 44% indicated an active experience of a mental illness at the time of enquiry (Smith et al., 2020). These findings not only suggest an imminent and inclusive need for psychological support services for coaches, but also advise a more holistic understanding of the factors that undermine mental well-being in sport.

Mental well-being is broadly regarded as one's perceived levels of happiness and pleasure (hedonic well-being) and the extent to experience optimal functioning (eudaimonic well-being) (Giles et al., 2020). Mental well-being in sport signifies the tendency to respond positively to challenges and demands through the application of adjustable coping strategies that are associated with superior performance (Nicholls et al., 2016). Prolonged periods of low mental well-being can result in poor mental health and diagnosable conditions such as depression and anxiety, which has become a pressing issue in sport in recent years (Samuel et al., 2020).

In the refinement of sport psychological support, rational emotive behaviour therapy (REBT) (Ellis, 1994) has become a progressive and promising therapeutic framework to alter sport clients' dysfunctional/irrational thought processes and emotions, which are reported to be a primary cause for performance issues and mental ill-health (Turner, 2016; Wood et al., 2019). Integrative analyses performed in a systematic mapping review of an expanding corpus of research on the use of REBT interventions in a sport context acknowledged an increase in application to promote athletes' anxiety control and performance while functionalizing their irrational beliefs (Jordana et al., 2020). Within psychology's REBT framework, irrational beliefs are rigid, extreme, and illogical views of events that are typified as a manifestation of demandingness (absolutistic/inflexible requirements), awfulizing (catastrophising), and low forbearance of frustration. The fourth characterisation of irrational beliefs is the downing (depreciation) of oneself, others and/or one's life situation (Ellis & Dryden, 2007). Meta-analytical knowledge derived from research findings that covered a period of 60 years indicated that these representations of dysfunctional cognitions promote the onset of psychopathology and are likely to stem from activating situations (Vîslă et al., 2016). This notion is corroborated by recent research in sport that confirms strong positive parallels between irrational beliefs and perceived threat in approaching competition (imagined & actual) within a sample of golfers (Chadha et al., 2019), as well as anxiety symptoms and depression in a sample of triathletes, duathletes, cyclists, and swimmers (Turner et al., 2019a). In a similar vein, Mansel's (2021)

investigation involving an international sample of individual and team sport athletes from various levels of participation revealed a positive association between self-depreciation, awfulizing, and perceived threat in anticipation of competition. Self-depreciation was also noted to predict a stress mindset and depressive symptoms, which underscore the potential bearing irrational beliefs have on athletes' mental well-being in sport (Mansel, 2021).

However, following Taylor and Brown's (1988) influential paper that alluded to the potential positive effects that irrational beliefs could have on psychological functioning, several studies in sport have since shown that distortions of reality can be useful. For example, soccer referees were found to be more resilient and confident when believing that they had superior skills and objectivity ('illusory superiority') than their colleagues (Wolfson & Neave, 2007). Findings of a controlled experimental field study that assessed the effects of rational and irrational self-talk on pressured putting performance of amateur golfers also noted a significant improvement in shot accuracy when using irrational self-talk (though not as much as rational self-talk) (Turner et al., 2018a). Given the enhancing effects of both negative and positive self-talk on one's executive functions (Kim et al., 2021), externally prompted self-talk in the referred study are not necessarily reflective of deeply held beliefs and should be interpreted with caution. Despite a linkage noted between high irrational beliefs and controlled motivation regulation and the potentially crippling influence on student athletes' mental and physical health (Turner et al., 2022), Turner and colleagues (2020) agreed that irrational beliefs can intensify athletes' drive in pursuit of performance. This notion is supported by Mesagno and colleagues' (2020) experimental study on semi-professional Australian football players, which indicated that certain irrational performance beliefs have the potential to ignite functional emotional responses that promote goal-attainment and performance in sport. Accordingly, they have suggested that such beliefs should not necessarily be concerning to sport psychology practitioners and that the interplay between cognitive distortions and mental well-being should be further explored to broaden understanding on how irrational beliefs can be safely utilised for performance without undermining mental well-being (Mesagno et al., 2020). This recommendation advances on Turner et al.'s (2019b) earlier identification of mental schemas as a potential mechanism through which irrational beliefs predict psychological distress in a sample of athletes.

In pursuit of further clarification, along with the ongoing priority status given to the mental well-being of athletes and coaches (Breslin et al., 2017), especially after the onset of COVID-19 (Håkansson et al., 2021), we seek to understand the co-occurrence of irrational performance beliefs

(iPB) and dispositional IU, and how these constructs relate to mental well-being in sport. To the investigators' knowledge, little to no research has investigated the unique interaction between iPB and IU with inference to mental well-being in sport. Findings in this regard could pave the way for a clearer understanding of how dispositional reactions towards uncertain sport situations stimulate maladaptive cognitions that induce psychopathology disorders in sport. More specifically, knowing whether and to what extent iPB and IU co-occur to predict mental well-being may offer a more multifaceted understanding of mental health risk factors that will encourage practitioners to refine/expand their application of REBT in their efforts to promote well-being and mental health in sport contexts. Hence, the current study sets out to verify the following hypotheses: (H1) iPB will be positively associated with IU, of which both these variables will be inversely (negatively) related to perceived states of mental well-being in sport. Based on IU being regarded as a transdiagnostic vulnerability factor for the onset and maintenance of different psychological disorders (Boelen & Lenferink, 2018) and precursor to challenge and threat appraisal in sport (Meijen et al., 2020), we further expect (H2) IU to account for the negative association between iPB and participants' perceived state of mental well-being. This hypothesis is also supported by recent research findings that confirm instinctive tendencies (i.e., automatic thoughts, mental schemas) to account for the influence of irrational beliefs on psychological distress in an atemporal mediation model (Buschmann et al., 2018; Turner et al., 2019b).

Materials and Methods

Participants

The study included an international sample (N = 94) of male (52.1%), female (46.8%) and gender otherwise specified (1.1%) athletes (62.77%, N = 59) and coaches (37.23%, N = 35) aged between 18 and 72 years (M age = 31.99, SD = 12.81). Inclusion criteria required participants to be an adult (18 years and older) athlete or coach returning to sport competition under certain restrictions after an unforeseen break in seasonal training and competition schedules due to governments' lockdown regulations imposed during the COVID-19 pandemic. Also, participants had to be articulate in English and not suffer from a clinically diagnosed mental disorder that would put them at risk when partaking in the study or that could influence the accuracy of their responses to the survey items.

insert Table 1 here

Design and procedures

The investigation obtained ethical approval (Ref: 26269) through Northumbria University's research ethics approval system in the Department of Psychology prior to the start of data collection. The study adopted a single timepoint, cross-sectional atemporal research design. A study participation invitation containing a link to an online Qualtrics survey was dispersed through email, WhatsApp, and other online platforms (e.g., the primary investigator's LinkedIn account and social media pages) to recruit a convenience sample of athletes and sport coaches. Participants were also requested to share the invitation with other athletes or coaches in their respective team/social networks (snowball sampling). Upon clicking on the Qualtrics generated link, the participants were presented with an information sheet that described the nature and requirements of the study, whereafter informed consent was sought to agree their voluntary participation and to gain access to the survey items. The participants were informed to leave out any items they wished not to answer and abandon the survey at any point in time should they prefer to do so. A debrief sheet containing further information about the study, the primary investigator's contact details, and instructions on how to withdraw data from the study up to the point of a formal report, as well as available support services in the event of any form of distress as a result from partaking in the study, was provided after completion of the survey.

Measures

Demographic information was requested regarding age, gender, country of residence, role (athlete or coach), level of competition (school, university, club, semi/professional), sport (team or individual), and years of experience at the involved level. This was followed by Likert scale items from the Intolerance of Uncertainty Scale, Irrational Performance Beliefs Inventory, and the Short Warwick Edinburgh Mental Well-being Scale.

The Intolerance of Uncertainty Scale (IUS; Freeston et al., 1994) is a 27-item self-report measure relating to the idea that uncertainty is stressful and upsetting, leads to the inability to act, is negative, should be avoided and is unfair. Items also focus on emotional and behavioural reactions to ambiguous situations, the consequences of uncertainty, and attempts to control future events. Item responses are rated on a 5-point Likert-scale that ranges from 1 ("Not at all characteristic of me") to 5 ("Entirely characteristic of me"). Items from the IUS are all non-reversed (e.g., "Uncertainty stops me from having a firm opinion") and can be summated into a unifactorial score ranging from 27-135 (as in the present study) with a higher score suggesting greater intolerance of uncertainty. The IUS reported exceptional internal consistency and good test-retest reliability ($\alpha = .91$; Freeston et al., 1994) that is proven to be a valid measure after a series of studies involving different population groups (Gosselin et al., 2008). Although the IUS measure has not yet been validated in athletes and

coach samples within sport, it has revealed excellent internal reliability in the current sample. Similar reliability is also reported for the IUS in a study by Robinson and Freeston (2015), which involved a sample of student-athletes.

The Irrational Performance Beliefs Inventory-2 (iPBI-2; Turner & Allen, 2018b) was utilised to measure participants' cognitive distortions in sport. The iPBI-2 consists of 20 items that are equally divided into four subscales, namely primary beliefs (e.g., "I have to be viewed favourably by people that matter to me"), low frustration tolerance (e.g., "I can't bear not getting better at what I do"), awfulizing (e.g., "It would be terrible to be dismissed by my peers"), and depreciation (e.g., "I am a loser if I do not succeed in things that matter to me"). Scores from each subscale are summed to form a composite irrational performance belief score (iPB COMP). Response items are non-reversed and are rated on a 5-point Likert scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). The iPBI-2 has demonstrated acceptable construct validity in a sample of amateur and semi-professional athletes with Cronbach alpha values ranging from .76 to .87 for the involved subscales (Turner & Allen, 2018b).

The Short Warwick Edinburgh Mental Well-being Scale (SWEMWBS; Stewart-Brown & Janmohamed, 2008) uses seven positively worded statements to describe the occurrence of thoughts and experiences related to subjective well-being and psychological functioning over the past two weeks (e.g., "I've been feeling optimistic about the future"). The SWEMWBS requires respondents to indicate their level of agreement on a Likert scale ranging from 1 ("None of the time") to 5 ("All of the time"). Responses are summed to provide a single score, with higher scores indicating more positive aspects of mental well-being/functioning. In this regard, the minimum scale score is 7 and the maximum is 35. Total scores for the 7-item version need to be converted on a metric table with converted scores of 17 or less suggesting apparent depression or anxiety; 18-20 suggesting potential depression or anxiety, 21-27 suggesting average mental well-being, and 28-35 high mental well-being (Stewart-Brown et al., 2009). The SWEMWBS has been validated as a measure of mental well-being in population-level studies (McKay & Andretta, 2017; Ringdal et al., 2018), and has revealed good levels of reliability (Cronbach alpha = 0.84) in a sport setting (Nicholls et al., 2020).

Data analyses

The data were analysed using IBM Statistical Package for The Social Sciences (SPSS) version 26. Incomplete surveys (37.33% attrition rate) were removed from the data set before the analyses. No missing values were found for the involved measures upon inspection. In accordance with conventional criteria (Tabachnick & Fidell, 2013), Boxplots (at the interquartile range rule of multiplier 2) and Z-scores (greater than ± 3.29) were used to identify outliers that were subjected to

'winsorization' (< 1%) (Tukey, 1979). Further examination of the data confirmed a normal distribution (Shapiro-Wilk values > .05) for all the study variables. The reliability (Cronbach's alpha values) of the employed measures within the included sample was computed and is included in the descriptive statistics (Table 1). Due to the novelty of research on this topic in sport, differences between coaches and athletes were evaluated in this study using independent samples *t*-test to guide us on whether to treat the participants' role in sport as a confounding variable in the subsequent analyses. Pearson correlation coefficient analyses were then performed to establish the relationship between the study variables. Guided by the analytical procedures adopted in similar research by Turner et al. (2019b), two sets of simple atemporal mediation model (SAMM) analyses ensued using Hayes's (2013) PROCESS macro v 3.5 (model 4) syntax in SPSS to examine the mediating effect of IU in the interplay between iPB and perceptions of mental well-being in sport (Fig. 1). One set included composite IU as the mediator variable between composite iPB (X) and mental well-being (Y), and one set included composite iPB as the mediator variable between composite IU (X) and mental well-being (Y). The bootstrapping function (at 5000 samples with bias-corrected confidence intervals [95 % CI]) was applied in both mediational models to approximate the statistical significance of indirect effects (Preacher & Hayes, 2008) while controlling for the role (i.e., athlete or coach) in which the participants function within sport. To ensure the adequacy of the sample size, a Monte Carlo power analyses (Schoemann et al., 2017) based on a continuously varying sample size approach that ensures a power of .8 was calculated. The recommended minimum sample size was 90 participants, which is less than the sample included in the present study. However, a posteriori/alternate Monte Carlo analyses based on the current study's set sample size of 94, confirmed power of .84 at 5000 replications with a 20000 draws per Rep, a 1234 random seed, and 95% confidence level with the entry of the standardized coefficients identified by a, b, c path analyses and the std deviations of the X, M and Y variables (as per the guidance of Schoeman et al., 2017). Moreover, our current sample size also has an excess margin of security over the minimum sample size recommended based on a GPower calculation with 4 predictors (a-path: 1, covariate: 1, b-path: 2) with a medium effect (0.15), 0.05 level of probability, and 80% power. Based on Winer and colleagues' (2016) guidance and distinctions of mediational models and analyses in clinical psychology research, it is important to note that the current methodology does not contain a temporal component and that a cause and effect is not implied, nor should the reader interpret the findings as such.

Results

The composite and respective subscale scores of the employed measures demonstrated adequate to excellent internal reliability in the current sample with Cronbach's alpha values ranging from .67 - .95. Overall, the participants reported moderately high total iPB ($M = 64.95, SD = 10.28$) and IU ($M = 68.27, SD = 118.95$) perceptions, with an average mental well-being state ($M = 24.64, SD = 5.63$, converted metric score = 21.52), that revealed to be slightly above the 20-point cut off score for poor mental well-being (Table 1). The independent samples t -test results (Table 1) identified three significant differences in the tested variables between athletes and coaches, suggesting that athletes are more likely to entertain depreciative thoughts about performances ($M = 12.76, SD = 4.53, t(92) = 2.53, p < .05, d = .53$) and react more aversively to uncertainty ($M = 71.17, SD = 20.34, t(86.5) = 2.10, p < .05, d = .45$), whereas coaches reported a more positive mental well-being state ($M = 26.17, SD = 6.16; t(92) = -2.06, p < .05, d = -.43$). The effect size for all the noted differences was found to border on Cohen's (1988) conception for a moderate effect ($d = .50$). It should be noted that the normality in the athlete and coach distributions were verified (i.e., skew < 2.0 and kurtosis < 9.0) before the mentioned analyses and the assumption of homogeneity of variance across the groups was tested of which the Levene's test for equality in variance showed no violations ($p > .05$), except for composite IU and iPB scores, which highlighted that equal variance in these scores should not be assumed. Due to the noted differences, the participants' role as a coach or athlete were controlled for in the atemporal mediation analyses.

insert Table 2 here

Pearson correlation co-efficient results (Table 2) revealed that iPB was significantly and positively related to IU and inversely related to mental well-being. In addition, a significant inverse relationship existed between IU and mental well-being. After the verification of association, mediation analyses were conducted (Table 3).

insert Table 3 here

The assumptions for a regression model were inspected before running Hayes' PROCESS mediation analyses in which inspection of scatterplots confirmed linearity between the variables (iPB, IU & mental well-being) without any incidence of multicollinearity between the predictor variables (correlations were $< .7$ & tolerance $> .1$) and no visible outliers (no std. residuals were greater than ± 3), unusual leverage (all values were $< .2$) or highly influential points (all Cook's distances < 1). The Durban-Watson statistic of 2.216 confirmed the independence of residuals. Furthermore, the data were revealed to be homoscedastic, as assessed by visual inspection of a plot of standardized residuals versus unstandardized predicted values.

Analyses of the indirect effects revealed that IU fully and significantly mediated the inverse influence of iPB on mental well-being ($\beta = -.1268$, CI: $-.2357, -.0307$) as confirmed by the Sobel test ($a\beta = -2.74$, $SE = .05$, $p < .01$) (Fig. 1: Model 1). iPB positively affected IU ($\beta = 1.15$, CI: $.8597, 1.4475$), and IU, in turn, negatively affected mental well-being ($\beta = -.11$, CI: $-.1843, -.0355$). Nevertheless, the results also suggested that the total inverse influence (ignoring the mediator IU) of iPB on mental well-being was revealed to be significant ($\beta = -.13$, CI: $-.2361, -.0174$). However, the influence of iPB on mental well-being proved to be insignificant when IU (the mediator) was accounted for ($\beta = .00$, CI: $-.1356, .1357$). For model 2, there was a significant overall inverse effect ($\beta = -.42$, CI: $-.6436, -.1986$), but no significant indirect effect emerged ($\beta = .00$, CI: $-.1778, .2044$), indicating that iPB did not significantly intercede the influence of IU on mental well-being as confirmed by the Sobel test ($a\beta = 0.06$, $SE = .09$, $p > .05$).

insert Figure 1 here*

Discussion

A growing concern is demonstrated worldwide about the mental well-being of those involved in sport, especially since the onset of the COVID-19 pandemic (Smith et al., 2020). This study set out to examine the interplay between irrational performance beliefs and the intolerance to uncertain experiences in relation to mental well-being upon the return to sport following COVID-19 disruptions. The results of the present investigation support our hypotheses, revealing a significant inverse relationship between the participants' perceived state of mental well-being and their levels of iPB and IU.

Irrational performance beliefs (iPB) inverse relation to mental well-being is not surprising seeing that cognitive behavioural frameworks (REBT in particular) posit that it is not events that directly cause emotions and behavioural reactivity, but the belief one takes about the events (Ellis, 1994). Thus, rigid, extreme, and illogical beliefs in this sense undermine mental well-being as it is considered the primary cause for psychological distress and maladaptive behaviours (Turner, 2016). In this respect, Browne et al. (2010) found that high irrational beliefs are positively linked to negative, unhealthy emotions such as anger and shame, which can predispose people to clinical conditions such as depression, anxiety, and suicidal thoughts. Specific to the context of sport, the ever-increasing training and performance demands, and evaluative nature associated with winning and losing, as well as the added challenges imposed by a global pandemic, are prime instances of

activating events that provoke irrational thinking patterns. In support of the latter concerning the resumption of sport in the current pandemic, the mean iPB and IU scores noted in this study's sample are higher, and mental well-being scores lower than that reported in a comparable sample of athletes pre-COVID-19 conditions (Robinson & Freeston, 2015; Turner & Allen, 2018b; Kuettel et al., 2021; Nicholls et al., 2020). This offers plausible reason for the moderately high iPB and associated low perceived state of mental well-being noted in the current sample. Similar reasoning can be used to explain the inverse association noted between participants' perceived state of mental well-being and level of IU. In this regard, numerous studies have identified IU as a general correlate that is present across a spectrum of psychological and emotional disorders (McEvoy & Mahoney, 2011; Carleton, 2012; Boelen & Lenferink, 2018). IU is also linked to obsessive-compulsive disorder (Sookman & Pinard, 2002) and is noted to be a strong predictor of worry, which is a central feature of generalised anxiety disorder (Dugas et al., 2007). Therefore, it is not unusual for IU to relate negatively to mental well-being within the current investigation's sample. The unprecedented disruptions, fears, anxiety, concerns, and uncertainty associated with the ongoing COVID-19 pandemic has amassed novel challenges on athletes and coaches whose goals, identities and livelihoods are shaped around their sport involvement (Mann et al., 2020; Samuel et al., 2020).

Sharing a feature with iPB, IU is also linked to psychological distress (Nekić & Mamić, 2019). Based on this commonality, it was expected that iPB would associate positively with a dispositional tendency to hold negative beliefs about uncertainty and its implications (e.g., anxiety, excessive worry, and avoidance), as was verified by the results in the current investigation. Consequently, we believe that unrealistic and distorted beliefs (i.e., absolutistic, inflexible, catastrophising) are likely to co-occur with a negative appraisal of uncertainty about performance demands/outcomes in sport environments.

Furthermore, our findings revealed that IU fully mediated the inverse relationship between iPB and participants' mental well-being in sport. This finding is noteworthy as it reveals that IU promotes iPB negative influence on mental well-being, a finding that is substantiated by recent research on the intermediary role of instinctive tendencies (i.e., automatic thoughts, mental schemas) (Buschmann et al., 2018; Turner et al., 2019b). Given the evidence on the inferior decision-making strategy and behavioural inhibition of high IU individuals in comparison to low IU (Jensen et al., 2014), the interceding role IU plays in the inverse influence of iPB on mental well-being in sport is reasonable. In this respect, the relevance of uncertainty appraisals in sport environments could be essential as athletes and coaches often sustain the mindset that what they do in sport is who they are

as a person (Reid, 2002), and ambiguity over their identity as a competent athlete or coach has severe consequences for their emotional and psychological welfare (Watson, 2011). The prevalence of IU in sport is, therefore, not an improbable occurrence and so its interceding role in the influence on the interaction between iPB and mental well-being in sport contexts should not be overlooked.

While the primary objective of REBT is to dispute and restructure clients' irrational beliefs for more rational and adaptive ways of thinking to promote healthier feelings and behaviours (Turner, 2016), our findings suggest that REBT practitioners in sport should aim for a deeper evaluation and contention of clients' tendency to experience unknown outcomes as unacceptably threatening in the co-occurrence of irrational beliefs. However, whilst the disputation and restructuring of a client's primary distorted beliefs can effectively occur in a short duration of time with the presentation of different information or healthier alternative ways of thinking, sport psychology practitioners should take heart of evidence suggesting that clients high in IU tend to be less likely to alter their thinking/decisions when presented with different information compared to low IU individuals (Jensen et al., 2014). Based on this notion along with other evidence suggesting IU as a shared factor of emotional disorders (McEvoy & Mahoney, 2011), REBT practitioners in sport might want to consider expanding disputation and rational restructuring techniques to accommodate more IU-specific protocols, such as IU awareness training and behavioural experiments. Behavioural experiments entail the identification and testing of the involved personal beliefs via related predetermined behaviours or situations (Bennett-Levy et al., 2003), and have proven to be more efficacious in the treatment of high IU in comparison to regular exposure exercises used in traditional cognitive behaviour therapy (CBT) (Raes et al., 2011). Grounded on theoretical paradigms in physiological arousal (Foa & Kozak, 1986) and inhibitory learning (Craske et al., 2014), Herbert and Dugas's (2019) proposed framework on IU-treatment strongly advocates the practicality of behavioural experiments that involve the active identification and reflection of personal beliefs in relation to objective experiences. Key advantages that these authors have highlighted about behavioural experiments are that they are active and experiential, client centred, targeted at existing uncertainty beliefs instead of anxiety or fear, facilitate the adoption of new beliefs, help clients recognise and modify instinctive tendencies to avoid uncertain situations, and encourage curiosity and creativity. Sustaining the general conception of REBT, the process of cognitive mediation elicited in behavioural experiments acts as a mechanism of change, which could alleviate clients' dispositional tendencies of ritualistic behaviour, worry and rumination (common features of IU) in the effort of promoting mental well-being in sport. In this respect, Herbert and Dugas's (2019) conclusive views from their 12-session IU-specific intervention study affirms the

efficient and effective long-term effects in treating high IU in individuals suffering from generalised anxiety disorder. In this regard, REBT practitioners could benefit from assessing and identifying their clients' idiosyncratic uncertainty beliefs in the case formulation and planning of intervention. Relapse prevention training that reviews changes to uncertainty experiences that have occurred over the course of therapy and how athletes and coaches can embed behavioural experiments as a lifestyle in and out of sport could further promote well-being and mental health efforts. This brings to light the need for the development and validation of a context-specific measure of IU to better assess ritualistic responses to uncertain events athletes, coaches, and other figures in sport environments face.

Athletes' increased engagement in depreciative thinking, adverse reaction to uncertainty, and lower level of perceived mental well-being in comparison to coaches lend credence to our recommendation for including IU-specific assessment and focus in REBT endeavours in the promotion of mental well-being and health in sport. However, these differences noted between athletes and coaches are not surprising since coaches in sport are required to act as leaders who guide, support, and develop athletes in their sporting endeavours (Weinberg & Gould, 2019). Resultingly, the responsibility that comes with coaching and the advancement of training/education and regulation standards in this profession seen over the years (Allison et al., 2016) could have taught coaches to adopt less depreciatory views about themselves and become more resilient to uncertain experiences that in effect sustain better mental well-being. The coaches in our sample were also more mature (M age = 40.56, SD = 13.48) compared to the athletes (M age = 26.97, SD = 9.35), which according to Turner and Allen (2018b) could explain the noted differences in depreciative thinking patterns. However, the findings did not confirm any significant differences between the coaches and athletes on any of the four remaining iPB subscale scores (or composite iPB score), which highlights the similarity in unhealthy beliefs adopted in sport contexts and the subsequent importance for applied psychological services in sport.

Despite our unique findings on athletes' and coaches' cognitions and state of mental well-being at the resumption of sport during COVID-19, the role IU plays in the co-occurrence of iPB in sport should not necessarily be perceived temporal to the current pandemic. Well-being and mental health in sport has been a pressing concern before the outbreak of the COVID pandemic (Gavrilova & Donohue, 2018) and similarly are elevated levels of uncertainty and distorted cognitions about performance inherent in sport (Jones et al., 2009; Turner et al., 2016). Therefore, based on our findings, recommendations on the assessment and consideration of IU-specific protocols during

REBT are applicable beyond current times not only in the endeavours to refine psychological support services, but also to promote mental well-being in sport. Nevertheless, this study is not without limitations. Perceptions and affective states fluctuate (Skinner & Brewer, 2002), which is not accounted for in a cross-sectional single time point research design. Comparable to the general population's increased feelings of functional impairment, worry, frustration and anger in response to the recent pandemic (Brooks et al., 2020; Pfefferbaum & North, 2020), athletes' and coaches' cognitions and uncertainty experiences might change as they get more accustomed to adjustments in their sporting context. Therefore, future research should adopt longitudinal designs to explore further the interaction between IU, iPB, and mental well-being in sport, especially after the gradual return to a greater semblance of normality with vaccination rollout programmes and the lifting of all COVID-19 restrictions. Although the study accounted for the active role participants adopt in the mediation analyses, gender, team vs. individual sport, level of competition/involvement, and phase in one's sport/coaching career were not controlled for in the mediation analyses due to the relatively small sample of athletes and coaches who were able to resume formal sport activities after the initial lockdown period in their respective countries. Controlling for these confounding variables could further clarify the specificity of practical and theoretical implications. Finally, our findings on the atemporal mediation analyses should not be interpreted or generalised to either athletes or coaches (although the difference in roles was controlled for as a covariate) as a combined sample of these figures were used in the analyses to present initial findings in sport on a novel concept that may pave the way for further research on key figures in sport.

Conclusion

The current study presented novel research into the interaction between IU, iPB, and mental well-being upon the return to sport after major lockdown restrictions during the COVID-19 pandemic. The findings demonstrated that the influence iPB exerts on aspects of mental well-being in sport can be explained through IU. This suggests that IU is a supportive mechanism through which iPB is related to poor mental well-being in sport, a finding that aligns well with recent research (Turner et al., 2019b), but with maladaptive schemas as a mediator rather than IU. Furthermore, the results also revealed that athletes held more depreciative thoughts about themselves and had poorer mental well-being than coaches. Overall, a significant association exists between IU and iPB that could prompt further research into the complex interaction of these novel constructs that are not dually acknowledged in distinctive branches of cognitive therapy such as in REBT. To expand on this study, longitudinal (temporal) mediational research is recommended, where a unified model of IU, iPB and mental well-being in sport is developed and examined. In this regard, the development and

validation of a context specific measure of IU in sport would be more appropriate. Furthermore, practitioners within the framework of REBT could benefit from identifying and modifying clients' instinctive perceptions and tolerance of uncertainty through the inclusion of IU-specific awareness training and behavioural experiments.

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TABLE 1: Sample demographic and sport-related characteristics

Demographic information		Coaches (N = 35)	Athletes (N = 59)
Mean age in years (SD)		40.56 (SD = 13.48)	26.97 (SD = 9.35)
Gender identification	Male	74.3%	38.6%
	Female	25.7%	60.3%
	Prefer not to say	-	1.1%
Sport involvement	Individual sport	60%	39%
	Team sport	40%	61%
Level of competition	School level	14.3%	3.4%
	University level	17.1%	35.6%
	Club	40%	32.2%
	Semi/professional level	28.6%	28.8%
Experience at the involved level	6+ years	71.4%	44.1%
	4-6 years	8.6%	8.6%
	1-3 years	20%	37.3%
Respective country	Austria	5.7%	1.7%
	Brazil	2.9%	-
	Germany	-	6.8%
	Netherlands	-	10.2%
	Northern-Ireland	-	1.7%
	Oman	2.9%	-
	Poland	-	1.7%
	South Africa	40%	3.4%
	United Arab Emirates	-	1.7%
	United Kingdom	48.6%	67.8%
	United States of America	-	3.4%

TABLE 2: Descriptive statistics, reliability, and independent t-test results

Variables	N	Min	Max	Mean	Std. Deviation	Cronbach's α	Independent <i>t</i> -test		<i>t</i> -value	df	p	
							Athletes (N = 56) <i>M</i> (<i>SD</i>)	Coaches (N = 33) <i>M</i> (<i>SD</i>)				
PIB	94	6	25	17.62	3.40	.72	17.47 (3.71)	17.88 (2.82)	-.566	92	.57	
LFT	94	8	25	18.81	3.67	.84	19.10 (3.98)	18.31 (3.07)	1.007	92	.32	
iPB	94	5	24	16.30	3.38	.67	16.27 (3.52)	16.34 (3.17)	-.099	92	.921	
DEP	94	5	25	11.91	4.34	.82	12.76 (4.53)	10.49 (3.61)	2.531	92	.01*	
Total iPB	94	45	88	64.95	10.28	.89	66.00 (11.17)	63.17 (8.42)	1.390	86.70	.17	
IU	Total IU	94	27	114	68.27	18.95	.95	71.17 (20.34)	63.37 (15.40)	2.100	86.49	.04*
MWB	Total MWB	94	13	35	24.65	5.63	.87	23.75 (5.13)	26.17 (6.16)	-2.055	92	.04*

PIB = Primary beliefs; LFT = Low frustration tolerance; AWF = Awfulizing; DEP = Depreciation; iPB = Total irrational performance beliefs; IU = Total intolerance of uncertainty; MWB= Total mental well-being

TABLE 3: Correlation between study variables

Pearson's Correlation	N = 89	iPB	IU	MWB
iPB	Coefficient	1		
	Sig. (2-tailed)			
IU	Coefficient	.64**	1	
	Sig. (2-tailed)	.00		
MWB	Coefficient	-.26**	-.39**	1
	Sig. (2-tailed)	.01	.00	

** . Correlation is significant at the 0.01 level (2-tailed).

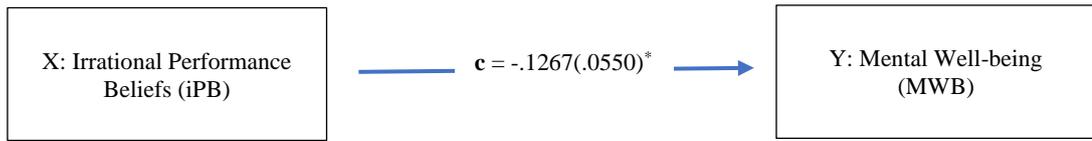
iPB = Total irrational performance beliefs; IU = Total intolerance of uncertainty; MWB = Total mental well-being

Continues...

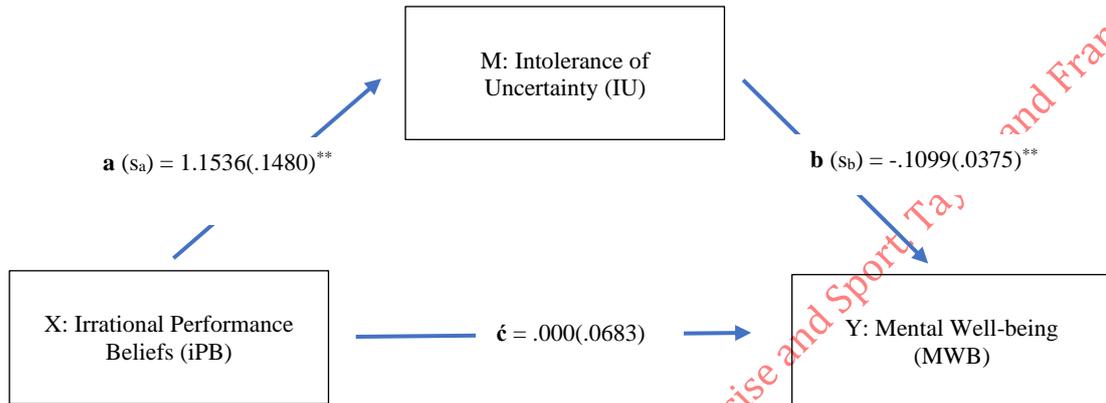
12 Mar 2022, (Accepted/In press) In: Research Quarterly for Exercise and Sport. Taylor and Francis

Model 1

Mediator not in the model / total effect

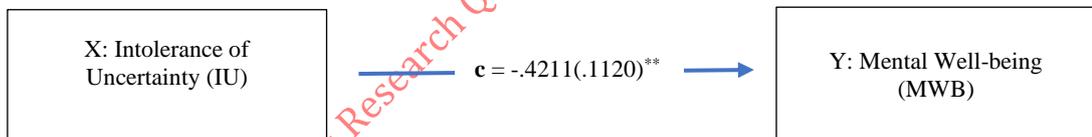


Mediator in the model / direct and indirect effect



Model 2

Mediator not in the model / total effect



Mediator in the model / direct and indirect effect

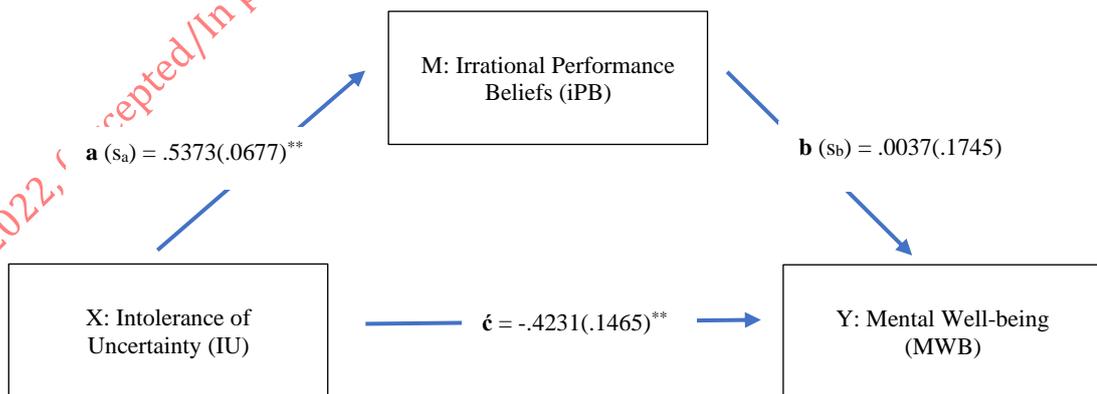


Fig. 1: Mediation diagrams for both models 1 and 2. Values not in parenthesis reflect path coefficients and values in parenthesis reflect standard error. Significance values were at * $p < .05$, ** $p \leq .001$.