


**Please cite the Published Version**

Turner, MJ , Slater, MJ, Dixon, J and Miller, A (2017) Test–retest reliability of the irrational performance beliefs inventory. *European Journal of Sport Science*, 18 (1). pp. 123-129. ISSN 1746-1391

**DOI:** <https://doi.org/10.1080/17461391.2017.1411527>

**Publisher:** Taylor & Francis

**Version:** Accepted Version

**Downloaded from:** <https://e-space.mmu.ac.uk/624594/>

**Usage rights:**  In Copyright

**Additional Information:** This is an Author Accepted Manuscript of a paper accepted for publication in *European Journal of Sport Science*, published by and copyright Taylor & Francis.

**Enquiries:**

If you have questions about this document, contact [openresearch@mmu.ac.uk](mailto:openresearch@mmu.ac.uk). Please include the URL of the record in e-space. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from <https://www.mmu.ac.uk/library/using-the-library/policies-and-guidelines>)

Test-retest reliability of the irrational performance beliefs inventory (iPBI).

Resubmitted: 8<sup>th</sup> August 2017

2<sup>nd</sup> Resubmitted: 13<sup>th</sup> October 2017

Turner, M. J\*, Slater, M. J., Dixon, J., & Miller, A.

Centre for Sport, Health and Exercise Research, Staffordshire University

\*corresponding author: B180, Brindley Building, Leek Road, Staffordshire University, Stoke  
on Trent, ST4 2DF, 01782294295, [m.turner@staffs.ac.uk](mailto:m.turner@staffs.ac.uk)

## Abstract

The irrational performance beliefs inventory (iPBI) was developed to measure irrational beliefs within performance domains such as sport, academia, business, and the military. Past research indicates that the iPBI has good construct, concurrent, and predictive validity, but the test-retest reliability of the iPBI has not yet been examined. Therefore, in the present study the iPBI was administered to university sport and exercise students ( $n = 160$ ) and academy soccer athletes ( $n = 75$ ) at three time points. Time point two occurred seven days after time point one, and time point three occurred twenty-one days after time point two. In addition, social desirability was also measured. Repeated-measures MANCOVAs, intra-class coefficients, and Pearson ( $r$ ) correlations demonstrate that the iPBI has good test-retest reliability, with iPBI scores remaining stable across the three time points. Pearson's correlation coefficients revealed no relationships between the iPBI and social desirability, indicating that the iPBI is not highly susceptible to response bias. The results are discussed with reference to the continued usage and development of the iPBI, and future research recommendations relating to the investigation of irrational performance beliefs are proposed.

Keywords: REBT; irrational beliefs; reliability; performance; response bias

1           Test-retest reliability of the irrational performance beliefs inventory (iPBI).

2   Recent growth in the reported application of rational emotive behaviour therapy (REBT) in  
3   performance domains such as sport (Turner & Barker, 2014) and business (Turner & Barker,  
4   2015) has highlighted the need for a performance-specific measure of irrational beliefs.

5   Recent recommendations assert that new measures should consider situational perceptions in  
6   assessing psychological constructs (Ziegler & Horstmann, 2015) and therefore the irrational  
7   performance beliefs inventory (iPBI; Turner et al., 2016), the first measure of irrational  
8   beliefs within performance domains, was developed and validated. The iPBI was developed  
9   as a brief (28-item) psychometric for use in performance domains such as sport, academia,  
10   business, and the military. Guided by recommendations for the development of irrational  
11   beliefs measures (Terjesen, Salhany, & Sciutto, 2009), and building on extant psychometrics,  
12   the iPBI reflects current manifestations of REBT theory and measures only beliefs, not  
13   emotional and or behavioural outcomes.

14           Consistent with contemporary REBT theory (e.g., Dryden, 2015), the iPBI measures  
15   the four core irrational beliefs with 7-items measuring primary beliefs (PIB), low-frustration  
16   tolerance (LFT), awfulizing (AWF), and depreciation (DEP). This is important because  
17   dysfunctional emotions (e.g., immobilizing emotions such as anxiety) and associated  
18   maladaptive behaviours (e.g., withdrawal) stem from irrational beliefs (e.g., Browne, Dowd,  
19   & Freeman, 2010; Szentagotai & Jones, 2010). Therefore, the ability to accurately measure  
20   irrational beliefs can help to identify risk factors for dysfunctional emotions and maladaptive  
21   behaviours, and assess REBT effectiveness in clients. The goal of REBT is to reduce  
22   irrational beliefs in favour of rational beliefs, and therefore the iPBI needs to be sensitive to  
23   detect changes, while also being reliable enough to mark stability in irrational beliefs. In  
24   research examining the use of REBT in sport, the Shortened General Attitudes and Beliefs  
25   Scale (SGABS; Lindner, Kirkby, Wertheim, & Birch, 1999) has typically been used to

1 measure irrational beliefs. However, the SGABS is limited because limited because it does  
2 not represent current manifestations of REBT, and specifically, does not produce results for  
3 the four core irrational beliefs. In addition, the SGABS is not context-specific, and therefore  
4 the rationale for developing the iPBI was driven by the need to more accurately assess the  
5 four core irrational beliefs in performance domains such as sport, academia, business, and the  
6 military (Turner et al., 2016).

7 Initial development and validation data for the iPBI (Turner et al., 2016) indicates  
8 construct, concurrent and predictive validity, however this primary data did not indicate test-  
9 retest reliability. Some consider test-retest reliability to be the most important type of  
10 reliability when considering the use of a test as an outcome measure (Law, 2004). Test-retest  
11 reliability indicates the reproducibility of the measure, and its ability to provide consistent  
12 scores over time in a stable population (Aaronson et al., 2002). A valid and reliable measure  
13 of irrational beliefs should demonstrate that scores remain stable over time, unless REBT has  
14 been applied, in which case scores should significantly decrease post-intervention. This is  
15 important because much of the research applying REBT interventions in sport adopts single-  
16 case designs (e.g., Barker, McCarthy, Jones, & Moran, 2011), where outcomes are measured  
17 repeatedly throughout baseline and intervention period, thus psychometrics need to be  
18 reliable on repeated assessment.

19 Further, the performance domain sampled in the initial validation of the iPBI included  
20 only occupational workers, and did not include academic and or athletic participants (Turner  
21 et al., 2016). It is important to progressively validate the iPBI in all of the intended  
22 performance domains to ensure that it is a reliable indicator of irrational performance beliefs  
23 across multiple performance domains. Two performance domains for which the iPBI was  
24 initially developed are academia and sport, and the authors were able to sample United  
25 Kingdom (U.K.) academy soccer athletes and U. K. university students for the current study.

Recent research has indicated that irrational beliefs positively predict increases in burnout in athletes over a season (Turner & Moore, 2016), and are positively related to negative affect, and negatively related to positive affect in university students (Allen, El-Cheikha, & Turner, 2017). As such, testing the reliability of the iPBI in athlete and student samples is important in order to ensure contextual sensitivity of the recently developed measure. Therefore in the current study the test-retest reliability of the iPBI is examined in separate sport (soccer athletes) and academic (university students) samples, two of the performance domains for which the iPBI was designed. To be clear, we examine the test-retest reliability of the iPBI in two separate performance domains, namely an academy soccer athlete sample, and an academic student sample. The two samples are treated separately in the analyses in the current paper, but for brevity we show findings for both samples in the reporting the results.

The chief aim of the present study is to examine the test-retest reliability of the iPBI across three time points within a single calendar month, advancing the test-retest irrational beliefs research, where two time points just days apart is a more typical protocol (e.g., Lindner et al., 1999). The secondary aim of the current study is to explore the social desirability of irrational beliefs. Social desirability is a key concern when considering the validity of scores produced via self-report psychometrics, which are inherently open to response bias (van de Mortel, 2008), and therefore affects the validity of a questionnaire (Huang, Liao, & Chang, 1998).

## Method

### Participants

Participants were university students enrolled on a sport and exercise science course ( $n = 160$ ,  $M_{age} = 20.79$ ;  $SD = 3.70$ ; first year of study = 119 students; second year of study = 41 students; female = 33; male = 78;  $n = 49$  participants did not indicate their sex) and academy soccer athletes ( $n = 75$ ;  $M_{age} = 15.92$ ;  $SD = 1.74$ ; female = 33; male = 42). Students

were recruited from the sport and exercise department at a university in the U.K. Data were collected using convenience sampling, whereby students were accessed through a university lecturer who distributed the questionnaires on three separate occasions to their sport and exercise students. In their studies, students had not learned about irrational beliefs, or REBT. Academy soccer athletes were recruited from a Premier League Category 1 U.K. mens soccer academy, and from a U.K. womens Tier 2 Premier League regional talent club. For soccer athlete data, the clubs' sport psychologist distributed the questionnaires on three separate occasions. These samples were targeted because participants are required to perform on a regular basis, whether it is in exams and assessments (students), or competitive sport (soccer athletes), and the iPBI was developed to assess irrational beliefs within these performance domains. Ethical approval was granted by the university, and all participants completed informed and or minor (soccer athletes only) assent prior to any data collection. All data were collected using pen and paper questionnaires, within environments the participants were familiar with. That is, soccer athletes completed the questionnaires in a meeting room at the football club, while students completed the questionnaires in a lecture theatre.

## Measures

**Irrational performance beliefs.** To assess the presence of irrational beliefs, participants completed the iPBI (Turner et al., 2016). The questionnaire is designed for usage in performance domains (such as sport or academia) and consists of 28-items, seven-items for each of its four subscales (PIB, LFT, AWF, and DEP). Scores from each subscale are summed to form a composite irrational performance beliefs score (COMP). Responses are made on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The iPBI has been shown to have good criterion, construct, and concurrent validity (Turner et al., 2016). For the current sample at first completion ( $N = 225$ ), Cronbach's  $\alpha$  were PIB = .63, LFT = .76, AWF = .76, DEP = .84, COMP = .87. Therefore, subscales demonstrated

1 acceptable to good internal consistency (Loewenthal, 2004). Further, data from all first  
2 completions showed that Mean subscale scores ( $MPIB = 24.61, SD = 2.69$ ;  $MLFT = 26.99,$   
3  $SD = 2.99$ ;  $MAWF = 22.83, SD = 3.42$ ;  $MDEP = 17.17, SD = 4.49$ ) were comparable to  
4 previous norms (Turner et al., 2016).

5       **Social desirability.** The brief social desirability scale (BSDS; Haghighat, 2007) was  
6 developed as a short social desirability scale for brevity and practicality, and has four  
7 questions. The BSDS was selected in the current study due to its usage in recent sport  
8 research (e.g., Kavussanua, Hatzigeorgiadisb, Elbec, & Ring, 2016). Participants were asked  
9 to respond to the four questions with a “yes” or a “no,” and a score of 1 was allocated to  
10 “yes” answers, and a score of 0 for “no” answers. Item four is reverse scored, because “no” is  
11 deemed to be the socially desirable answer. The BSDS is valid and reliable (Cronbach’s  $\alpha =$   
12 .60) and free from gender specificity.

### 13 **Procedures**

14       Participants completed questionnaires at three time points. The development of  
15 similar measures (e.g., SGABS; Lindner et al., 1999) has deemed test-retest reliability across  
16 two time points sufficient to make recall of previous answers more difficult. Guidelines  
17 suggest that test-retest validity should be assessed at least several days following first  
18 completion (Law, 2004). The current study employed a more robust method by making the  
19 duration between time points longer, including a third time point to assess more long-term  
20 test-retest reliability, and by recruiting a larger sample. Specifically, 107 participants  
21 completed all three time points ( $n_{students} = 52$ ;  $n_{athletes} = 55$ ). This number of participants  
22 is in line with some previous test-retest research for irrational beliefs measures (e.g., Lindner  
23 et al., 1999;  $n = 90$ ), and higher than recommended in guidelines, which advocates at least 30  
24 participants (Law, 2004). In addition, for a medium effect size ( $\eta^2 = .059$ ) to be detected  
25 using repeated measures analyses with sufficient power (.80), a sample size of  $n = 30$  was



required for each of the two samples (Clark-Carter, 2010). At time point 1, after indicating consent, participants completed the iPBI, the BSDS, and provided demographic information. Seven days after time point 1, time point 2 occurred, where participants completed the iPBI only. Time point 3 occurred 21 days after time point 2, and participants completed the iPBI for the final time, and received a full debrief as to the aims of the study.

### **Analytic Strategy**

Prior to main data analyses, data underwent missing values analyses and were screened for outliers. Missing data analyses showed that data were missing completely at random (MCAR) for AWF,  $\chi^2(6) = 7.24, p = .30$ , and DEP,  $\chi^2(27) = 33.42, p = .18$ , at time point 1 only. Therefore, the expectation maximization (EM) technique was conducted to replace missing values in these data. To identify outliers, Shapiro Wilks tests were performed, and  $z$  scores inspected. Significant outliers with a  $z$  score of 2SDs were windzorized (Smith, 2011).

For main data analyses, the two samples (students and soccer athletes) were treated separately. Main data analyses were conducted in three stages. First, two repeated-measures MANCOVAs (one test for students, one test for soccer athletes) were performed, with age as the covariate, to examine changes in each iPBI subscale (PIB, LFT, AWF, DEP, and COMP) across the three time points. Age was included as a covariate because past research indicates a negative linear association between irrational beliefs and age (e.g., Turner et al., 2016). It was important to analyze the soccer athlete and student samples separately in this instance in order to distinguish changes over time for each participant group. Second, intra-class coefficients (ICC) and Pearson's correlation coefficients were calculated to examine the consistency of irrational beliefs scores across time points (e.g., Law, 2004).

Finally, two separate correlation analyses were performed for all first completions of the iPBI, one for the student data ( $n = 160$ ) and one for the soccer athlete data ( $n = 75$ ), to explore the relationships between irrational beliefs and social desirability.

## Results

### Changes in irrational beliefs across the three time points.

For soccer athlete data, the repeated measures MANCOVA revealed no effect for time, Wilk's  $\lambda = .77$ ,  $F(9,34) 1.15$ ,  $p > .05$ ,  $\eta^2 = .23$ . For student data, repeated measures MANCOVA revealed no effect for time, Wilk's  $\lambda = .91$ ,  $F(9,35) .39$ ,  $p > .05$ ,  $\eta^2 = .09$ . Further, follow-up univariate analyses revealed no significant effects ( $p > .05$ ) for time in any of the variables across the soccer athlete or student samples (Table 1). The removal of age as a covariate did not change the direction or non-significance of results. Inspection of the means demonstrates a consistency in scores in all iPBI variables across time points 1, 2, and 3. ICC results (Table 1) and Pearson's correlation co-efficients (Table 2) for soccer athlete and student data revealed strong agreement across time points for all irrational performance beliefs variables.

### Relationships between irrational beliefs and social desirability.

Pearson's correlation coefficients (Table 3) conducted for each of the samples revealed no significant associations between social desirability and the iPBI subscales.

## Discussion

The current study had two main aims. First, the test-retest reliability of the iPBI was tested across three-time points in two separate samples that reflected the performance domains of academia (students) and sport (soccer athletes). Second, the relationship between iPBI scores and social desirability was examined, because social desirability can affect the validity of a questionnaire (Huang et al., 1998). Results indicate that the iPBI demonstrates good test-retest validity in both samples. Inferential statistics indicate that the four iPBI subscales, and

the composite scores, remained stable across the three time points in both soccer athlete and student samples. This is important because a reliable psychometric should provide consistent scores over time in a stable population (Aaronson et al., 2002). Further, iPBI scores were not related to social desirability scores. This study contributes significantly to the extant literature in several ways. First, this is the first study to examine the test-retest reliability of the iPBI. The finding that the iPBI is reliable on repeated administration across two separate samples and unrelated to social desirability, alongside past findings that the iPBI has construct, concurrent and predictive validity (Turner et al., 2016), establishes the iPBI as a sound measure of irrational performance beliefs. Second, to build on Turner et al's (2016) initial iPBI research, which recruited an occupational sample, the current study included both student and soccer athlete samples. This is important because the iPBI was developed for use across different performance domains, and therefore should be tested within various performance samples including sport and academia. Further, the demonstration of test-retest reliability of the iPBI in two separate samples enhances in the findings.

The main finding of the current paper that the iPBI demonstrates good test-retest reliability has implications for the use of the iPBI and the investigation of irrational beliefs and REBT in performance domains. Support for the test-retest reliability, alongside past research evidencing construct, concurrent, and predictive validity (Turner et al., 2016), of the iPBI means that researchers and practitioners can be more confident in using the iPBI to measure irrational performance beliefs. That is, administrators of the iPBI can be more certain that the iPBI is a valid and reliable measure that not only measures what it proposes to measure, but can also be used as part of an ongoing, repeated-measures, assessment of irrational beliefs. This is particularly valuable in sport and exercise psychology where single-case designs, with repeated markers of the dependent variables collected, are being used more prominently (e.g., Barker et al., 2011), thus requiring psychometrics that are reliable on

1 repeated assessment. Past research (e.g., Turner & Barker, 2013; 2015) shows that general  
2 irrational beliefs (using the SGABS; Lindner et al., 1999) can decrease at the onset of REBT  
3 in performance domains, and can return to baseline or remain stable depending on the  
4 number of REBT sessions provided to participants. This research could be strengthened with  
5 the use of a contextually valid measure of irrational performance beliefs such as the iPBI, and  
6 therefore the further development and validation of the iPBI is paramount.

7         Addressing the limitations of the current study would further and more rigorously  
8 assess the reliability of the iPBI. First, a broader range of athletes could be recruited across  
9 various sports and age groups. Indeed, research that has examined REBT in sport has mainly  
10 focussed on football and cricket, but there is a need to broaden the athlete sample base to gain  
11 a broader understanding of irrational beliefs, and the use of the iPBI in, for example,  
12 individual and team sports. Also, in relation to recruiting student samples, future research  
13 should address the large attrition in participants reported in the current study over the three  
14 time points. The nature of collecting data from students in an academic domain means that  
15 retaining all participants for repeated measures research is difficult. In the current study, we  
16 ensured that each time point happened at the same time in the day, which meant that if  
17 students were absent that day at that time, we could not record their data. Future research  
18 may consider using online survey tools to mitigate attrition, but researchers should be careful  
19 to ensure data is collected at consistent times for each time point. Future research should also  
20 collect data across multiple universities to broaden the student sample beyond a single  
21 institution, as this may benefit the generalizability of the findings. Second, given that the  
22 initial development and validation of the iPBI was conducted with an occupational sample, a  
23 test-retest assessment should take place within that sample too. Since the iPBI was developed  
24 for use across various performance domains, it is important to validate the measure across  
25 those settings (e.g., sport, business, military, and academia). It should be recognized that the

current study includes soccer athlete and student populations only. Third, because the iPBI is a new measure, additional CFA analyses should be conducted across different samples. In the current, CFA could have revealed challenges to the four-factor structure of the iPBI, and researchers should recruit sufficient samples ( $n > 200$ ; Myers, Ahn, & Jin, 2011) in order to confirm the four-factor structure of the iPBI. Finally, to understand how the iPBI scores react to REBT, a repeated-measures intervention design should be conducted. The current study shows that iPBI scores remain stable in a non-intervention situation, but it is not yet fully known how the iPBI reacts to REBT (e.g., Deen, Turner, & Wong, 2017) and whether and to what extent reductions in irrational beliefs, as expected, would occur.

In sum, results from this study demonstrate test-retest reliability of the iPBI in separate soccer athlete and student samples. This is the first study to assess the test-retest reliability of the iPBI, and builds on past research showing that the iPBI has good construct, concurrent, and predictive validity (Turner et al., 2016). Social desirability scores were not related to iPBI scores, suggesting that the iPBI is not highly susceptible to response bias.

### References

- Aaronson, N., Alonso, J., Burnam, A., Lohr, K. N., Patrick, D. L., Perrin, E., & Stein R. E. (2002). Assessing health status and quality-of-life instruments: attributes and review criteria. *Quality of Life Research*, 11, (3), 193–205. doi: 10.1023/A:1015291021312
- Allen, M. S., El-Cheikha, S. E., & Turner, M. J. (2017). A longitudinal investigation of irrational beliefs, hedonic balance and academic achievement. *Learning and Individual Differences*, 58, 41-45. <https://doi.org/10.1016/j.lindif.2017.07.003>.
- Browne, C. M., Dowd, E. T., & Freeman, A. (2010). Rational and irrational beliefs and psychopathology. In D. David, S. J. Lynn, & A. Ellis, A. (Eds.), *Rational and irrational beliefs in human functioning and disturbances: Implications for research, theory, and practice*. New York, NY: Oxford University Press.

- 1 Clark-Carter, D. (2010) *Quantitative Psychological research: The complete student's*  
2 *companion*. Hove: Psychology Press.
- 3 Deen, S., Turner, M. J., & Wong, R. (2017). The effects of REBT and credos on irrational  
4 beliefs and resilient qualities in athletes, *The Sport Psychologist*, 31, 249-263
- 5 Haghighat, R. (2007). The development of the brief social desirability scale (BSDS).  
6 *Europe's Journal of Psychology*, 3, (4).
- 7 Huang, C., Liao, H., & Chang, S. (1998). Social desirability and the Clinical Self-Report  
8 Inventory: methodological reconsideration. *Journal of Clinical Psychology*, 54, (4),  
9 517-528.
- 10 Kavussanu, M., Hatzigeorgiadis, A., Elbe, A. M., & Ring, C. (2016). The moral  
11 disengagement in doping scale. *Psychology of Sport and Exercise*, 24, 188-198.
- 12 Law, M. (2004). *Outcome measures rating form guidelines*. CanChild Centre for Childhood  
13 Disability Research, McMaster University, Hamilton, Canada.
- 14 Loewenthal, K. M. (2004). *An introduction to psychological tests and scales* (2<sup>nd</sup> ed.). Hove,  
15 UK: Psychology Press.
- 16 Lindner, H., Kirkby, R., Wertheim, E., & Birch, P. (1999). A brief assessment of irrational  
17 thinking: The shortened general attitude and belief scale. *Cognitive Therapy and*  
18 *Research*, 23, 651-663.
- 19 Myers, N. D., Ahn, S., & Jin, Y. (2011). Sample size and power estimates for a  
20 confirmatory factor analytic model in exercise and sport: A Monte Carlo approach.  
21 *Research Quarterly for Exercise and Sport*, 82, (3), 412-423.
- 22 Schill, T., Monroe, S., Evans, R., & Ramanaiah, N. (1978). The effects of self-verbalizations  
23 on performance: A test of the rational-emotive position. *Psychotherapy: Theory,*  
24 *Research, Practice, Training*, 15, (1), 2-7.

- 1 Smith, M. (2011). *Research methods in accounting* (2<sup>nd</sup> ed.). London: SAGE Publications  
2 Ltd.
- 3 Szentagotai, A., & Jones, J. (2010). The behavioral consequences of irrational beliefs. In D.  
4 David, S. J. Lynn & A. Ellis (Eds.), *Rational and irrational beliefs in human*  
5 *functioning and disturbances* (pp. 75-97). Oxford: Oxford University Press.
- 6 Terjesen, M. D., Salhany, J., & Sciutto, M. J. (2009). A psychometric review of measures of  
7 irrational beliefs: Implications for psychotherapy. *Journal of Rational-Emotive and*  
8 *Cognitive-Behavior Therapy*, 27, 83-96.
- 9 Turner, M. J., & Barker, J. B. (2014). Using Rational Emotive Behavior Therapy with  
10 athletes. *The Sport Psychologist*, 28, (1), 75-90.
- 11 Turner, M. J., & Barker, J. B. (2015). Examining the effects of rational emotive behavior  
12 therapy (REBT) on the irrational beliefs of blue-chip professionals. *Journal of*  
13 *Rational-Emotive & Cognitive-Behavior Therapy*, 33(1), 17-36.
- 14 Turner, M. J., Allen, M., Slater, M. J., Barker, J. B., Woodcock, C., Harwood, C. G., &  
15 McFadyen, K. (2016). The development and initial validation of the irrational  
16 performance beliefs inventory (iPBI). *European Journal of Psychological Assessment*,  
17 Online ahead of print. doi: 10.1027/1015-5759/a000314
- 18 Turner, M. J., & Moore, M. (2016). Irrational beliefs predict increased emotional and  
19 physical exhaustion in Gaelic football athletes. *International Journal of Sport*  
20 *Psychology*. 47, (2), 187-199.
- 21 van de Mortel, T. F. (2008). Faking it: Social desirability response bias in self-report  
22 research. *Australian Journal of Advanced Nursing*, 25, (4), 40-48.
- 23 Ziegler, M., & Horstmann, K. (2015). Discovering the second side of the coin Integrating  
24 situational perception into psychological assessment. *European Journal of*  
25 *Psychological Assessment*, 31, 69-74.

Table 1.

*Repeated-measures Univariate ANCOVA, intra-class coefficients, Means  $\pm$  SD for soccer athlete and student data across the three data collection timepoints.*

Variables	Time 1	Athlete Data			$\eta^2$	Intra-class coefficients		
		Means $\pm$ SD Time 2 (7days)	Time 3 (30days)	ANCOVA F (df)		F (df)	ICC	95% CI
PIB	24.39 $\pm$ 2.87	23.78 $\pm$ 2.73	23.25 $\pm$ 2.55	$F(2,84) = .49$	.01	$F(54,108) = 7.21^*$	.85	.86-.91
LFT	26.82 $\pm$ 3.17	25.88 $\pm$ 3.46	25.78 $\pm$ 3.99	$F(2,84) = .15$	.01	$F(49,98) = 8.46^*$	.85	.80-.93
AWF	22.33 $\pm$ 3.61	22.22 $\pm$ 3.30	21.53 $\pm$ 3.05	$F(2,84) = 2.35$	.05	$F(50,100) = 8.46^*$	.88	.81-.93
DEP	16.75 $\pm$ 3.52	17.00 $\pm$ 3.22	17.75 $\pm$ 3.42	$F(2,84) = 2.50$	.06	$F(50,100) = 7.35^*$	.86	.77-.91
COMP	22.47 $\pm$ 2.70	21.99 $\pm$ 2.64	22.05 $\pm$ 2.28	$F(2,84) = 1.70$	.04	$F(43,86) = 12.27^*$	.92	.86-.95

Variables	Time 1	Student Data			$\eta^2$	Intra-class coefficients		
		Means $\pm$ SD Time 2 (7days)	Time 3 (30days)	ANCOVA F (df)		F (df)	ICC	95% CI
PIB	24.63 $\pm$ 3.23	24.23 $\pm$ 3.95	24.31 $\pm$ 3.13	$F(2,100) = .29$	.01	$F(51,102) = 8.75^*$	.89	.82-.93
LFT	27.07 $\pm$ 3.40	26.20 $\pm$ 3.69	26.02 $\pm$ 4.41	$F(2,98) = .60$	.01	$F(50,100) = 4.65^*$	.78	.65-.87
AWF	22.07 $\pm$ 4.01	22.15 $\pm$ 4.02	22.08 $\pm$ 3.94	$F(2,92) = .18$	.01	$F(47,94) = 7.17^*$	.86	.78-.92
DEP	17.11 $\pm$ 5.36	16.62 $\pm$ 5.45	17.79 $\pm$ 4.68	$F(2,100) = .13$	.01	$F(51,102) = 7.95^*$	.87	.80-.92
COMP	22.76 $\pm$ 3.00	22.33 $\pm$ 3.69	22.40 $\pm$ 3.35	$F(2,86) = .02$	<.01	$F(44,88) = 9.78^*$	.90	.83-.94

Note. \* $p < .001$



Table 2.

*Pearson's correlation coefficients (r) for each iPBI subscale for soccer athlete and student data across the three timepoints (all  $p < .001$ ).*

Variables	PIB Time 2	PIB Time 3	LFT Time 2	LFT Time 3	AWF Time 2	AWF Time 3	DEP Time 2	DEP Time 3
Athlete Data								
PIB Time 1	.68	.59						
PIB Time 2		.51						
LFT Time 1			.66	.72				
LFT Time 2				.75				
AWF Time 1					.73	.64		
AWF Time 2						.71		
DEP Time 1							.70	.57
DEP Time 2								.76
Variables	Student Data							
PIB Time 1	.77	.63						
PIB Time 2		.67						
LFT Time 1			.62	.45				
LFT Time 2				.51				
AWF Time 1					.69	.67		
AWF Time 2						.64		
DEP Time 1							.71	.62
DEP Time 2								.68

Table 3.

*Pearson's correlation coefficients (r) for irrational performance beliefs, perceived helpfulness of beliefs and social desirability, for the first completion of all measures in the soccer athlete sample and the student sample.*

Variables	Athlete Sample						Student Sample					
	1	2	3	4	5	6	1	2	3	4	5	6
1. PIB	-	.44**	.57**	.31**	.73**	.01	-	.39**	.69**	.18*	.70**	.03
2. LFT		-	.40**	.34**	.72**	.10		-	.39**	.28**	.66**	.05
3. AWF			-	.37**	.79**	.06			-	.44**	.83**	-.01
4. DEP				-	.70**	-.10				-	.75**	-.01
5. COMP					-	.06					-	.03
6. Social desirability						-						-

*Note.* \* $p < .05$ , \*\* $p < .01$