Adolescent Soccer Athletes' Irrational Beliefs About Basic Psychological Needs are Related to Their Emotional Intelligence and Mental Health

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Abstract

There has been a scarcity of research regarding the unique mental health risk factors that adolescent athletes face. The recently proposed Rational Emotive Self Determination Scale for Adolescents (RESD-A) has been suggested to understand some of the antecedent and associative factors of adolescent athlete mental health. The principal aim of this study is to examine the structural and criterion validity of the RESD-A in an athlete sample for the first time. To achieve this aim, two hundred and forty-two club level soccer athletes participated in the study. Confirmatory factor analysis (CFA) was conducted to test the validity of the RESD-A's factor structure. Partial correlation analyses with the subscales of RESD-A, emotional intelligence, and mental health scores were used to examine criterion validity. Initial results for the structural and criterion validity of the RESD-A with an athlete population are promising. The potential importance, limitations and directions for future research are discussed.

Keywords CBT · Sport · Football · Irrational beliefs · REBT

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Introduction

There is a growing scientific interest in the mental health of athletes (MacIntyre et al., 2017; Turner, 2016; Shannon & Breslin, 2020), but despite this growth, the mental health of adolescent athletes remains underexplored. For adolescent athletes, although some data indicates that they report lower mental health problems than the non-athletic adolescents (possibly due to greater physical activity; Martinsen, 2008), being an athlete comes with unique mental health risk factors (Gulliver et al., 2012). For example, the psychological impacts of injury, overtraining and burnout, intense public and media scrutiny, and managing ongoing competitive pressure (Rice et al., 2016). These risk factors can result in increased symptoms of anxiety and depressive (Gulliver et al., 2015; Weber et al., 2018), eating disorders (Sundgot-Borgen, & Torstveit, 2004) and burnout (Gustafsson et al., 2017). Understanding antecedent and associative factors of adolescent athlete mental health is important in order to formulate effective support for this population, who are reluctant to seek help (Gulliver et al., 2012).

In the psychotherapeutic literature, there has been a recent blending of two dominant theories of human functioning that are highly relevant to the examination of mental health antecedents in adolescent athletes. Artiran et al. (2020) proposed the integration of irrational beliefs as posited within rational emotive behaviour therapy (REBT; Ellis, 1957), and basic psychological needs (BPN) theory (Deci & Ryan, 2002) as posited within the self-determination meta-theory (SDT; Deci & Ryan, 1985). In BPN theory, people function and develop most effectively when their needs of autonomy (the need to experience ownership of one's own actions and choices), competence (the need to feel competent in doing optimally challenging activities and to achieve desired outcomes), and relatedness (the need to have sense of belonging and mutual respect) are met (Bartholomew et al., 2011; Li et al., 2013). In essence, Artiran et al. (2020) put forth the notion of irrational beliefs pertaining to the three BPNs of autonomy, relatedness, and competence. In REBT there are four irrational beliefs; demandingness ('I must'), awfulizing ('it is awful'), low frustration tolerance ('I can't stand it'), and depreciation/condemnation ('I am worthless', or 'they are worthless') (Dryden, 2013). The extant empirical evidence suggests that the satisfaction of the three BPNs brings about higher levels of overall psychological well-being in athletes (e.g., Bean et al., 2019; Mack et al., 2011; Reinboth & Duda, 2006), and that irrational beliefs are deleterious for athlete mental health (e.g.,Turner, Carrington, et al., 2019 ; Turner, 2016; Turner, Aspin, et al., 2019).

So, the satisfaction of BPNs are desirable for mental health, but if one applies irrational beliefs to the satisfaction of the BPNs, then the mental health benefits may be nullified. For example, regarding the BPN of autonomy, an adolescent may believe that 'I must always decide and do whatever I want (demandingness), otherwise things are terrible (awfulizing), I can't stand it (low frustration tolerance), it makes me a totally worthless person (self-depreciation), and my parents are useless (other depreciation)'. When the adolescent faces a situation in which they are prohibited from doing what they want, their irrational beliefs concerning

autonomy may precipitate unhealthy negative emotions and maladaptive behaviours (Turner, 2016) that can harm performance (Mesagno et al., 2020; Turner et al., 2018), and increased burnout (Turner & Moore, 2016). If one demands fulfilment of the BPNs, and one makes ones' self-worth dependent on such need fulfilment, mental health could be undermined (Artiran et al., 2020).

To examine the veracity of the integration of irrational beliefs with the BPNs, Artiran et al. (2020) developed and validity tested a novel psychometric for use with adolescents. The Rational Emotive Self Determination Scale for Adolescents (RESD-A; Artiran et al., 2020) provides an integrated assessment of irrational beliefs regarding the BPNs of autonomy, competence, and relatedness. Initial results for the RESD-A indicate model fit for a three-factor structure comprising autonomy irrational beliefs (AIB), relatedness irrational beliefs (RIB), and competence irrational beliefs (CIB). The original RESD-A (Artiran et al., 2020) demonstrates .92 internal consistency values. Cronbach's Alpha values of the subscales were found to be 0.78 for AIB, 0.84 for CIB, and 0.82 for RIB. Also, moderate to high test–retest reliability: $r = 0.85$ for AIB ($p < 0.01$), $r = 0.87$ for CIB ($p < 0.001$) and $r = 0.70$ ($p < 0.01$) for RIB, and $r = 0.82$ ($p < 0.001$) for the total RESD-A score. These results showed that the test–retest reliability of the RESD-A was high, and the scale was able to perform stable measurements.

Irrational beliefs of autonomy, competence and relatedness predicted negative emotions, and positive emotions were found to be predicted by irrational beliefs of autonomy and relatedness (Artiran, 2019). Data from adolescents also indicated a positive association between greater AIB, RIB, and CIB scores, and depression (Türkmen, 2018), exam anxiety (Demirci, 2018), antisocial behaviour, and dysfunctional negative emotions (Artiran et al., 2020). Initial results concerning the RESD-A are promising, but implications for athletes cannot be confidently implied because as yet data do not exist that test the validity of the RESD-A in athlete samples. Indeed, there is a growing understanding of athlete mental health and recent research points to irrational beliefs and variables proposed within self-determination theory (SDT) as possible risk factors for psychological distress in athletes (Turner et al., 2022). The RESD-A offers an assessment of potentially important psychological variables that bridge irrational beliefs and SDT, which could help to explain and predict athlete mental health. Also, the BPNs captured by the RESD-A are especially relevant to athletes, who operate in settings in which their senses of competence, autonomy, and relatedness are vital for their success, and as such, may be highly subject to irrational beliefs underpinned by strong desires to attain these 'needs'. Further, the formative research into RESD-A concerns only Turkish adolescents, and therefore the extent to which the RESD-A is valid in non-Turkish samples is currently unknown.

Therefore, the current study has one overarching aim; to examine the structural (using confirmatory factor analysis), internal consistency and criterion validity (association with markers of psychological health and wellbeing) of the RESD-A in an athlete sample for the first time, and in a non-Turkish sample for the first time. If the RESD-A is to be widely used for sport psychology research and practice, we must first ensure that it is valid and reliable for use with athletes. To this end, we sample adolescent soccer athletes competing in the United States of America (USA)

and United Kingdom (U.K.). To indicate psychological health and wellbeing we adopt two markers; emotional intelligence (EI; Salovey & Mayer, 1990), and self-reported mental health (Veit & Ware, 1983). Athletes who demonstrate greater EI have been found to be more successful (Laborde et al., 2016), have positive emotions (Lane & Wilson, 2011) are more likely to generate higher levels of self-determined motivation, (Arribas-Galarraga et al., 2017; Sukys et al., 2019) and have greater mental health (Schutte et al., 2007). In addition, Welpe et al. (2005) found a negative relationship between EI and irrational beliefs. There are various models of EI, however, Laborde et al.'s (2016) meta-analysis of EI in sport found that the Trait Emotional Intelligence Questionnaire (TEIQue) offers the strongest measurement tool for EI in sport settings.

For the current study, concerning structural validity it is hypothesized that the three-factor solution found in Artiran et al. (2020) will be supported in the present sample. Concerning criterion validity, it is hypothesized that the athlete's AIB, RIB, and CIB scores will be negatively associated with the EI and mental health of adolescent soccer players from the USA.

Method

Participants

Two hundred and forty-two club level soccer athletes (99 = Female) participated in the present study (391 players in total were invited to take part). All participants played in youth teams from under-15 s through to under-18 s ($M = 15.19$ years of age, $SD = 1.10$) at two clubs, one in Massachusetts, USA, and one in the Midlands, U.K. The soccer players in the USA (n = 201) compete at a regional level with the goal of playing at the collegiate level. The soccer players in the U.K. (n = 41) compete at a Championship academy level with the goal of playing at the professional level.

The first and fourth authors approached the teams within the targeted age groups to invite athletes to participate. Ethical approval was granted by a university ethics panel in the United Kingdom, and informed consent from the parents and assent from players were collected prior to all data collection. Hard copy questionnaires were completed physically by participants, administered by the first and fourth authors, at the clubs after a scheduled training session. The presence of the researcher was necessary to explain to athletes what was required (De Leeuw, 2011) and to ensure athletes completed the questionnaires independently, as some children are susceptible to peer influence when completing questionnaires (Platt, 2016).

Design

We adopted a cross-sectional atemporal design, in which a battery of questionnaires was completed by all participants at a single timepoint. Data were collected from a subset of the population and represents what is going on at only one point in time

or over a short period of time (Levin, 2006). Given that the chief aim of the current study was to test the validity of the RESD-A within an athlete sample, sample size was determined using guidelines for confirmatory factor analysis (Devellis, 2012). Specifically, we targeted $n = 250$ participants to achieve five participants per item (51 items $\times$ 5 participants = 254). We used purposive convenience sampling to recruit participants, as the first and fourth authors were able to determine which athletes met the age requirements for the study.

Measures

Emotion Intelligence

Trait Emotional Intelligence was measured using the trait emotional intelligence questionnaire short-form (TEIQue-SF; Petrides, 2009). The TEIQue-SF reportedly has a strong theoretical framework (Laborde et al., 2016) with four subscales: well-being (6 items), self-control (6 items), emotionality (8 items), and sociability (6 items). Participants indicate their responses on a 7-point Likert scale, ranging from 1 (*completely disagree*) to 7 (*completely agree*). The extant literature indicates strong fit indices for the four-factor model (e.g., $\chi^2(32) = 331.42$, $p < 0.001$, CFI = 0.95, RMSEA = 0.08, SRMR = 0.03; Chirumbolo et al., 2019), which is echoed in other papers (e.g., Feher et al., 2019; Perera, 2015).

Mental Health

The Mental Health Inventory (MHI; Veit & Ware, 1983) is a widely accepted measure of overall emotional functioning, and participants completed the abbreviated version (MHI-5; Cuijpers et al., 2009) which contains 5-items, scored on six-point scales ranging from 1 (*none of the time*) to 6 (*all of the time*). The MHI-5 assessed affect over the past month, as well as the experience of psychological well-being and the absence of psychological distress (Marques et al., 2011). The MHI-5 is suitable for use with adolescents (e.g., Rivera-Riquelme et al., 2019) and athletes (e.g., Kola-Palmer et al., 2020). A total score is calculated, and lower scores reflect worse mental health (e.g., Viertiö et al., 2021). Internal consistency reliability coefficients range from 0.80 to 0.96 across several studies (Ware et al., 1994).

Basic Psychological Needs Irrational Beliefs

The RESD-A (Artiran et al., 2020) measures context specific irrational beliefs regarding the three basic psychological needs of autonomy, relatedness, and competence, as posited within SDT. Each need is measured using three scenarios; autonomy (e.g., my mom or/and dad keep telling me when and how should I study) and relatedness (e.g., my best friend is totally ignoring me and hanging out with another girl/guy) scenarios comprise six questions, and competence (e.g., I couldn't handle a task which was assigned to me) scenarios comprise five questions. All items are scored on a five-point Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Examples of items are 'Being restricted is catastrophic/awful', 'I can't stand it when I can't make my own decisions' (autonomy), 'I can't stand it when I am ignored by significant people', 'When I am unhappy, someone must listen to me' (relatedness), 'I must definitely be competent in what I do' (competence).

Analytic Strategy

Prior to main data analyses, data were examined for missing cases using Little's Missing Completely at Random (MCAR) test in SPSS version 26. There were no missing cases in the dataset. We then inspected the data for outliers (standardized z values > 3.29; Hahs-Vaughn, 2017), which were Winsorized ($n = 142$ from 23,232 cases = 0.61%; Kwak & Kim, 2017).

Main data analyses were conducted in two phases. First, we performed confirmatory factor analysis (CFA) to test the validity of the RESD-A's factor structure (Sümer, 2000). The ratio of each parameter is estimated with t-statistics, considered significant if the values exceed 1.96 at the 0.05 alpha level, and 2.56 at the 0.01 alpha level (Hoyle, 1995). The error variances of the variables were also examined in the model. In order to evaluate the model, the following fit indices were examined: Chi-Squared (χ^2), ratio of the Chi-Square divided by the degrees of freedom (χ^2/df) (Byrne, 1998), the Root Mean Square Error of Approximation (RMSEA), the Goodness of Fit Index (GFI) and the Comparative Fit Index (CFI). Values of 0.90 and above for the GFI and CFI indicate acceptable model fit. SRMR and RMSEA values of below 0.08 indicate an acceptable model (Hu & Bentler, 1999; Kline, 2011; Şimşek, 2007). The maximum likelihood estimation method was used with LISREL 8.5 software (Jöreskog & Sörbom, 1993).

Second, we calculated Pearson's correlation coefficients between RESD-A subscale scales, MHI scores, and EI subscale scores to examine the criterion validity of the RESD-A in the current sample. Finally, we examined the between-groups effects of athlete location (USA vs. U.K.) on the outcome variables using univariate (for mental health) and multivariate (basic psychological needs, irrational beliefs, and emotional intelligence subscales) analyses of variance (ANOVA/MANOVA).

Results

Factor Structure of the RESD-A

On 51 the items of the RESD-A, Bartlett's test indicated a χ^2 of 6367.16 ($df = 1275$, $p < 0.001$), attesting to the factorability (Newcomb, 1994) of the data set. CFA results (see Figures 1 and 2 in supplementary materials), and the goodness of fit statistics, produced for the three-factor model ($\chi^2 = 79.57$, df = 48.0, CFI. = 0.98, GFI = 0.94, RMSEA = 0.057) indicated almost perfect fit to the data. Chi-Square (χ^2), ratio of the Chi-Square divided by the degrees of freedom (χ^2 / df) is 1.65, indicating that the model is acceptable. The correlation coefficients for the three RESD-A latent variables were $r = 0.53$ ($p < 0.05$) between RIB and AIB, $r = 0.51$ ($p < 0.05$) between

RIB and CIB, and $r = 0.45$ ($p < 0.05$) between AIB and CIB. Kline (1998) states that the hypotheses are confirmed if the estimated parameter for each path of the structural model is significant, that is, when the t-value is > 1.96 for $p < 0.05$. According to t-test results, all parameters were significant with the t value of over 1.96 value ($p < 0.05$). In the 3-factor model, t-test values in all parameters ranged from 5.81 to 15.41 and were statistically significant. The CFA results for the current sample are consistent with past research (Artiran, 2015; Artiran et al., 2020) attesting to the structural validity of the RESD-A. Finally, Cronbach's alphas indicate high internal consistency for subscales AIB ($\alpha = 0.85$), RIB ($\alpha = 0.87$), and CIB ($\alpha = 0.89$).

Criterion Validity of the RESD-A

The Pearson's correlation analysis revealed that RESD-A subscales were significantly associated with EI subscale scores and MHI scores (Table 1). Specifically, AIB, RIB, and CIB were negatively related to EI subscale scores of wellbeing, self-control, emotionality, sociability, and also negatively related to mental health. In sum, greater irrational beliefs concerning basic psychological needs, as measured with the RESD-A, were related to poorer EI and mental health.

Athlete location

For RESD-A subscale scores, MANOVA did not reveal a significant main effect for athlete location, $F(3,237) = 1.18$, $p = 0.318$, partial eta squared $= 0.02$. For EI subscale scores, MANOVA revealed a significant main effect for athlete location, $F(4,237) = 4.99$, $p < 0.001$, partial eta squared $= 0.08$. Univariate effects, $F(1,240) = 17.22$, $p < 0.001$, partial eta squared $= 0.07$, indicated that emotionality was greater in the U.S.A. athletes ($M = 41.55$, $SD = 5.62$) compared to U.K. athletes ($M = 37.47$, $SD = 6.21$). For MHI scores, ANOVA revealed a significant effect for athlete location, $F(1,240) = 13.68$, $p < 0.001$, partial eta squared $= 0.05$. Mental health was higher in the U.K. athletes ($M = 82.24$, $SD = 7.64$) compared to U.S.A. athletes ($M = 73.29$, $SD = 15.09$).

Table 1 Means, SDs, and Pearson's correlation coefficients for all self-report variables

Variable	Mean	SD	1	2	3	4	5	6	7
1. AIB	39.40	9.33	–						
2. RIB	33.48	8.59	.55***	–					
3. CIB	36.80	9.57	.48***	.52***	–				
4. Wellbeing	33.90	5.07	− .30***	− .24***	− .31***	–			
5. Self-control	28.44	5.21	− .35***	− .25**	− .34***	.63***	–		
6. Emotionality	40.86	5.91	− .31***	− .18**	− .34***	.41***	.45***	–	
7. Sociability	30.41	4.85	− .13*	− .28**	− .18**	.38***	.40***	.38***	–
8. Mental health	74.81	14.49	− .24***	− .30***	− .33***	.60***	.46***	.16**	.20**

***$p < .001$; **$p < .01$; *$p < .05$

Discussion

The purpose of the current study was to examine the construct and criterion validity of a newly developed self-report measure of REBT-derived irrational beliefs within the context of the three basic psychological needs (BPNs) posited in SDT. The CFA analysis revealed the three-factor RESD-A to have an excellent factor structure (construct) validity, comparable to the initial validity tests conducted on the RESD-A (Artiran et al., 2020). Correlation analyses demonstrated, as hypothesized, that greater AIB, RIB, and CIB scores were related to poorer EI and mental health. Correlation results are in line with formative data on the RESD-A that indicates that adolescents with higher levels of irrational beliefs about BPNs seem to be more vulnerable to mental health complaints (Artiran et al., 2020).

The results of the current study are potentially important and useful for researchers and sport psychology practitioners working with adolescent athletes. For practitioners, supporting athletes in developing strong perceptions of satisfied BPNs is an important goal (Jõesaar et al., 2011), but results of the current study imply that some dangers may arise if young athletes hold irrational beliefs pertaining to these BPNs. Preliminary data (Artiran et al., 2020) and the present study indicate that there may be some mental health factors that relate to holding irrational beliefs about the BPNs, and thus, practitioners could work with athletes and coaches to ensure that, whilst the satisfaction of BPNs is striven for, an irrational demand for said BPNs is discouraged. Practitioners working with athletes who do hold irrational beliefs about the BPNs can utilise REBT to help athletes themselves, and the coaches (Turner, 2019), to challenge such beliefs and instigate rational alternate beliefs. Researchers working in the applied milieu may wish to use the RESD-A to evaluate the effectiveness of their work in the irrational beliefs of athletes.

The current paper has some limitations that provide opportunities for further development and that could be addressed in future research. First, a larger sample size should be recruited in order to be confident in the validity of RESD-A in young athletes. Comrey and Lee (1992) suggest that 200 participants is 'fair', and Kline (2011) suggests that for structural equation models (SEMs) like CFA, a typical sample size about 200 cases for non-complex models. But some research indicates that ten participants per item is more favourable (Turner et al., 2021). Second, it is still unknown whether and to what extent RESD-A scores predict poorer mental health, because only cross-sectional atemporal data have been collected. Researchers should complete longitudinal studies that assess the predictive validity of the RESD-A in mental health changes over time. Third, the athlete sample we recruited was fairly homogenous, and the generalisation of these results is unknown. Further work is needed to test the RESD-A, across different sports, and in large samples from which results can be more suitably generalised. In addition to testing the RESD-A in larger samples, researchers should also test alternate models to understand the potential for additional factors nested within the RESD-A. It is also important to test alternate models (e.g., bifactor; Rodriguez et al., 2016) in order to ensure that the factor structure proposed by Artiran

et al. (2020) is indeed the most parsimonious model. Future research should also pay close attention to depreciation beliefs in the RESD-A, with current data (error variances) indicating that depreciation could be a separate entity from the other the three irrational belief types. Indeed, past research with athletes indicates the particular salience of depreciation in the mental health of athletes (Turner, Aspin, et al., 2019), and some researchers suggest that depreciation may operate as a schema (Szentagotai et al., 2005), with some data indicating a convergence of depreciation and maladaptive schema (Turner, Carrington, et al., 2019). In athletes, there is a burgeoning need to gain a deeper understand of the development, ramifications, and disputation, of depreciation beliefs.

In conclusion, in this brief study we confirmed the factor structure of the recently developed RESD-A with a sample of adolescent athletes. Data also indicated criterion validity for the RESD-A in the athlete sample, whereby greater RESD-A subscales scores (AIB, RIB, and CIB) were associated with poorer mental health and wellbeing (EI).

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10942-022-00464-0.

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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