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11   Psychological distress across sport participation groups: The mediating effects of secondary

12   irrational beliefs on the relationship between primary irrational beliefs and symptoms of

13   anxiety, anger, and depression.

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1   Abstract

2   It is not fully understood to what extent cognitive mediators are involved in the transaction

3   between contextual factors and athlete mental health. Rational emotive behaviour therapy

4   (REBT) holds that primary irrational beliefs lead to psychological distress through secondary

5   irrational beliefs. Therefore this study examined the mediational effects of primary and

6   secondary irrational beliefs on psychological distress across three sport participation groups;

7   non-sport participants, recreational sport participants, and elite athletes. This study also

8   examined the differences in irrational beliefs and psychological distress between individual

9   and team sport participants, between females and males, and across the three sport

10   participation groups. Data revealed that secondary irrational beliefs mediated the

11   relationships between primary irrational beliefs and psychological distress. Between-groups

12   analyses revealed that elite athletes demonstrated smallest depreciation irrational beliefs, and

13   elite female athletes reported greater depression symptoms than elite male athletes. The

14   implications of the findings for research and applied work are discussed.

15   *Keywords*: mental health; well-being; appraisal; anxiety, anger

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1   Psychological Distress Across Sport Participation Groups: The Mediating Effects Of

2   Secondary Irrational Beliefs On The Relationship Between Primary Irrational Beliefs And

3   Symptoms Of Anxiety, Anger, And Depression.

4   The mental health and psychological well-being of athletes has been brought into

5   focus recently, both in the media and in research. A recent *Frontiers in Psychology* special

6   issue (MacIntyre, Van Raalte, Brewer, Jones, O'Shea, & McCarthy, 2016) brought the current

7   understanding of athlete mental health to the fore. Also, Olympic swimmer Michael Jamieson

8   has spoken openly about his experiences of depression that contributed to his retirement,

9   stating that he was being "far too analytical of my performances, expecting far too much of

10   myself on a day-to-day basis in training" ("Michael Jamieson: Depression Goes

11   Unrecognized in Elite Sport," 2017). Some authors (Hughes & Leavey, 2012) posit that

12   athletes are at greater risk of mental illness due to the contextual demands of sport such as the

13   requirement for high effort, great investment of time, and high exertion of energy, leading to

14   loss of autonomy and disempowerment, which are symptomatic of burnout that is strongly

15   correlate with affective disorders such as depression (Creswell & Eklund, 2007).

16   Recently researchers have suggested that athletes may be vulnerable to depressive

17   symptoms (dysphoria), due to the stressful nature of being an athlete (Frank, Nixdorf, &

18   Beckmann, 2015). Indeed, past research has indicated that contextual factors can increase the

19   risk of depression, such as injuries, overtraining, excessive stress, competitive failure, and

20   aging (e.g., Nixdorf, Frank, & Beckmann, 2016; Reardon & Factor, 2010), tournament

21   frequency, important tournaments, and chronic stress (Nixdorf, Frank, & Beckmann, 2015).

22   In addition, researchers have found that athletes competing in individual sports, compared to

23   team sports, report higher symptoms of depression (Nixdorf et al., 2016) and that female

24   athletes report greater prevalence of depressive symptoms than male athletes (Schaal et al.,

25   2011; Storch, Storch, Killiany, & Roberti, 2005; Wolanin, Hong, Marks, Panchoo, & Gross,

1   2016). Further, those engaged in sport report lower levels of depressive symptoms than those

2   not engaged in sport (Armstrong & Oomen-Early, 2007; Uglesic et al., 2014). Therefore,

3   demographic factors appear to be important in the study of athlete mental health.

4   However, when viewed through a cognitive-behavioural lens, it is not yet fully

5   understood whether and to what extent cognitive mediators are involved in the transaction

6   between contextual factors and athlete mental health. Given the importance of mental health

7   in athletes, and the recent call to action within the sport psychology domain (MacIntyre et al.,

8   2016), the present study seeks to advance the knowledge base concerning the antecedents of

9   psychological distress in athletes. Psychological distress is negatively related to mental

10   health (Payton, 2009) and has been defined as a state of emotional suffering characterized by

11   symptoms of depression and anxiety (Mirowsky & Ross, 2002). In the current study separate

12   markers of anxiety, depression, and anger, are used indicate psychological distress.

13   One cognitive-behavioural approach that is receiving growing attention in sport and

14   exercise literature (see Turner, 2016 for a review) is rational emotive behaviour therapy

15   (REBT; Ellis, 1957). REBT was the first cognitive-behavioural theory (CBT) and posits that

16   it is not events that directly cause psychological distress; rather it is one's beliefs about the

17   events that lead to emotional and behavioral reactivity. REBT is distinguished from other

18   CBT approaches by placing irrational and rational beliefs at its core. In REBT rational beliefs

19   (flexible, non-extreme, and logical) lead to psychological health, whereas irrational beliefs

20   (rigid, extreme, and illogical) lead to psychological distress. There are four types of rational

21   and irrational beliefs. Rational beliefs comprise a primary rational belief (preferences) and

22   three secondary beliefs (anti-awfulizing, high frustration tolerance; HFT, and self/other

23   acceptance). Irrational beliefs comprise a primary irrational belief (demandingness; PIB) and

24   three secondary beliefs (awfulizing; AWF, low frustration tolerance; LFT, and self/other

25   depreciation; DEP).

1   Research investigating REBT within sport has focused on the application of REBT

2   with a range of athletes, using group and one-to-one intervention methods (e.g., Cunningham

3   & Turner, 2016; Deen, Turner, & Wong, 2017; Turner & Barker, 2013; Turner, Slater, &

4   Barker, 2015; Wood, Barker, & Turner, 2016). Results from the extant literature support the

5   application of REBT with athletes to reduce irrational beliefs and anxiety, and increase

6   rational beliefs, resilient qualities, and performance. However, research is yet to examine the

7   prevalence of irrational beliefs in athletes compared to non-athletes and to fully explore the

8   relationships between irrational beliefs and psychological distress. In fact, just one study has

9   examined the relationships between irrational beliefs and athlete psychological well-being,

10   finding that irrational beliefs were positively related to increased physical and emotional

11   exhaustion of Gaelic Football athletes over an in-season eight-week period (Turner & Moore,

12   2016). In contrast, the relationship between irrational beliefs and psychological distress (and

13   mental illness) is much explored outside of sport (see Turner, 2016, for a review). In one

14   study (Macavei, 2005), a comparison between non-depressed, dysphoric, and clinically

15   depressed participants revealed that irrational beliefs (AWF, LFT, and DEP) were highest in

16   clinically depressed participants, followed by dysphoric participants, and then non-depressed

17   participants. Interestingly, PIB did not differ between non-depressed, dysphoric, and

18   clinically depressed participants. A recent meta-analysis investigating the relationships

19   between irrational beliefs and negative affect (Visla, Fluckiger, Holtforth, & David, 2016)

20   revealed significant small to moderate effect sizes for general distress ($r = .36$), depression (r

21   $= .33$), anxiety ($r = .41$), anger ($r = .25$), and guilt ($r = .29$). In general, there is a moderate but

22   robust relationship between irrational beliefs and psychological distress (MacInnes, 2004). At

23   present, it is not known whether the relationships between irrational beliefs and psychological

24   distress hold true in athletic samples.

1   The relationships between irrational beliefs and psychological distress may be driven

2   by particular core irrational beliefs (Visla et al., 2016). Indeed, the study by Macavei (2005)

3   found that PIB did not distinguish between non-depressed, dysphoric, and clinically

4   depressed participants, and past research suggests that particular *secondary* irrational beliefs

5   (AWF, LFT, and DEP) might offer more proximal causes for specific emotions. In one study

6   (David, Schnur, & Belloiu, 2002), it was found that AWF helped to explain the most variance

7   in anxiety (alongside high motivational relevance, low motivational congruence, and low

8   emotion-focused coping), LFT helped to explain the most variance in anger (alongside high

9   motivational relevance, low motivational congruence, and high other-accountability), and

10 DEP helped to explain the most variance in depression (alongside high motivational

11 relevance, low motivational congruence, low problem focused coping, and low future

12 expectations). With these findings replicated (David, David, Ghinea, Macavei, & Kallay,

13 2005), it seems that PIB relate to anxiety, anger, and depression, most strongly via AWF,

14 LFT and DEP, respectively. The notion that secondary irrational beliefs are more proximal to

15 psychological distress has been subjected to mediation analyses. In one study of varsity

16 students (DiLorenzo, David, & Montgomery, 2007), secondary irrational beliefs (AWF, LFT,

17 and DEP) were found to fully mediate the relationship between PIB and psychological

18 distress. DiLorenzo et al. advocate the examination of specific emotions as opposed to a

19 single indicator of psychological distress, and call for the use of a more diverse sample.

20   The mediational effects of irrational primary and secondary beliefs on psychological

21 distress have been conceptualized in REBT theory (Ellis & Dryden, 1997) and past research

22 (e.g., DiLorenzo et al., 2007) as the "REBT-I Model" (p. 767). In the REBT-I Model,

23 secondary irrational beliefs mediate the relationship between PIB and psychological distress.

24 The present study tests the REBT-I Model (Figure 1) in a non-sporting and sporting sample

25 (recreational and elite), and makes specific hypotheses in relation to the REBT-I Model with

1   regards to predicting symptoms of anxiety, anger, and depression (psychological distress).

2   This is the first study to examine the core primary and secondary irrational beliefs in varying

3   levels of sport participation and the first to test the REBT-I Model in a sporting sample.

4   Indeed, the present study serves as both a replication of DiLorenzo et al.'s mediational study

5   and an extension to the literature by examining specific emotions that indicate psychological

6   distress and irrational performance beliefs (rather than general irrational beliefs), in a sporting

7   sample. The present study also adds to the extant literature concerning the mental health of

8   sport participants by seeking to understand the potential role of irrational beliefs in symptoms

9   of anxiety, anger, and depression. Following DiLorenzo et al.'s recommendations, the present

10 study investigates the mediational effects of secondary irrational beliefs on the relationship

11 between PIB and psychological distress (anxiety, anger, and depression).

12   The present study chiefly aims to test the REBT-I Model across non-sport

13 participants, recreational sport participants, and elite athletes. First, in line with REBT theory

14 (REBT-I Model) and past research, and following mediation guidelines (e.g., Hayes, 2009), it

15 is hypothesized that secondary irrational beliefs will mediate the relationships between PIB

16 and forms of psychological distress. Specifically, it is hypothesized that LFT, AWF, and DEP

17 will mediate the effects of PIB on anxiety, anger, and depression.

18   A secondary aim of the present study is to examine the differences in irrational beliefs

19 and psychological distress between individual and team sport participants, between females

20 and males, and across non-sport participants, recreational sport participants, and elite athletes.

21 The investigation of between-groups differences in irrational beliefs and psychological

22 distress adds to past research that reports differences between individual and team sport

23 athletes (Nixdorf et al., 2016), females and males (e.g., Wolanin et al., 2016), and between

24 non-athletes and athletes (e.g., Ugle et al., 2014).

1   It is hypothesized that, based on recent research indicating differences between sport

2   type in depression (Nixdorf et al., 2016), team sport athletes would report greater

3   psychological distress compared to individual sport athletes. In addition, past research

4   indicates that females may be more prone to irrational beliefs (Walen & Greiger, 1988) and

5   mental ill-health (e.g., Wolanin et al., 2016), therefore in the present study it is hypothesized

6   that females would report greater irrational beliefs and greater psychological distress than

7   males. Finally, in line with the extant literature (e.g., Ugle et al., 2014), it is hypothesized that

8   non-sport participants would report the greatest irrational beliefs and psychological distress,

9   followed by recreational sport participants, and then elite athletes.

10   Method

11   Participants

12   Participants ($N = 423$, female = 223, Mage = 27.16; SDage = 10.50; age range = 14-

13   70) were British elite athletes ($n = 127$, female = 50), recreational sports participants ($n =$

14   174, female = 83), and non-sport participants ($n = 122$, female = 51). Elite athletes were

15   involved in team ($n = 82$) and individual ($n = 45$) sports, and included athletes participating

16   in futsal ($n = 21$), football ($n = 29$), swimming ($n = 3$), running ($n = 2$), figure skating ($n = 4$),

17   cricket ($n = 1$), tennis ($n = 2$), badminton ($n = 2$), gymnastics ($n = 10$), athletics ($n = 2$),

18   squash ($n = 2$), basketball ($n = 1$), golf ($n = 1$), show jumping ($n = 1$), hockey ($n = 7$), mixed

19   martial arts ($n = 1$), paddle boarding ($n = 1$), karate ($n = 1$), rackets ($n = 1$), rugby ($n = 13$),

20   skeleton ($n = 1$), table tennis ($n = 1$), judo ($n = 14$), trampolining ($n = 1$), archery ($n = 1$), and

21   triathlon ($n = 4$). Recreational sport participants were involved in team ($n = 63$) and

22   individual ($n = 66$) sports ($n = 45$ unreported), and included individuals participating in

23   football ($n = 36$), swimming ($n = 9$), running ($n = 7$), cheerleading ($n = 1$), figure skating ($n =$

24   2), cricket ($n = 4$), tennis ($n = 14$), badminton ($n = 7$), netball ($n = 3$), gymnastics ($n = 1$),

25   korfball ($n = 2$), athletics ($n = 2$), squash ($n = 2$), basketball ($n = 3$), bowls ($n = 1$),

1   bodybuilding ($n = 1$), golf ($n = 1$), show jumping ($n = 4$), hockey ($n = 5$), mixed martial arts

2   ($n = 1$), karate ($n = 1$), rugby ($n = 7$), shooting ($n = 1$), volleyball ($n = 1$), dance ($n = 1$), pool

3   ($n = 1$), mountaineering ($n = 1$), karting ($n = 1$), and triathlon ($n = 9$). Participants were

4   recruited using convenience, snowball, and random sampling via social media. A university

5   ethics panel granted ethical approval, and all participants completed informed and/or minor

6   assent prior to any data collection. All data were collected using an online questionnaire

7   (Qualtrics), which took approximately 5 minutes to complete.

8   Measures

9   Irrational performance beliefs. To assess the presence of irrational beliefs, participants

10   completed the irrational performance beliefs inventory (iPBI; Turner et al., 2016). The

11   questionnaire is designed for usage in performance settings (such as sport) and consists of 28-

12   items, seven-items for each of its four subscales (PIB, LFT, AWF, and DEP). Responses are

13   made on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The

14   iPBI has been shown to have good criterion, construct, and concurrent reliability (Turner et

15   al., 2016). For the current sample, Cronbach's α were PIB = .68, LFT = .74, AWF = .70, DEP

16   = .87. Therefore, subscales demonstrated acceptable to good internal consistency

17   (Loewenthal, 2004).

18   Psychological distress. The State Trait Personality Inventory (STPI; Spielberger,

19   1979) was used in order to assess participants' symptoms of anxiety, anger, and depression.

20   Anxiety, anger, and depression are considered major indicators of psychological distress, and

21   have been referred to as "critical psychological vital signs that are strongly related to an

22   individual's well-being" (Speilberger & Reheiser, 2009, p. 272). The STPI comprises 80

23   items assessed on a Likert scale (1 = *almost never*; 4 = *almost always*), 40 assessing state and

24   40 assessing trait emotional tendencies including anxiety, anger, depression, and curiosity,

25   distributed in 10-items per emotion. Only trait anxiety, anger, depression items were used in

1   the current study, demonstrating internal consistency, with Cronbach's α coefficients of .82

2   for anxiety, .86 for anger, and .84 for depression.

3   Procedures

4   Participants were recruited using convenience, snowball, and random sampling via

5   social media. Convenience sampling was achieved by liaising with U.K. sport and exercise

6   psychologists and researchers to gain access to athlete groups with whom they worked.

7   Snowball sampling was achieved by encouraging participants, on completion of the survey,

8   to send the details of the study to other potential participants that may or may not take part in

9   sport. Random sampling was achieved via a social media campaign targeting sporting

10   organizations to engage their athletes in the project, and targeting the general public for the

11   recreational and non-sport samples. The authors adopted multiple sample recruitment devices

12   to limit self-selection and sampling biases associated with a single approach to sample

13   recruitment. Potential participants were asked to email the authors to take part in the study

14   and were then sent the online questionnaire (iPBI and STPI) to complete via a hyperlink sent

15   to them via email. In addition to irrational beliefs and emotions data, participants were also

16   asked to report their age, sex, the sport they compete within and the competitive level of their

17   sport. Participants were then fully debriefed as to the purpose of the study.

18   Analytic Strategy

19   Prior to main data analyses, data underwent missing values analyses and were

20   screened for outliers. Missing data analyses showed that data were not missing completely at

21   random (MCAR) for any variable, and thus missing data were not imputed. To identify

22   outliers, Shapiro Wilks tests were performed, and z scores inspected. Significant outliers with

23   a z score of 2SDs were windzorized (Smith, 2011).

24   In line with recent studies (DiLorenzo et al., 2007; Felton & Jowett, 2013) adopting

25   the same study design, descriptive statistics including means (Ms), standard deviations (SDs),

1   and intercorrelations (*r*s) were calculated for the main study variables including PIB, LFT,

2   AWF, DEP, anxiety, anger, depression, and age as a prerequisite for mediational analyses

3   (Table 1). Because the participant sample included three distinct participation groups (elite

4   athletes, recreational sport participants, and non-sport participants), it was also important to

5   examine the differences in irrational beliefs and psychological distress between these groups.

6   Indeed, past research has not investigated the differences in irrational beliefs between elite

7   athletes and sub-elite or non-athletes. In addition, due to past research indicating sex

8   differences in irrational beliefs and psychological distress, the differences between females

9   and males were also assessed. Finally, as past research has indicated differences in depression

10   between team and individual athletes, the differences between team and individual sport

11   participants in irrational beliefs and psychological distress were also examined. Therefore,

12   two 3-way MANCOVAs were conducted, one for the four core irrational beliefs, and one for

13   the three emotions that indicate psychological distress.

14   Mediation with bootstrapping analyses were conducted using Model 4 of the Process

15   macro (Haynes, 2012) in SPSS, to replicate the REBT-I model defined by DiLorenzo et al.

16   (2007), but with the three distinct emotions anxiety, anger, and depression. A total of nine

17   meditation analyses were conducted to examine the mediational effects of LFT, AWF, and

18   DEP, on the relationship between PIB and each of the three emotions (anxiety, anger,

19   depression). To assess indirect effects in the mediation analyses, 95% bias corrected

20   bootstrap confidence intervals (based on 5,000 bootstrap samples) were used.

21   Results

22   Descriptive statistics

23   Descriptive statistics can be seen in Table 1, including mean (± SD) scores for

24   irrational performance beliefs, anxiety, anger, and depression, across sport participation

25   group, sex, and sport-type, and norm levels for each variable. Data showed that participants

1   in the current sample scored higher than norms on all variables, accept for symptoms of

2   depression, where present data was equal to norm data. Correlation coefficients (Table 2)

3   revealed that all irrational beliefs were positively and significantly related to all

4   psychological distress variables, and with each other. These inferential statistics, alongside

5   past research (DiLorenzo et al., 2007; Turner et al., 2016), indicate that irrational beliefs are

6   positively associated with psychological distress, thus warranting the inclusion of all

7   irrational beliefs and psychological distress variables in the mediation analyses. Because age

8   was weakly but significantly related to LFT, DEP, and anxiety, and has been shown to be

9   related to irrational beliefs in the past (e.g., Turner et al., 2016), age was included as a

10 covariate in all further analyses.

11 Group differences

12   Irrational beliefs. The three-way MANCOVA indicated a significant main effect for

13 sport participation group, $\Lambda = .89$, $F(4,588) = 4.33$, $p < .001$, $\eta^2 = .06$. A significant between-

14 subjects effect was revealed for DEP, $F(2,297) = 8.46$, $p < .001$, $\eta^2 = .05$, with pairwise

15 comparisons of means indicating that elite athletes ($M = 16.14$; $SD = 5.40$) reported

16 significantly smaller ($p < .001$) DEP than non-sporting ($M = 19.82$; $SD = 4.23$) participants,

17 and that recreational athletes ($M = 17.68$; $SD = 5.98$) reported significantly smaller ($p < .03$)

18 DEP than non-sporting participants. There were no significant between-subjects effects for

19 PIB, $F(2,297) = 1.86$, $p > .05$, $\eta^2 = .01$, LFT, $F(2,297) = 1.62$, $p > .05$, $\eta^2 = .01$, and AWF, F

20 $(2,297) = .42$, $p > .05$, $\eta^2 < .01$. See Table 1 for mean irrational beliefs across sport

21 participation groups.

22   There was a significant main effect for sex, $\Lambda = .96$, $F(4,294) = 3.26$, $p < .02$, $\eta^2 =$

23 $.04$. A significant between-subjects effect was revealed for PIB, $F(1,297) = 8.46$, $p < .01$, η^2

24 $= .03$, with pairwise comparisons of Means indicating that females ($M = 25.97$; $SD = 3.64$)

25 reported significantly greater PIB than males ($M = 24.26$; $SD = 3.39$). A significant between-

1   subjects effect was revealed for LFT, $F(1,297) = 10.50$, $p < .01$, $\eta^2 = .34$, with pairwise

2   comparisons of means indicating that females ($M = 26.99$; $SD = 3.33$) reported significantly

3   greater LFT than males ($M = 25.17$; $SD = 3.58$). A significant between-subjects effect was

4   revealed for AWF, $F(1,297) = 6,76$, $p = .01$, $\eta^2 = .02$, with pairwise comparisons of means

5   indicating that females ($M = 24.28$; $SD = 3.89$) reported significantly greater AWF than

6   males ($M = 22.68$; $SD = 4.03$). No significant between-subjects effect was revealed for DEP,

7     $F(1,297) = 2.30$, $p > .05$, $\eta^2 = .01$.

8   There was no significant main effect for sport-type, $\Lambda = .99$, $F(4,294) = .65$, $p > .05$,

9     $\eta2 = .01$, indicating no differences in irrational beliefs between team and individual sports

10   participants.

11   Psychological distress. The three-way MANCOVA indicated no significant main

12   effect for participation group, $\Lambda = .96$, $F(6,590) = 1.84$, $p > .05$, $\eta^2 = .02$. There was a

13   significant main effect for sex, $\Lambda = .91$, $F(3,295) = 9.78$, $p < .01$, $\eta^2 = .09$. A significant

14   between-subjects effect was revealed for anxiety, $F(1,310) = 13.924$, $p < .001$, $\eta^2 = .05$, with

15   pairwise comparisons of means indicating that females ($M = 21.39$; $SD = 5.29$) reported

16   significantly greater ($p < .001$) anxiety than males ($M = 18.76$; $SD = 4.51$). There was no

17   significant main effect for sport-type, $\Lambda = .99$, $F(3,295) = .11$, $p > .05$, $\eta^2 = .001$, indicating

18   no differences in psychological distress between team and individual sports participants.

19   There was a significant interaction effect for group and sex in depression symptoms

20   scores, $F(2,297) = 3.80$, $p < .03$, with follow-up univariate (ANCOVA) tests indicating that

21   elite females athletes reported significantly ($p < .04$, $\eta^2 = .03$) greater depression symptoms

22   ($M = 17.44$; $SD = 5.86$) than elite male athletes ($M = 15.30$; $SD = 4.92$; Table 3).

23   In sum, elite athletes demonstrated smaller DEP than recreational sport participants,

24   and recreational sport participants reported smaller DEP than non-sport participants.

25   However, there were no differences in PIB, LFT, or AWF between sport participation groups.

1   Females reported greater PIB, LFT, and AWF, and anxiety, than males. Also, elite female

2   athletes reported greater symptoms of depression than elite male athletes. There were no

3   differences in irrational beliefs and psychological distress between sport-types (team vs.

4   individual).

5   Mediation analyses

6   Due to significant MANCOVAs, all mediation analyses included participation group

7   and age as covariates, allowing participation group and age to be accounted for. In line with

8   past research (DiLorenzo et al., 2007), a graphical representation of each mediation analysis

9   is shown in Figure 2 (anxiety), Figure 3 (anger), and Figure 4 (depression), and in addition,

10   related regression effects (R^2Change), F values, bootstrapped standardized confidence

11   intervals (CIs), and Sobel tests, can be seen in Table 4.

12   Anxiety. For LFT there was no difference between direct and indirect mediated

13   effects of PIB and anxiety. For AWF and DEP, the mediational hypothesis was supported

14   with AWF (c path β = .48, p < .001 to c' path β = .20, p < .01) and DEP (c path β = .48, p <

15   .001 to c' path β = .30, p < .01), both fully mediating the relationship between PIB and

16   anxiety.

17   Anger. For LFT, AWF, and DEP, the mediational hypothesis was supported with LFT

18   (c path β = .39, p < .001 to c' path β = .19, p > .05), AWF (c path β = .39, p < .001 to c'

19   path β = .04, p > .05) and DEP (c path β = .39, p < .001 to c' path β = .17, p < .05), both

20   fully mediating the relationship between PIB and anxiety.

21   Depression. For LFT there was no difference between direct and indirect mediated

22   effects of PIB and depression. For AWF and DEP, the mediational hypothesis was supported

23   with AWF (c path β = .16, p < .05 to c' path β = -.14, p > .05) and DEP (c path β = .16, p <

24   .05 to c' path β = -.04, p > .05) both fully mediating the relationship between PIB and

25   depression.

1   In sum of mediation analyses, AWF and DEP mediated the relationships between PIB

2   and all three emotions, but LFT only mediated the relationship between PIB and anger.

3   Discussion

4   This study chiefly aimed to test the REBT-I Model (Figure 1) across non-sport

5   participants, recreational sport participants, and elite athletes, in the prediction of

6   psychological distress. The present study is the first published study to investigate the role of

7   irrational beliefs in the psychological distress (indicated by symptoms of anxiety, anger, and

8   depression) of athletes. In line with the REBT-I Model (DiLorenzo et al., 2007), results

9   revealed that AWF and DEP mediated the relationships between PIB and symptoms of

10   anxiety, anger, and depression (psychological distress). However, LFT mediated the

11   relationship between PIB and anger only. These findings support extant research that

12   suggests secondary irrational beliefs are more proximal to psychological distress (e.g., David

13   et al., 2002), and adds to the growing evidence purporting that irrational beliefs are

14   deleterious for mental health (e.g., Visla et al., 2016). The findings of the current study also

15   extend the literature regarding athlete mental health (e.g., Nixdorf et al., 2016), by offering

16   potential cognitive-behavioural associates (irrational beliefs) of psychological distress. This

17   study lends additional support to the use of the iPBI for use in performance settings to

18   measure irrational beliefs, adding to the iPBI's predictive validity by revealing positive

19   relationships between iPBI subscales and psychological distress in sport participants,

20   extending similar findings revealed in an occupational setting (Turner et al., 2016).

21   A secondary aim of the present study was to examine the differences in irrational

22   beliefs and psychological distress between individual and team sport participants, between

23   females and males, and across non-sport participants, recreational sport participants and elite

24   athletes. Results revealed that elite athletes reported less DEP than recreational sport

25   participants, and that recreational sport participants reported less DEP than non-sport

1   participants, but in contrast to past research (e.g., Ugle et al., 2014), there were no differences

2   in psychological distress across the groups. This is the first published study to reveal

3   differences in irrational beliefs across sport participation groups. Data analysis also showed

4   that female participants reported greater PIB, LFT, AWF and anxiety than males, and elite

5   female athletes reported greater symptoms of depression than elite male athletes. The finding

6   that females reported greater irrational beliefs than males supports past REBT literature (e.g.,

7   Walen & Greiger, 1988), and females reporting greater symptoms of anxiety supports past

8   research that indicates that female sport participants may be more prone to mental ill-health

9   (e.g., Wolanin et al., 2016). This is also consistent with data from the general population.

10   Finally, contradicting past research (Nixdorf et al., 2016), and against a study hypothesis,

11   there were no differences in irrational beliefs or psychological distress between individual

12   and team sport participants.

13   The present study supports contemporary theory and research (e.g., DiLorenzo et al.,

14   2007) regarding the relationships between the four core irrational beliefs and psychological

15   distress. Specifically, the REBT-Model I was broadly supported, with the relationships

16   between PIB and anxiety, anger, and depression mediated by secondary irrational beliefs

17   (AWF, LFT, and DEP). However, LFT only mediated the relationship between PIB and

18   anger. These findings suggest that, as found in previous literature (David et al., 2002; David

19   et al., 2005; DiLorenzo et al., 2007), PIBs are primary appraisal components, while AWF,

20   DEP, and to some extent LFT, are secondary appraisal mechanisms. Past research has also

21   found that the relationships between PIB, LFT, and psychological distress are less consistent

22   (e.g., DiLorenzo et al., 2007), which might suggest that PIB and LFT might contribute to

23   anxiety and depression separately, rather than interactively. The seemingly specific

24   relationship between LFT and anger supports past research demonstrating the association

25   between LFT and aggressive expression of anger (Martin & Dahlen, 2004), and reduced

1   anger control (Moller & Van der Merwe, 1997). The present study not only supports previous

2   research, it also extends the literature by demonstrating validity for the REBT-Model I in

3   specific emotional indicators of psychological distress, as called for by researchers

4   (DiLorenzo et al., 2007). The present study also extends past research by recruiting a sport

5   participation sample, including both recreational and elite athletes. Importantly, the findings

6   yield a similar pattern of results as previous work in varsity samples (e.g., DiLoreonzo et al.,

7   2007), thus aiding the generalizability of REBT-Model I across different populations.

8   The implications of the mediation results in the present study are threefold. First, the

9   data provides an insight into potentially important associates, namely the four core irrational

10   beliefs, of psychological distress across a spectrum of sport participants. Importantly, the

11   current study data indicates that the mediational relationships present within general and

12   clinical populations (e.g., David et al., 2005) are also present within a sport participation

13   sample. While past research has elucidated important situational factors that increase mental

14   health risk (e.g., injuries, competitive failure, ageing; Nixdorf et al., 2016; Reardon & Factor,

15   2010), the present study offers cognitive factors that are ultimately more controllable for

16   athletes, although it should be noted that irrational beliefs can be difficult to change (Ellis &

17   Dryden, 1997) due to being deeply ingrained (Macavei & McMahon, 2010). That is, it is not

18   always possible for an athlete to avoid injury or competitive failure, and of course nobody

19   can escape aging, but through REBT it is possible to reduce irrational beliefs at a general

20   (e.g., Turner & Barker, 2013) and specific (Cunningham & Turner, 2016) level. Although the

21   current study offers no direct evidence that irrational beliefs can be controlled, the efficacy of

22   REBT in reducing emotional disturbance has been supported in hundreds of research articles

23   (David, Mongomery, Macavei, & Bovbjerg, 2005) in both clinical and nonclinical

24   populations, youths and adults (David & Avellino, 2002), and by three meta-analyses

25   (Engles, Garnefski, & Diekstra, 1993; Gonzalez, Nelson, Gutkin, Saunders, Galloway, &

1   Shwery, 2004; Lyons & Woods, 1991). In particular, one meta-analysis offered strong

2   support for REBT (Engles et al., 1993; effect size of 1.62) and concluded that REBT's

3   superiority over placebo treatment conditions was directly related to an increase in rational

4   thinking. Therefore, practitioners can help athletes to control their irrational beliefs (i.e.,

5   reduce irrational beliefs in favor of rational beliefs) in order to reduce the risk of experiencing

6   psychological distress.

7   Second, in the case of anger symptoms, the mediation analyses indicate that LFT is

8   more proximal than the other core irrational beliefs. Therefore, interventions designed to help

9   individuals reduce their anger should focus on revealing potential LFT beliefs, and then in

10   line with REBT, disputing LFT and endorsing HFT. Finally, mediation analyses revealed that

11   both AWF and DEP are more proximal to all three emotions, and therefore a full assessment

12   of irrational beliefs should be completed with clients who present with anxiety, anger, or

13   depression symptoms. This is important because REBT practitioners strive towards

14   uncovering a client's full irrational beliefs where secondary irrational beliefs (LFT, AWF,

15   and or DEP) are derived from primary irrational beliefs (Dryden, 2009). So when working

16   with an individual, irrational beliefs are more accurately revealed as couplets such as "I must

17   be accepted by people (PIB) and it means I am worthless if I am not (DEP)," for example.

18   The results of the present study reinforce the importance of helping clients to explore both

19   primary and secondary beliefs as potential associates of psychological distress.

20   The results of the mediation and correlational analyses report in the present paper

21   should not be taken to mean that irrational beliefs cause psychological distress. Whilst theory

22   and research attest to the directional relationship between irrational beliefs and psychological

23   distress, the cross-sectional data reported in this study were collected at a single time point,

24   thus it is not possible to detect causation. Only one study involving athletes has demonstrated

25   that irrational beliefs predict increases in psychological ill-being (burnout; Turner & Moore,

1   2016). Also, and importantly, the idea that irrational beliefs can be controlled, and that

2   cognitions can be and should be challenged using logico-empirical disputation in CBTs, has

3   been subject to debate (Longmore & Worrell, 2007). Amidst a lack of empirical support for

4   some of the fundamental tenets of CBT, and a paucity in evidence demonstrating that CBT's

5   effectiveness in reducing psychological distress is mediated cognitively, it may be that

6   cognitive interventions such as those posited within REBT are not a necessary component of

7   therapy (Hayes, Follette, & Linehan, 2004). Despite the evidence that CBTs such as REBT

8   are effective treatments, the notion of cognitive mediation is in a state of academic and

9   therapeutic limbo. Readers should be mindful of this debate when interpreting the therapeutic

10   implications of the current study.

11   The between-groups analyses in the current study for irrational beliefs revealed that

12   elite athletes reported the lowest DEP, followed by recreational sport participants, and then

13   non-sport participants. These results suggest two potential occurrences in this sample. First,

14   those with low DEP are more likely to pursue, and progress in, a career in elite sport. It may

15   be that holding low DEP beliefs, where failures and set-backs are not generalized to the self,

16   allow for more functional responses to adversity (e.g., Turner, 2016), which may facilitate an

17   athletes' progression and ascension to elite standing. However, although consistent with

18   REBT theory, this conjecture goes beyond the data and scope of the current study. Second, it

19   may be that repeated exposure to adversity, such as for example, failure (or potential failure)

20   may help to reduce irrational beliefs such as DEP. To explain, since DEP reflects the global-

21   rating of oneself on the basis of one event, such that failing "makes me a failure", repeated

22   exposure to failure may serve to discredit this belief, because despite failing the athlete is still

23   able to progress in their careers. In REBT, with athletes who present with DEP failure beliefs,

24   the course of action is often to set behavioural assignments between-sessions, where the

25   athlete is prompted to face potential failure to show that even if they fail they are still able to

1   accept themselves. Therefore, the finding that elite athletes have the lowest DEP scores could

2   be a function of the adverse environment (e.g., Nixdorf et al., 2015) in which athletes toil.

3   This is important because past research indicates that athletes may be more susceptible to

4   depression when faced with failure (Hammond, Gialloreto, Kubas, & Davis, 2013). So

5   having low DEP beliefs may be important for helping athletes maintain psychological well-

6   being particularly in times of failure, where athletes are more susceptible to depression.

7   In addition, it is also possible that elite athletes who experience professional success

8   and financial wellbeing may be less likely than recreational sport participants and non-sport

9   participants to hold DEP beliefs. To explain, one of the reasons that DEP is associated with

10   psychological distress is because the belief "I failed so I am therefore I failure" expresses

11   contingent self-worth. It stands to reason that athletes who have contingent self-worth, who

12   also experience high perceived success, may consider themselves to be "a success", which

13   could be reflected in low DEP beliefs. However, the current study does not measure

14   contingent self-worth, and therefore any reasoning used to explain the low DEP beliefs in the

15   elite athlete sample in the current study is conjectural. Future research should investigate

16   contingent self-worth more fully, because low DEP beliefs do not necessarily reflect high

17   unconditional self-acceptance (USA) beliefs (which are rational beliefs). Just because elite

18   athletes express low DEP, does not mean that they hold unconditional perceptions of their

19   self-worth (Cunningham & Turner, 2016). Indeed, irrational and rational beliefs are

20   relatively orthogonal (Ellis, David, & Lynn, 2010).

21   The between-groups analyses also revealed that female participants reported greater

22   PIB, LFT, and AWF than males, which is in line with past research concerning sex

23   differences in irrational beliefs (e.g., Walen & Greiger, 1988). Also, the data showed that

24   across the groups, female participants reported greater symptoms of anxiety than males, and

25   that specifically within the elite athlete group, female athletes reported greater symptoms of

1   depression than male athletes. Some research suggests that in the general population, females

2   are diagnosed with depression and anxiety disorders almost twice as often as males (e.g.,

3   Schaal et al., 2011), and in research concerning athletes, the finding that females report

4   greater symptoms of depression than males is a consistent discovery (e.g., Hammond et al.,

5   2013; Junge & Feddermann-Demont, 2015; Storch et al., 2005; Wolanin et al., 2016). Schaal

6   et al. (2011) sampled a large (>2,000) population of athletes and found that females were

7   56% more likely to have suffered from an anxiety disorder than males, and that nearly twice

8   as many females than males reported experiencing depression, over their lifetime. Schaal et

9   al. (2011) concluded that female athletes appear to be more susceptible to difficulties

10   encountered in their environment than males. There are many potential genetic,

11   physiological, and socio-environmental explanations for the sex differences in mental health

12   (McLean & Anderson, 2009), which are beyond the scope of the present study. But the

13   concomitant sex differences in irrational beliefs found in the current study surely add to the

14   previously observed psychosocial differences between females and males (e.g., worry

15   reinforced by gender-norms; Bangasser et al., 2010), which may help explain sex differences

16   in anxiety and depression symptomatology. That is, irrational beliefs should be further

17   explored as a potential mechanism for sex differences in psychological distress, alongside the

18   complex constellation of additional antecedents.

19   Data from the current study also revealed no differences across sport participation

20   groups in psychological distress. This finding supports some previous literature showing that

21   athletes experience depression at approximately the same rate as non-athletes (Yang et al.,

22   2007), but is also in contrast to several other researchers' findings (e.g., Ugle et al., 2014).

23   Similar to the current paper, Ugle et al. used three sport participation groups, but found that

24   there were less depressive symptoms in athletes compared to recreation and non-sport

25   participants. However, Ugle et al.'s study was conducted with Croatian participants and they

1   had circa 600 participants compared to the 423 U.K. participants in the current study, so the

2   two studies are not necessarily directly comparable. Other research in collegiate athletes and

3   non-athletes has also found that athletes report lower depression symptoms than non-athletes

4   (Armstrong & Oomen-Early, 2009; Proctor & Boan-Lenzo, 2010). There are some plausible

5   explanations as to why athletes may report less depressive symptoms that non-athletes, such

6   as regular exercise and social support (see Armstrong & Oomen-Early, 2009), but data from

7   the current study showed that sport participation group was not important in the between-

8   groups analyses or the mediational analyses.

9   Finally, there were no differences in irrational beliefs or psychological distress

10   between individual and team sport participants. This finding is in contrast to past research

11   that has found that athletes engaged in individual sport reported greater symptoms of

12   depression than athletes engaged in team sports (e.g., Nixdorf et al., 2013; 2016; Schaal et al.,

13   2011). However, as well as symptoms of depression, the current study also offers findings

14   for anxiety and anger symptomatology, similarly revealing no differences between individual

15   and team sport participants. It is unclear why the current study did not replicate previous

16   findings. With past studies conducted in France (Schaal et al., 2011) and Germany (Nixdorf

17   et al., 2016), and the current U.K. study, perhaps national and cultural differences should be

18   considered in future research. Also, the number of sports represented in the current study ($n =$

19   43) is larger than that of past research, which represents a less homogenous sample in terms

20   of sport type, but gives a broader perspective in sport activity in general, rather than for

21   specific sports. For example, Nixdorf et al. (2016) recruited 199 athletes engaged in eight

22   sports, with the majority competing in soccer ($n = 113$). Therefore, future research should

23   replicate past research with equitable samples in order to make direct comparisons.

24   This study has some limitations that if addressed could strengthen the examination of

25   irrational beliefs and psychological distress in athletes. First, the cross-sectional and

1   correlation nature of the study means that causation between irrational beliefs and

2   psychological distress cannot be implied. Indeed, this is a limitation that pervades much of

3   the irrational beliefs literature (Turner, 2016). Thus, future research could compare the

4   irrational performance beliefs of depression, dysphoric, and control participants, replicating

5   Macavei (2005) to assess the prevalence of irrational beliefs across varying severities of

6   depression. Second, this study examines the role of irrational beliefs in psychological

7   distress, but does not consider rational beliefs. In fact, research has concentrated more on

8   irrational beliefs than rational beliefs, perhaps reflecting a problem-focused, rather than a

9   benefit-focused, bias in the literature concerning REBT (see Turner, 2016 for a review). This

10   is important because rational and irrational beliefs are relatively orthogonal (i.e., they do not

11   correlate highly; see Bernard, 1998), and so low irrational beliefs do not represent high

12   rational beliefs, and vice versa. Researchers might consider developing a rational beliefs

13   measure that contrasts the iPBI, so that rational beliefs can be included when predicting

14   psychological distress in athletes.

15   Study limitations notwithstanding, the findings of the current study adds to the body

16   of literature concerning potential associates of psychological distress in athletes, by revealing

17   that irrational beliefs are associated with anxiety, anger, and depression. Further, this study

18   finds support for REBT Model-I (DiLorenzo et al., 2007) in the prediction of psychological

19   distress, offering support for the notion that secondary irrational beliefs are more proximal to

20   psychological distress than primary irrational beliefs. Indeed, the mediational findings in the

21   current paper extend the REBT literature by testing the REBT Model-I in a sport

22   participation sample for the first time. The current study also adds to the vibrant conversation

23   happening in the athlete mental health literature at present. Specifically, this is the first

24   published study to show differences in irrational beliefs across sport participation groups, and

25   males and females. Regarding psychological distress, this study has some findings consistent

1   with past research, and also some findings inconsistent with past research. For example, the

2   finding that across the sample females reported greater anxiety than males, and that elite

3   female athletes reported greater symptoms of depression than elite male athletes, supports

4   past research (e.g., Wolanin et al., 2016). In contrast, the finding that there were no

5   differences in psychological distress between sport participant groups or individual and team

6   sports is contrary to some previous research (e.g., Nixdorf et al., 2016).

7   If a conservative stance is taken, that athletes are no more likely to experience mental

8   illness than the general public, we can assume that one in four will be affected each year

9   (England Athletics, 2014), with 17.6% of adults (in England) having at least one common

10   mental disorder and a similar proportion having symptoms which do not fulfil full diagnostic

11   criteria (McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009). If as proposed in this

12   paper, irrational beliefs represent a risk factor for the mental health of athletes, future

13   research should investigate irrational beliefs and the application of REBT with athletes.

14

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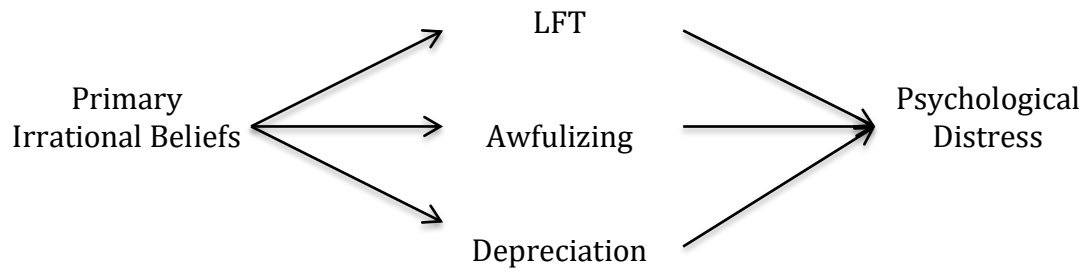
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1 Figure 1. Graphical illustration of the REBT Model-I (DiLorenzo et al., 2007) tested in the
2 current study.
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LFT

Primary
Irrational Beliefs → Awfulizing → Psychological
Distress

Depreciation

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1 Table 1. Norm levels (iPBI; Turner et al., 2017; STPI; Spielberger, 1995), and M ± SD for all variables across sport participation group, sex, and
2 sport-type.
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Variable	Norm levels	Current Sample Overall	Group			Sex		Sport-type	
			Non-sport	Recreational	Elite	Female	Male	Team	Individual
PIB	23.36 ± 5.29	24.91 ± 3.63	23.86 ± 3.37	25.18 ± 3.89	25.18 ± 3.29	25.94 ± 3.65	24.26 ± 3.39	24.83 ± 3.45	25.00 ± 3.75
LFT	23.05 ± 5.54	25.78 ± 3.63	25.04 ± 3.48	25.84 ± 3.55	26.32 ± 3.63	27.00 ± 3.32	25.18 ± 3.58	25.83 ± 3.79	25.89 ± 3.30
AWF	21.28 ± 5.97	23.44 ± 4.05	23.39 ± 3.44	23.58 ± 4.19	22.95 ± 4.22	24.29 ± 3.88	22.68 ± 4.03	23.33 ± 3.92	23.21 ± 4.23
DEP	16.03 ± 7.18	18.05 ± 5.68	19.83 ± 4.24	17.75 ± 5.99	16.14 ± 5.40	18.34 ± 5.86	17.10 ± 5.34	17.60 ± 5.28	17.54 ± 6.00
Anxiety	18.04 ± 4.9	20.14 ± 5.08	18.83 ± 4.83	20.35 ± 4.92	19.74 ± 5.06	21.43 ± 5.29	18.76 ± 4.51	19.58 ± 5.00	20.15 ± 4.99
Anger	18.47 ± 4.75	21.55 ± 6.00	21.60 ± 4.68	21.66 ± 6.29	19.65 ± 6.22	22.07 ± 6.13	20.13 ± 5.82	20.54 ± 6.10	21.25 ± 5.84
Depression	18.05 ± 6.23	18.93 ± 5.01	18.70 ± 3.98	19.34 ± 4.92	18.05 ± 5.02	18.93 ± 5.11	18.51 ± 4.59	18.50 ± 4.82	18.92 ± 4.74
Age	-	27.16 ± 10.49	22.77 ± 6.61	30.84 ± 10.98	26.06 ± 10.60	26.90 ± 10.62	27.17 ± 10.37	22.78 ± 5.68	33.26 ± 12.48

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1   Table 2. Bivariate correlation co-efficients (*r*) for irrational beliefs, emotions, and age.

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Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. PIB	1	.55**	.63**	.30**	.33**	.22**	.10*	.075
2. LFT	.55**	1	.55**	.32**	.27**	.27**	.10*	-.10*
3. AWF	.63**	.55**	1	.58**	.41**	.35**	.27**	-.04
4. DEP	.30**	.32**	.58**	1	.47**	.46**	.44**	-.114*
5. Anxiety	.33**	.27**	.41**	.47**	1	.51**	.77**	-.096*
6. Anger	.22**	.27**	.35**	.46**	.51**	1	.49**	-.073
7. Depression	.10*	.10*	.27**	.44**	.77*	.49**	1	-.024
8. Age	.08	-.10*	-.04	-.11*	-.10*	-.07	-.02	1

3   *p <.01, **p <.001

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1   Table 3. Elite athlete, recreation sport, and non-sport, participants' M ± SD depression scores across females and males.
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Sex	Group		
	Non-sport	Recreational	Elite
Females	19.80 ± 5.06	19.05 ± 5.48	17.44 ± 5.86*
Males	18.36 ± 5.21	17.81 ± 6.07	15.30 ± 4.92

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4   Note. *$p < .04$ larger score than elite male athletes
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1 Table 4. Regression effects (R^2Change), F values, Bootstrapped Standardized confidence intervals (CIs), and Sobel Tests for each mediation
2 analysis conducted.
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4 ** $p < .001$

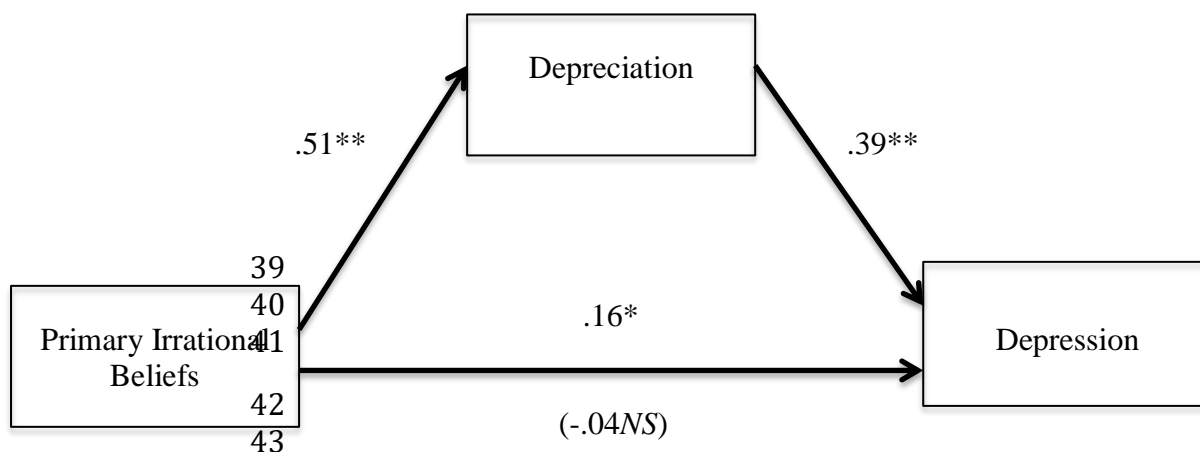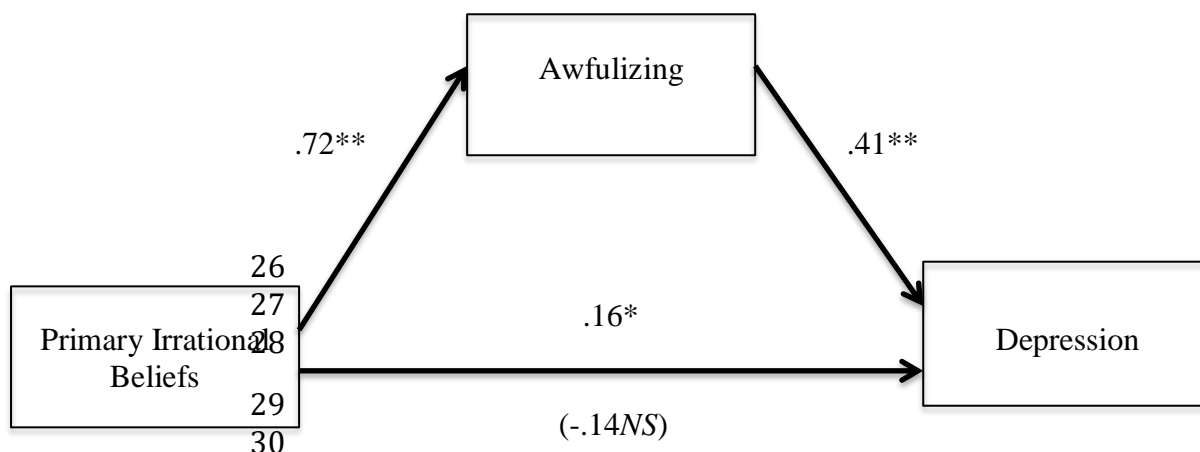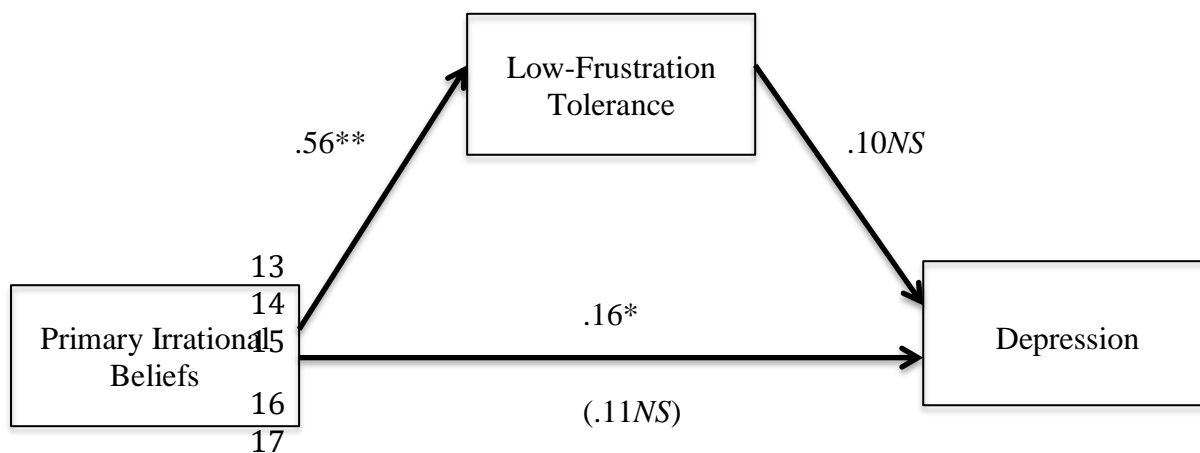| Model	Variables			c path	a path	b and c' path	95% CI mean indirect effect	Sobel Test (Z)
	IV	DV	MV					
1	PIB	Anxiety	LFT	$F(3, 418) = 19.97$, $R^2 = .13$**	$F(3, 418) = 77.64$, $R^2 = .33$**	$F(4, 417) = 15.94$, $R^2 = .14$**	.00 - .11	1.82 NS
2	PIB	Anxiety	AWF	$F(3, 418) = 19.97$, $R^2 = .13$**	$F(3, 418) = 113.38$, $R^2 = .42$**	$F(4, 417) = 23.21$, $R^2 = .19$**	.12 - .28	4.95**
3	PIB	Anxiety	DEP	$F(3, 418) = 19.97$, $R^2 = .13$**	$F(3, 418) = 25.38$, $R^2 = .16$**	$F(4, 417) = 36.17$, $R^2 = .26$**	.08 - .19	5.20**
4	PIB	Anger	LFT	$F(3, 418) = 12.20$, $R^2 = .08$**	$F(3, 418) = 77.64$, $R^2 = .33$**	$F(4, 417) = 14.67$, $R^2 = .12$**	.06 - .19	3.67**
5	PIB	Anger	AWF	$F(3, 418) = 12.20$, $R^2 = .08$**	$F(3, 418) = 113.38$, $R^2 = .42$**	$F(4, 417) = 18.21$, $R^2 = .15$**	.14 - .30	5.09**
6	PIB	Anger	DEP	$F(3, 418) = 12.20$, $R^2 = .08$**	$F(3, 418) = 25.38$, $R^2 = .16$**	$F(4, 417) = 27.82$, $R^2 = .23$**	.09 - .19	5.33**
7	PIB	Depression	LFT	$F(3, 418) = 3.72$, $R^2 = .02$*	$F(3, 418) = 77.64$, $R^2 = .33$**	$F(4, 417) = 3.11$, $R^2 = .03$*	-.03 - .10	1.17 NS
8	PIB	Depression	AWF	$F(3, 418) = 3.72$, $R^2 = .02$*	$F(3, 418) = 113.38$, $R^2 = .42$**	$F(4, 417) = 10.01$, $R^2 = .09$**	.14 - .30	5.13**
9	PIB	Depression	DEP	$F(3, 418) = 3.72$, $R^2 = .02$*	$F(3, 418) = 25.38$, $R^2 = .16$**	$F(4, 417) = 20.45$, $R^2 = .19$**	.10 - .21	5.30**

5 * $p < .05$
6 NS $p > .05$
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2 Figure 3. Mediational diagrams for models testing the interrelations among PIB, LFT, AWF,
3 and DEP, with anger as the outcome variable. Values (standardized) above lines reflect
4 bivariate (β) relations, and values below lines reflect multivariate relations accounting for
5 other predictors in the regression equation. All associations are significant (*p < .05, **p <
6 .001, *NS* = non-significant).
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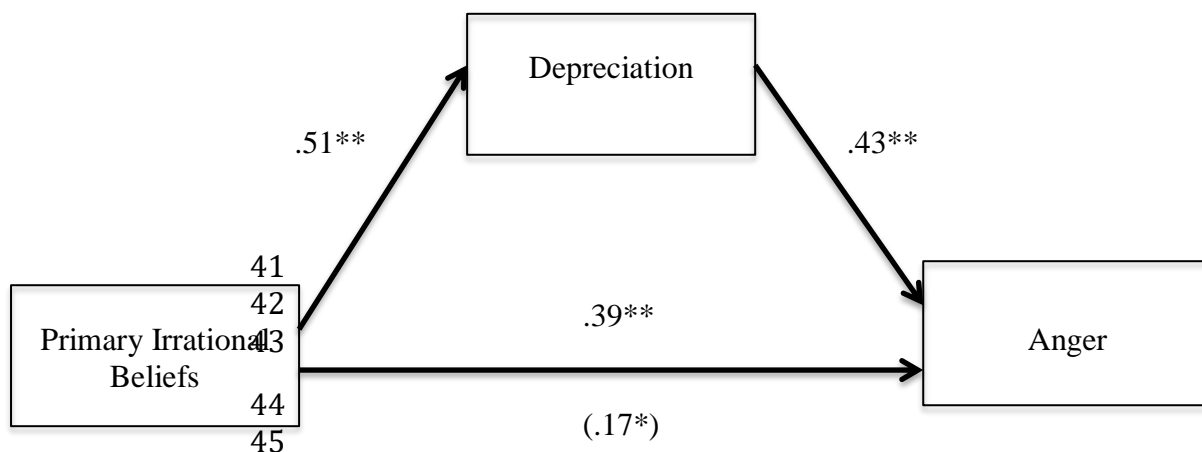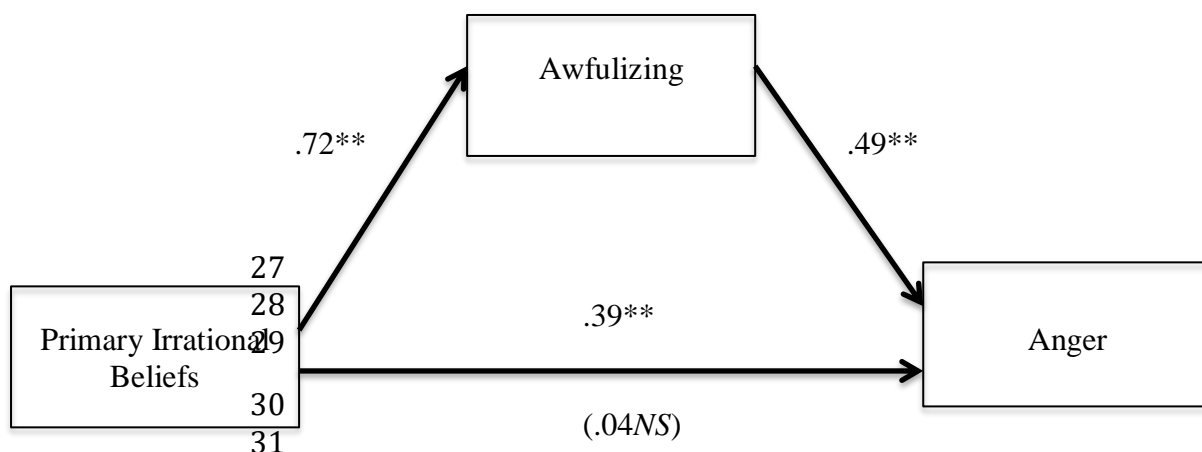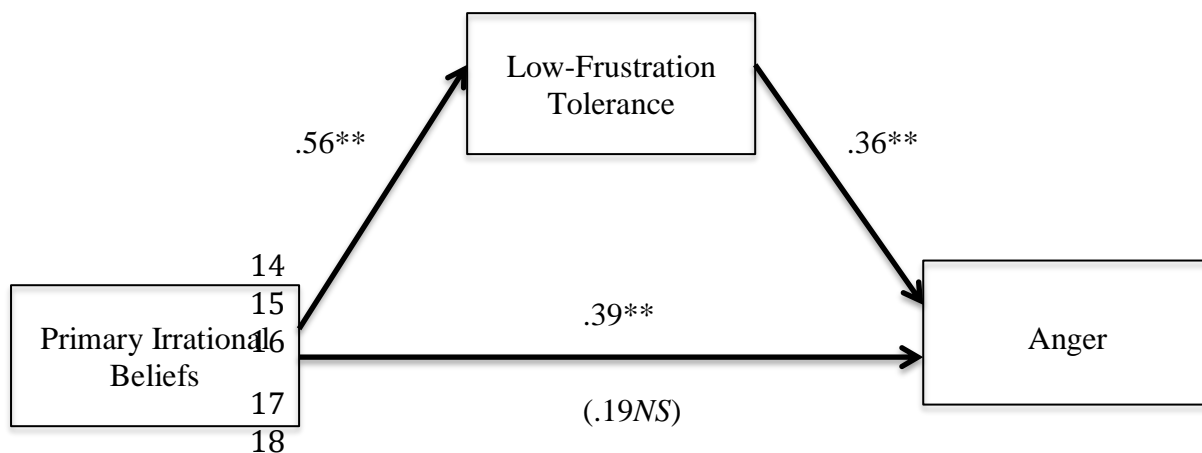
1   Figure 4. Mediational diagrams for models testing the interrelations among PIB, LFT, AWF,
2   and DEP, with depression as the outcome variable. Values (standardized) above lines reflect
3   bivariate (*β*) relations, and values below lines reflect multivariate relations accounting for
4   other predictors in the regression equation. All associations are significant (*p < .05, **p <
5   .001, *NS* = non-significant).

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1 Figure 2. Mediational diagrams for models testing the interrelations among PIB, LFT, AWF,
2 and DEP, with anxiety as the outcome variable. Values (standardized) above lines reflect
3 bivariate (β) relations, and values below lines reflect multivariate relations accounting for
4 other predictors in the regression equation. All associations are significant (*$p < .05$, **$p <$
5 .001).
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