



Pathways into Psychopathology: Modelling the Effects of Trait Emotional Intelligence, Mindfulness, and Irrational Beliefs in a Clinical Sample

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Complete List of Authors:	Petrides, K. V. ; University College London, London Psychometric Laboratory Gómez, María G.; Universidad de Barcelona, Faculty of Psychology Pérez-González, Juan-Carlos; Universidad Nacional de Educación a Distancia (UNED), Emotional Education Laboratory (EDUEMO Lab)
Keywords:	Trait Emotional Intelligence, Personality, Mental Health, Clinical Psychology, Personality Disorders, TEIQue

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Running Head: PATHWAYS INTO PSYCHOPATHOLOGY

Pathways into Psychopathology: Modelling the Effects of Trait Emotional Intelligence,
Mindfulness, and Irrational Beliefs in a Clinical Sample

For Peer Review

Abstract

We investigated possible pathways into mental illness via the combined effects of trait emotional intelligence (trait EI), mindfulness, and irrational beliefs. The sample comprised 121 psychiatric outpatients (64.5% males, mean age = 38.8 years) with a variety of formal clinical diagnoses. Psychopathology was operationalized by means of three distinct indicators from the Millon Clinical Multi-Axial Inventory ('mild pathology,' 'severe pathology,' and 'clinical symptomatology'). A structural equation model confirmed significant direct trait EI and mindfulness effects on irrational beliefs and psychopathology. Trait EI also had a significant indirect effect on psychopathology via mindfulness. Together, the three constructs accounted for 44% of the variance in psychopathology. A series of hierarchical regressions demonstrated that trait EI is a stronger predictor of psychopathology than mindfulness and irrational beliefs combined. We conclude that the identified pathways can provide the basis for the development of safe and effective responses to the ongoing mental health and overmedication crises.

Key Practitioner Message:

- Self-perception constructs concerning one's beliefs about oneself have a major impact on the likelihood of developing psychopathological symptoms.
- Emotional perceptions captured by trait emotional intelligence (trait EI) were stronger predictors of psychopathology than either or both mindfulness and irrational beliefs in a clinical sample of adults.
- If the seed factors of psychopathology are mainly psychological, rather than mainly biological, and given that psychological constructs, like trait EI, mindfulness, and irrational beliefs, are amenable to training and optimization, the findings herein provide the impetus for a much needed shift of emphasis from pharmacological to psychological treatments.

Keywords: trait emotional intelligence, personality, mental health, clinical psychology, personality disorders, TEIQue.

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3 Pathways into Psychopathology: Modelling the Effects of Trait Emotional Intelligence,
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5 Mindfulness, and Irrational Beliefs in a Clinical Sample
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8 Like many constructs in psychology, psychopathology lacks a consensually
9 agreed definition (Maddux, Gosselin, & Winstead, 2012). From a statistical point of
10 view, it has been proposed that abnormality is located in the negative tail of a bell-
11 shaped distribution. According to the dimensional model of psychopathology, normal
12 and abnormal personality as well as effective and ineffective psychological functioning
13 lie along a continuum of underlying level of risk for disorder that is graded in severity,
14 rather than discrete and categorical (Krueger & Markon, 2006). Psychopathology has
15 been concisely conceptualized as harmful dysfunction (Wakefield, 1992), ultimately
16 resulting in maladaptive behaviors that also involve experiences of psychological
17 suffering or loss of well-being.
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30 Recent research from a clinical perspective has suggested the possibility of a
31 general dimension of psychopathology, labelled the “p factor” by Caspi et al. (2014; see
32 also Lahey et al., 2015). This development had been foreshadowed by Rushton and
33 colleagues (Rushton & Irwing, 2009; Rushton, Irwing, & Booth, 2010), who
34 successfully extracted general factors from the Millon Clinical Multiaxial Inventory
35 (MCMI), the Dimensional Assessment of Personality Pathology, and the Personality
36 Assessment Inventory. Based on these results, they suggested that a general factor
37 occupies the apex of the multifactorial hierarchies of personality disorders, mirroring
38 the general factor identified in non-clinical personality traits (Rushton et al., 2009), and
39 the general factor in the hierarchy of cognitive abilities (Carroll, 1993).
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53 *Millon's theory and psychopathology*
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55 Following evolutionary principles, Millon (1969) outlined a theory that views
56 personality as a collection of stable qualities, including temperament, sensitivities,
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3 proclivities, preferences, behavioral patterns, and coping strategies (Strack & Millon,
4
5 2013). According to Millon, each personality style comprises three polarities:
6
7 “pleasure-pain,” “active-passive,” and “self-other”. Millon’s theory, which incorporates
8
9 universal guiding principles, stages of development based on neuropsychology, and a
10
11 taxonomic classification system (Tringone & Bockian, 2015) has exerted a major
12
13 impact on the development of the *Diagnostic and Statistical Manual of Mental*
14
15 *Disorders* (DSM; Pincus & Krueger, 2015).
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19 The MCMI is one of the most widely used diagnostic inventories in Spain
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21 (Muñiz & Fernández- Hermida, 2010), where the present sample originates, as well as
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23 in Europe (Evers et al., 2012) and the United States (e.g., Prins, 2014). It was
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25 developed in accordance with Loevinger’s (1957) three-stage model of test
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27 construction, involving theoretical foundation, internal structural checks, and external
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29 criterion validation (Choca & Grossman, 2015). The MCMI has been utilized in
30
31 numerous clinical studies to assess personality disorders. Examples of recent topics
32
33 include alcohol and cocaine abuse (López-Goñi, Fernández-Montalvo & Arteaga,
34
35 2015), mood disorders (Osma, García-Palacios, Botella, & Barrada, 2014), pathological
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37 gambling (Maniaci et al., 2015), posttraumatic stress disorders (Palic & Elklit, 2014),
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39 and somatoform disorders (Herrero, Ramírez-Maestre & González, 2008). Its profiling
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41 accuracy has rendered it highly popular in research with forensic samples, such as
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43 domestic violence perpetrators (Gibbons, Collins & Reid, 2011) and fire-setters (Ó
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45 Ciardha et al., 2015).
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50 Given that psychopathology underpins a broad range of disordered behavior
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52 (e.g., Carragher, Krueger, Eaton, & Slade, 2015; Lahey & Waldman, 2012), it seems
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54 imperative to investigate potential psychological drivers of individual differences in
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56 psychopathological traits. Such investigations should preferably be conducted on
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3 clinical samples, since they alone can ensure clinical utility by allowing the
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5 extrapolation of results to clinical populations. Furthermore, the means, factor
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7 structures, and nomological networks of constructs may vary substantially between
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9 clinical and non-clinical samples (e.g., Bagby et al., 1999; Sinclair & Feigenbaum,
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11 2012; Williams & Paulhus, 2004). It follows that without clinical data (of which there
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13 is a severe dearth in emotional intelligence research; Hansen, Lloyd, & Stough, 2009), it
14
15 is very difficult to establish whether, and with what caveats, research conclusions
16
17 obtained in non-clinical samples may apply to clinical groups.
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21 The present paper focuses specifically on the constructs of trait emotional
22
23 intelligence and mindfulness in combination with a construct whose roots can be traced
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25 back to Greek sage Socrates, viz., irrational beliefs (Ellis, David, & Lynn, 2010).
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27 *Trait emotional intelligence*

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30 Trait emotional intelligence (trait EI or trait emotional self-efficacy) refers to a
31
32 constellation of emotional perceptions assessed via questionnaires and rating scales
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34 (Petrides, Pita, & Kokkinaki, 2007). Essentially, the construct concerns people's
35
36 perceptions of their emotional abilities. In recent years, trait EI has emerged as a
37
38 variable of central interest in the broader field of personality, with promising
39
40 applications in clinical psychology (Delhaye, Kempnaers, Stroobants, Goossens, &
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42 Linkowski, 2013; Petrides et al., 2016; Sinclair & Feigenbaum, 2012).
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46 A large meta-analysis by Martins, Ramalho, and Morin (2010; see also Petrides,
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48 Pérez-González, & Furnham, 2007) established that trait EI is a strong positive
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50 predictor of mental health. The construct has been positively associated with adaptive
51
52 coping styles, peer relations, and socio-emotional competence (e.g., Frederickson,
53
54 Petrides, & Simmonds, 2012) and negatively associated with a wide range of mental
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56 disorders, in clinical (e.g., Kornreich et al., 2011) as well as non-clinical (e.g.,
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3 Mikolajczak, Petrides, Luminet, & Coumans, 2009) samples. Nevertheless, there
4
5 continues to be a relative dearth of theory-driven trait EI research in clinical samples
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7 (Hansen et al., 2009; Zeidner, Matthews, & Roberts, 2012).
8

9 10 *Mindfulness*

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12 Mindfulness is a state of consciousness, attention, and awareness of present
13
14 events and experiences. Although its precise factor structure remains under
15
16 investigation (Siegling & Petrides, 2014, 2016), the construct includes characteristics
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18 like clarity of awareness, non-conceptual awareness, ability to focus attention, non-
19
20 evaluation or judgement of sensory experience, and orientation to the present (Brown,
21
22 Ryan, & Creswell, 2007).
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25 As regards its relevance to emotions, it has been shown that mindfulness
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27 correlates positively with the capacity to be more aware of emotional states and the
28
29 ability to change them so as to fulfil basic psychological needs (Brown & Ryan, 2003).
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31 Mindfulness has also been linked to emotional stability (Kumar, Feldman, & Hages,
32
33 2008) and emotion regulation (Wallace & Shapiro, 2006). These associations are
34
35 pertinent to the present research because emotion regulation problems are strongly
36
37 related to psychopathology (Davidson, 2000). Lack of mindfulness can lead to
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39 avoidance of, or preoccupation with, negative emotions, which are common agents of
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41 psychopathology (Gross, 2002). Indeed, several mindfulness-based interventions have
42
43 proven effective in enhancing emotion regulation, and reducing depression and
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45 rumination (Kabat-Zinn, 2003; Kumar, Feldman & Hayes, 2008).
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49 50 *Irrational beliefs*

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52 Irrational beliefs have been defined as “unrealistic reasoning processes by which
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54 external events are interpreted and through which emotional distress is mediated”
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56 (Koopmans, Sanderman, Timmerman, & Emmelkamp, 1994, p. 15). They are generally
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3 illogical, absolutist, and sincerely held, even though not provable or falsifiable, while
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5 rational beliefs are those that are logically self- or socially-helping (Ellis, 1995). By
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7 virtue of their involvement in dysfunctional behaviors, psychological disturbances, and
8
9 unhealthy emotions (Davies, 2008), irrational beliefs play a central role in
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11 psychopathology.
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14 Modelled on the teachings of the Greek philosopher Epictetus, Ellis' rational-
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16 emotional behavior theory (e.g., Ellis, 1989) suggests that psychological problems and
17
18 self- defeating behaviors are not caused by external events, but by beliefs about the
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20 events. Distorted perceptions and irrational beliefs are key factors in the etiology of
21
22 many disorders, such as depression and anxiety (Haaga, Dyck, & Ernst, 1991), bulimic
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24 symptomatology (Lohr & Parkinson, 1989), posttraumatic stress disorder (Hyland,
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26 Shevlin, Adamson, & Boduszek, 2015), and workaholism (Van Wijhe, Peeters, &
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28 Schaufeli, 2013).
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30 31 *The present study* 32

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34 Recognizing their theoretical connections, sporadic studies have explored the
35
36 interrelationships between various permutations of trait EI, mindfulness, and irrational
37
38 beliefs. For example, Bao, Xue, and Kong (2015) showed that trait EI and mindfulness
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40 are positively related and that aspects of the former mediate the latter's impact on stress
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42 (see also Schutte & Malouff, 2011), while Whitfield (2006) went so far as to propose
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44 integrating mindfulness-based and rational-emotive behavior therapies.
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48 To our knowledge, however, no empirical research has tried to model these
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50 interrelationships simultaneously in a multicomponent system. Furthermore, even those
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52 studies that previously examined these variables in a pairwise fashion have been
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54 overwhelmingly conducted on normative samples, which compromises their
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56 informational value with respect to clinical populations.
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3 The present study contributes towards addressing these theoretical gaps and
4 methodological limitations in the literature by formulating and testing the model
5 depicted in Figure 1. According to this model, trait EI and mindfulness are permitted to
6 have direct as well as indirect effects on a latent variable of psychopathology (defined
7 through the three MCMI indicators, viz., 'mild pathology,' 'severe pathology,' and
8 'clinical symptomatology'), while irrational beliefs are modelled as a potential mediator
9 of trait EI and mindfulness, with the additional possibility of a direct effect.
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18 The model was set up with trait EI as the upstream variable, reflecting its
19 precedence as a partly genetically determined construct (e.g., Vernon, Petrides, Bratko,
20 & Schemer, 2008), and with psychopathology as the downstream variable as the main
21 outcome of interest in the study. In between, mindfulness takes precedence over
22 irrational beliefs because awareness of the contents of our mind informs our beliefs,
23 rather than the other way around.
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32 A secondary aim of the study was to investigate the incremental validity of trait
33 EI vis-à-vis mindfulness and irrational beliefs. From a clinical perspective, the relevant
34 analyses will help us establish whether emotional disturbances are more important than
35 mechanical or illogical thinking patterns in predicting psychopathology. In the light of
36 previous results (e.g., Andrei, Siegling, Aloe, Baldaro, & Petrides, 2016; Petrides et al.,
37 2007; Siegling, Vesely, Petrides, & Saklofske, 2015) and theoretical accounts giving
38 more weight to emotions than to cognitive evaluations in the development of
39 psychological illness (e.g., hyper-emotion theory; Johnson-Laird, Mancini, & Gangemi,
40 2006), we hypothesized that trait EI would be a stronger predictor of psychopathology
41 than both mindfulness and irrational beliefs.
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53 This hypothesis was tested by means of three distinct statistical tests: i) a
54 hierarchical regression, whereby the global trait EI score was evaluated against the total
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3 mindfulness and total irrational beliefs scores (hypothesis H1); ii) a more stringent
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5 hierarchical regression, whereby the global trait EI score was evaluated against the five
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7 mindfulness factor scores and the two irrational beliefs factor scores (hypothesis H2);
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9 and, last, iii) a hierarchical regression, whereby the four trait EI factor scores were
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11 evaluated against the five mindfulness and two irrational beliefs factor scores
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13 (hypothesis H3). All three hypotheses predicted significantly negative incremental trait
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15 EI effects.
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18 **Method**

19 *Participants*

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22 One hundred and twenty-one psychiatric outpatients (64.5% males and 35.5%
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24 females) at the Molina del Segura Hospital in Spain with formal Axis I diagnoses
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26 according to the DSM-IV-TR, participated in the study. The sample comprised the
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28 following clinical diagnoses: 25.6% personality disorder (cluster A: 4 paranoid, 3
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30 schizoid, 3 schizotypal; cluster B: 1 antisocial, 5 borderline, 2 histrionic, 6 narcissistic;
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32 cluster C: 2 dependent, 5 obsessive-compulsive), 17.4% anxiety (7 generalized anxiety
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34 disorder, 4 panic disorder/agoraphobia, 4 social phobia/social anxiety disorder,
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36 6 obsessive-compulsive disorder), 15.7% dysthymia, 13.2% obsessive-compulsive
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38 disorder, 11.6% schizophrenia, 8.3% bipolar, and 8.3% depression. In 78.5% of cases,
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40 participants had been suffering from mental disorders for over a year.
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46 Mean age was 38.80 years ($SD = 10.26$; range 23 to 65). Fifty-seven percent
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48 were married, 41.3% single, and 1.7% widowed. With respect to education, 30.6% had
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50 completed primary school, 36.4% secondary school, and 33.1% held university degrees.
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52 With respect to occupational status, 45% were employed and 55% unemployed.
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54 Assessments of physical health confirmed that 19% of the sample also suffered from
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56 various physical conditions.
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Measures

Trait emotional intelligence

Trait EI was measured using the Spanish adaptation (Pérez-González, 2010) of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF; Petrides, 2009). The TEIQue-SF consists of 30 items designed to measure global trait EI, although it can also yield fairly reliable scores on the four factors of the construct, viz., Well-Being, Self-control, Emotionality, and Sociability. Items are responded to on a 7-point Likert scale. For a psychometric investigation of the TEIQue-SF using item-response theory, see Cooper and Petrides (2010). Cronbach's alphas on our sample were .85 for the global score, and .87, .61, .61, and .66, for Well-Being, Self-control, Emotionality, and Sociability, respectively.

Mindfulness

To assess mindfulness, we used the Five Factors Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The FFMQ consists of 39 items, responded to on a 5-point Likert scale. The five factors of the FFMQ are: *Observing*, which refers to noticing or attending to internal and external experiences, such as thoughts, body sensations, or emotions; *Describing*, which refers to labelling internal experiences with words; *Acting with awareness*, which refers to focusing on one's activities at a given moment as opposed to behaving mechanically; *Non-judging of inner experience*, which refers to taking a non-evaluative stance toward thoughts and feelings; and *Non-reactivity to inner experience*, which refers to allowing thoughts and feelings to come and go, without getting carried away by them. The Spanish adaptation of the FFMQ has shown good psychometric properties, with Cronbach's alphas, ranging from 0.80 to 0.91 (Cebolla et al., 2012). In our sample, the FFMQ exhibited satisfactory levels of reliability (ranging from .70 to .87; see Table 1).

Irrational beliefs

We used the brief Spanish adaptation (Calvete & Cardeñoso, 1999) of the Irrational Beliefs Test (IBT; Jones, 1968), which comprises 57 statements and 10 subscales: 'Demand for approval,' 'High self-expectations,' 'Blame proneness,' 'Frustration reactivity,' 'Emotional irresponsibility,' 'Anxious over-concern,' 'Problem avoidance,' 'Dependence,' 'Helplessness,' and 'Perfectionism'. Participants rated their agreement or disagreement with each statement on a 6-point Likert scale.

A total score was derived by summing up the scores on seven of the ten subscales. Three subscales were excluded due to negative or very low item-total correlations ('Problem avoidance,' 'Dependency,' and 'Perfectionism'). The internal consistency of this total score was .75. For the purposes of the second set of hierarchical regressions (hypothesis H2), which required the extraction of a smaller number of factors for analysis, a principal axis factor analysis with PROMAX rotation of the seven subscales was performed (full FA results are available from the corresponding author). Two factors emerged, explaining 58.73% of the variance. They were labelled as Emotional Irrational Beliefs (EIB; comprising 'Frustration reactive,' 'Emotional irresponsibility,' 'Anxious Over-concern,' 'Blame proneness,' and 'Helplessness') and Social Irrational Beliefs (SIB; comprising 'High Self-expectations' and 'Demand for Approval'). Factor pattern loadings ranged between .409 and .907 and the two factors intercorrelated at -.44. Factor score coefficients for the two factors were estimated by means of the regression method. Their alphas were .70 and .66, respectively.

Psychopathology

Personality features and symptom syndromes were assessed with the Spanish version (Ávila-Espada, Jiménez-Gómez et al., 2002) of the Millon Clinical Multi-Axial

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3 Inventory (MCMI-II; Millon, 1987)¹. The MCMI-II is a 175-item true/false
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5 questionnaire designed for use in clinical populations. It yields scores on 10 mildly
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7 pathological personality facets (Aggressive/sadistic, Antisocial, Avoidant, Compulsive,
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9 Dependent, Histrionic, Narcissistic, Passive-aggressive, Schizoid, Self-defeating), three
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11 severely pathological personality facets (Borderline, Paranoid, and Schizotypal), and
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13 nine facets of clinical symptomatology (Alcohol dependence, Anxiety disorder, Bipolar
14
15 manic disorder, Delusional disorder, Drug disorder, Dysthymic disorder, Major
16
17 Depression, Somatoform disorder, and Thought disorder). Last, it also includes three
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19 validity indices (Debasement, Desirability, and Disclosure). The MCMI has been
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21 constructed in accordance with a “polythetic” structural model, which permits item
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23 overlap between scales. We focus on four MCMI scores in this study (alphas in
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25 parentheses): mild personality pathology (.80), severe personality pathology (.86),
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27 clinical symptomatology (.92), and the total score (.92).
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31 *Procedure*

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34 The research protocol was approved by three experienced psychiatrists and
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36 ethical approval for the study was granted by the collaborating hospital’s Ethics
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38 Committee. The recruitment phase of the study lasted approximately eight weeks.
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40 Inclusion criteria for the study were age (between 18 and 65 years), ability to read and
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42 write, and ability to respond meaningfully to the interview questions. Exclusion criteria
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47 ¹ The Spanish translation of the MCMI-III has been available for several years and there
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49 is growing support for its convergent and predictive validity, however not in clinical
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51 samples yet (Rossi & Derksen, 2015). As a result, the MCMI-II remains one of the
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53 most widely used personality inventories in research and clinical practice in the Spanish
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55 language (López-Goñi et al., 2015).
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3 were age outside the 18-65 bracket, illiteracy, and mental or physical symptomatology
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5 that prevented meaningful participation in the study.
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8 Patients were initially assessed by a psychiatrist and then referred to a
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10 psychologist for the implementation of the study. Diagnosis was based on a structured
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12 diagnostic interview during which symptoms were considered strictly in relation to
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14 DSM-IV-TR criteria. The interview lasted approximately one hour and included a
15
16 structured assessment of sociodemographic characteristics. Data provided by the
17
18 psychiatrist included an objective evaluation of symptomatology and diagnosis through
19
20 formal consultation, age of onset of disorder, number of disease relapses, and physical
21
22 health information. Fourteen patients declined to participate citing reasons like fatigue
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24 or more urgent commitments. All participants gave written informed consent to
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26 participate in this study.
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29 30 **Results**

31
32 The descriptive statistics and internal consistencies for the variables in the study
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34 are presented in Table 1. The average global trait EI (TEIQue-SF) score in our clinical
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36 sample was two standard deviations ($M=3.53$; $SD=.77$) below normative means
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38 (Cooper & Petrides, 2010: $M=5.02$, $SD=.73$; Pérez-González, 2010: $M=4.90$, $SD=.65$).
39
40 It can be seen in that table that the study variables exhibited generally satisfactory
41
42 internal consistencies. A pattern of associations consistent with theoretical expectations
43
44 can be detected in the variable inter-correlation matrix (see Table 2). We note, in
45
46 particular, the strong negative correlations between all five trait EI variables (four
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48 factors and the global score) and the four psychopathology variables (three MCMI
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50 factors and the total score). Given that most variables in the table are moderately-to-
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52 strongly interrelated, it is possible to introduce a structure to the correlation matrix in
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54 accordance with the path diagram in Figure 1.
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Structural equation model

Using MPlus, we tested a structural equation model with maximum likelihood estimation, since the data were relatively normally distributed. A latent variable of psychopathology was operationalized via the three Millon indicators, viz., mild pathology, severe pathology, and clinical symptomatology. This latent variable was regressed onto trait EI, irrational beliefs, and mindfulness. In turn, irrational beliefs were regressed onto trait EI and mindfulness, and, last, mindfulness was regressed onto trait EI. The resultant standardized path estimates are depicted in Figure 1.

The model represented a satisfactory fit to the data as judged against the Hu and Bentler (1999) criteria: $\chi^2_{(6)}=42.89$, CFI=.96, TLI = .91, SRMR=0.03. The RMSEA value was unsatisfactory (.23; 90%CI = 0.17 - 0.29), however, this index tends to be inappropriate and misleading for models with low degrees of freedom, such as the present one (Kenny, Kaniskan, & McCoach, 2015). As can be seen in Figure 1, all paths reached statistical significance with the exception of that from irrational beliefs to psychopathology. Thus, both trait EI and mindfulness had significant direct effects on irrational beliefs and psychopathology, although the former's were somewhat stronger in both cases (-.559 versus -.189 for irrational beliefs and -.387 versus -.255 for psychopathology). Overall, 44% percent of the total variance in psychopathology was accounted for in the model.

Direct and indirect effects

The total standardized effect of trait EI on psychopathology was -0.637. This can be broken down to a direct part (-0.387, as reported above; $p < .01$) and an indirect part (-0.25; $p < .01$). The bulk of the indirect part involved the path via mindfulness (-0.189, $p < .05$).

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3 The total standardized effect of mindfulness on psychopathology was -0.272.

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5 The direct part formed the bulk of this effect (-0.255, as reported above; $p < .01$), while
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7 the indirect part (via irrational beliefs) did not reach significance levels (-0.017, $p = ns$).
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10 *Hierarchical regressions*

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12 Using SPSS, a hierarchical regression was performed with the total Millon score
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14 as the dependent variable in order to test hypothesis H1, viz., that trait EI will be a
15
16 stronger predictor of psychopathology than irrational beliefs and mindfulness. Full
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18 details are presented in Table 3. At step 1, the total scale scores for irrational beliefs
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20 and mindfulness were jointly entered into the equation ($R^2_{adj} = .38$, $F_{(2, 118)} = 38.13$, $p <$
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22 $.01$). At step 2, with global trait EI added to the equation, $R^2_{adj} = .45$, $F_{(3, 117)} = 31.27$, p
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24 $< .01$ ($\beta_{TEI} = -.386$, $t = 3.32$, $p < .01$). These results support hypothesis H1.
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28 Subsequently, we conducted a hierarchical regression with the same dependent
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30 variable (total Millon score), but this time with the five factor scores of mindfulness, the
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32 two factor scores of irrational beliefs, and global trait EI as predictors, in order to test
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34 hypothesis H2. This is a more stringent test of the incremental validity of trait EI,
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36 contrasting its one degree of freedom against two degrees of freedom for irrational
37
38 beliefs and five degrees of freedom for mindfulness. Full details are presented in Table
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40 3. At step 1, the factor scores for irrational beliefs and mindfulness were jointly entered
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42 into the equation ($R^2_{adj} = .44$, $F_{(7, 113)} = 14.53$, $p < .01$). At step 2, with global trait EI
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44 added to the equation, $R^2_{adj} = .50$, $F_{(8, 112)} = 14.20$, $p < .01$ ($\beta_{TEI} = -.347$, $t = 2.59$, $p <$
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46 $.05$). These results support hypothesis H2.
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50 A third and final hierarchical regression was performed with the same dependent
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52 variable (total Millon score), and the factor scores of irrational beliefs, mindfulness, and
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54 trait EI as predictors. This was in order to investigate which of the four trait EI factors
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56 are mainly responsible for the effects of the global score. Full details are presented in
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2
3 Table 3. The first step was identical to the corresponding step in the hierarchical
4 regression above. At step 2, with the four trait EI factors added to the equation, $R^2_{adj} =$
5 $.53$, $F_{(11, 109)} = 13.15$, $p < .01$ ($\beta_{WB} = -.469$, $t = 4.08$, $p < .01$; $\beta_{SC} = -.009$, $t = 0.11$, $p = ns$;
6 $\beta_{EMO} = -.151$, $t = 1.54$, $p = ns$; $\beta_{SOC} = .082$, $t = .91$, $p = ns$). Thus, only the Well-being
7 factor reached significance levels in this equation.
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14 Discussion

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16 Our emotional perceptions, reasoning processes, and ability to maintain
17 awareness on a moment-to-moment basis play an important role in the development and
18 maintenance of mental illness. Up to about half the variance in total MCMI scores can
19 be accounted for by individual differences in trait emotional intelligence, mindfulness,
20 and irrational beliefs. The structural equation and hierarchical regression models
21 suggest that negative emotional self-perceptions are perhaps more fundamental than
22 irrational thinking or lack of awareness in the development of psychopathology. It
23 seems that such self-perceptions lead to psychopathology both directly, but also
24 indirectly, through clouding awareness and fueling irrational thinking.
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36 Previous research on typical samples has shown that trait EI correlates
37 negatively with psychopathology (Martins et al., 2010) and irrational beliefs (Kamae &
38 Weisani, 2014), and positively with mindfulness (Schutte & Malouff, 2011). In turn,
39 mindfulness and irrational beliefs are, respectively, negatively and positively associated
40 with psychopathology (e.g., Gregório & Pinto-Gouveia, 2013; Browne, Dowd, &
41 Freeman, 2010) and inversely interrelated between them (Mellinger, 2010).
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50 Our study adds weight to this body of knowledge by integrating the foregoing
51 variables within a structural equation model and scrutinizing it on a clinical sample.
52 This sample exhibited a very low level of trait EI (two standard deviations below the
53 normative mean), which accords with findings from other studies that have compared
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3 personality profiles of typical versus clinical populations (e.g., Bagby et al., 1999;
4
5 Sinclair & Feigenbaum, 2012). Clinical samples are as rare as they are necessary for
6
7 this type of research because they do not leave any doubts as to whether the findings are
8
9 theoretically and practically relevant to clinical groups (e.g., Wupperman, Neumann, &
10
11 Axelrod, 2008). Studies using clinical samples are needed to identify personality
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13 correlates of mental health problems as well as to determine whether these differ from
14
15 correlates in non-clinical samples (Resurrección, Salguero, & Ruiz-Aranda, 2014).
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19 However, it should be recognized that clinical samples may inflate the
20
21 relationships between trait EI and mental health and that their findings cannot be
22
23 extrapolated to the general population. Normative samples may provide a more
24
25 accurate estimate of the increased mental health risk associated with low trait EI.
26
27 Therefore, both clinical and non-clinical samples are necessary to develop a full
28
29 understanding of the relationship between personality and health (Ferguson, 2013).
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33 The integration of the study's key variables within a structural equation model
34
35 enabled the examination of specific pathways into psychopathology, in contrast to the
36
37 dominant research designs in the literature that examine permutations of variables in a
38
39 rather haphazard fashion. An important conclusion of the analysis concerns the primacy
40
41 of emotional perceptions in the genesis of mental illness. Broad patterns of unhealthy
42
43 emotional perceptions are at the root of irrational thinking, of mechanical and
44
45 ruminative cognition that undermines mindfulness, and of maladaptive coping styles
46
47 leading to self-harming, personality disorders, and general psychopathy (e.g., Gardner
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49 & Qualter, 2009; Mikolajczak, Petrides, & Hurry, 2009; Peña-Sarrionandia,
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51 Mikolajczak, & Gross, 2015; Sinclair & Feigenbaum, 2012).
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55 The practical implications of this finding are thought-provoking when
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57 considered in a treatment context. Identifying seed factors at the start of
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3 psychopathological pathways can help us target our intervention efforts more precisely
4
5 and efficiently. If it is eventually established, in accordance with the present findings,
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7 that these seed factors are mainly psychological, rather than mainly biological, as large
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9 meta-analyses also seem to suggest (Risch et al. 2009), this can provide an impetus for a
10
11 much-needed shift from pharmacological to psychological treatments (Deacon, 2013).
12
13 This would be most desirable, given that drugs tend to operate on the basis of symptom
14
15 suppression (Hollon, Thase, & Markowitz, 2002) and are attended with problems of
16
17 addiction, tolerance, and a range of, potentially very severe, side-effects (Read,
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19 Cartwright, & Gibson, 2014; Weich et al., 2014).
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23 Related to this point are the facts that psychotherapy has been shown to be at
24
25 least as effective in the treatment of various psychopathologies as standard psychotropic
26
27 drugs (e.g., DeRubeis, Siegle, & Hollon, 2008) and that experiential and social
28
29 influences (e.g., cognitive therapy and meditation) are most powerful in inducing plastic
30
31 change in the brain (Davidson & McEwen, 2012). Such findings appear to be inspiring
32
33 a new wave of research that, like the present study, focuses on the theoretical links and
34
35 pathways inter-connecting fundamental self-perception constructs (see also Brockmeyer
36
37 et al., 2015).
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40 If dysfunctional emotional perceptions, as reflected in uniformly depressed trait
41
42 EI profiles, are at the root of pathways to psychopathology, an important question arises
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44 as to whether these profiles can be adjusted via training. Experimental studies with
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46 adults have shown that trait EI is amenable to training, which leads to parallel and
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48 lasting improvements in well-being, subjective health, quality of social relationships,
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50 and employability (e.g., Nelis et al., 2011). There is additional evidence from similarly
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52 rigorous research that trait EI training has long-term (lasting for at least one year)
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54 beneficial effects in terms of reducing perceived stress levels, somatic complaints and
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3 even diurnal cortisol secretion, a biological marker for stress (Kotsou, Nelis, Gregoire,
4 & Mikolajczak, 2011). Preliminary research with young adolescents has suggested that
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7 cognitive behavioral group-work (Ruttledge & Petrides, 2012) or yoga interventions
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9
10 (McIlvain, Miller, Lawhead, Barbosa-Leiker, & Anderson, 2015) can have positive
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12 effects on trait EI scores (see also Khalsa, Greiner-Ferris, Hofmann, & Khalsa, 2015).
13
14 Collectively, this evidence is important both for its practical consequences in people's
15
16 lives, but also for what it implies about the causal effects of trait EI on a range of
17
18 psychological and behavioral outcomes.
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20
21 As far as the incremental validity of trait EI is concerned, a spate of research,
22
23 including meta-analyses, has shown that not only is it a strong protective factor against
24
25 mental illness, but that it actually protects over and above multiple established
26
27 susceptibility factors, like maladaptive coping styles, negative affect, and neuroticism
28
29 (e.g., Andrei, Siegling, Aloe, Baldaro, & Petrides, 2016; Martins et al., 2010). The
30
31 hierarchical regressions revealed that the emotional perceptions captured by trait EI are
32
33 stronger predictors of psychopathology than both mindfulness and irrational beliefs. Of
34
35 the four trait EI factors, Well-being had the strongest incremental predictive validity,
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37 which further highlights the key role that this factor plays in mental health (see also
38
39 Edmodson & MacLeod, 2015).
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43 While the incremental predictive effects of trait EI tend to be modest, especially
44
45 in methodologically stringent designs whereby the global trait EI score is pitched
46
47 against multiple baseline constructs (as in the second hierarchical regression herein),
48
49 however they are still statistically and practically significant (Andrei et al., 2016). We
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51 must also carefully distinguish between prediction and explanation, and appreciate that
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53 the latter is at least as important as the former, if not more (Scriven, 1959). It is in its
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3 explanatory power and intervention possibilities, which can enhance people's everyday
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5 lives, where the utility of trait EI mainly rests.
6

7 8 *Limitations*

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10 The main limitations of this study are as follows. First, the sample size,
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12 although fairly large for clinical standards, was on the low end for structural equation
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14 modelling, which prevented us from fully modelling the observed indicators of the
15
16 latent variables. Second, as previously mentioned, the clinical nature of the sample
17
18 means that the results of the study do not necessarily generalize to the general
19
20 population. Third, the heterogeneous nature of the clinical sample, comprising a range
21
22 of psychiatric diagnoses, prevents us from proposing specific therapeutic actions.
23
24 Fourth, the study was conducted on a Spanish-speaking sample and it is not certain that
25
26 its results will generalize to other languages. An important goal for future research,
27
28 then, is to examine the circumstances and extent to which the findings replicate in other
29
30 contexts, countries, and cultures.
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33 34 *Conclusion*

35
36 Millions of people of all ages are suffering from debilitating mental disorders,
37
38 despite the ever-increasing popularity of psychotropic drugs (Brugha et al., 2004;
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40 Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Kessler et al., 2005; Merikangas et
41
42 al., 2010; Mojtabai & Jorm, 2015; Mojtabai, & Olfson, 2014). The present study
43
44 demonstrated that emotional perceptions, reasoning processes, and general awareness
45
46 create intertwined, but clearly identifiable, pathways leading to psychopathology. More
47
48 specifically, the results revealed significant paths, direct and mediational (via irrational
49
50 beliefs and mindfulness) from trait EI into psychopathology in a clinical sample.
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52 Understanding in greater detail and in multiple contexts the pathways uncovered in this
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54 study can help us develop effective, non-toxic responses to the mental health and
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overmedication crises that are scarring the lives of adults, adolescents, and children
alike.

For Peer Review

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Table 1

Descriptive Statistics and Internal Consistencies for the Key Variables in the Study

Variable	Cronbach's α	Mean	SD
1. Emotional irrational beliefs	.70	114.61	21.90
2. Social irrational beliefs	.66	44.57	10.44
3. Total irrational beliefs	.75	159.18	28.11
4. Mindfulness Observe	.70	20.65	5.91
5. Mindfulness Descriptive	.87	21.48	7.49
6. Mindfulness Awareness	.88	21.44	8.11
7. Mindfulness Non-judgement	.88	19.12	7.79
8. Mindfulness Non-reaction	.78	17.08	5.46
9. FFMQ total score	.80	99.78	26.11
10. Millon Personality Style	.80	30.66	7.06
11. Millon Personality Pathology	.86	33.09	14.19
12. Millon Clinical Symptomatology	.92	24.54	9.72
13. Millon total	.92	88.29	29.88
14. Trait EI Well-being	.87	3.57	1.36
15. Trait EI Self-control	.61	3.25	1.01
16. Trait EI Emotionality	.61	4.34	.93
17. Trait EI Sociability	.66	3.44	1.13
18. Global trait EI	.85	3.53	.77

Table 2

Correlation Matrix for the Key Variables in the Study

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Emotional irrational beliefs	-																
2. Social irrational beliefs	-.52**	-															
3. Total irrational beliefs	.94**	-.73**	-														
4. Mindfulness Observe	-.28**	.30**	-.33**	-													
5. Mindfulness Descriptive	-.42**	.30**	-.42**	.36**	-												
6. Mindfulness Awareness	-.41**	.44**	-.42**	.17	.47**	-											
7. Mindfulness Non-judgement	-.49**	.42**	-.50**	.22*	.50**	.66**	-										
8. Mindfulness Non-reaction	-.67**	.39**	-.61**	.43**	.60**	.52**	.54**	-									
9. Five Factors Mindfulness Questionnaire	-.60**	.49**	-.60**	.54**	.79**	.79**	.81**	.80**	-								
10. Millon Personality Style	.47**	-.34**	.47**	-.02	-.32**	-.34**	-.50**	-.44**	-.44**	-							
11. Millon Personality Pathology	.53**	-.31**	.50**	-.09	-.48**	-.47**	-.59**	-.53**	-.59**	.94**	-						
12. Millon Clinical Symptomatology	.55**	-.28**	.51**	-.26**	-.53**	-.48**	-.59**	-.55**	-.65**	.81**	.90**	-					
13. Millon total	.55**	-.32**	.51**	-.13	-.48**	-.46**	-.59**	-.54**	-.60**	.94**	.99**	.94**	-				
14. Well being	-.61**	.40**	-.62**	.38**	.50**	.37**	.53**	.52**	.61**	-.44**	-.52**	-.55**	-.53**	-			
15. Self control	-.58**	.33**	-.56**	.25**	.45**	.44**	.48**	.58**	.59**	-.36**	-.46**	-.49**	-.46**	.57**	-		
16. Emotionality	-.63**	.26**	-.54**	.12	.54**	.28**	.30**	.51**	.46**	-.45**	-.51**	-.53**	-.52**	.50**	.34**	-	
17. Sociability	-.26**	.21*	-.32**	.27**	.56**	.28**	.42**	.22*	.48**	-.20*	-.31**	-.31**	-.30**	.42**	.20*	.18	-
18. Global trait EI	-.72**	.38**	-.70**	.34**	.72**	.46**	.60**	.64**	.74**	-.51**	-.64**	-.66**	-.62**	.84**	.70**	.71**	.63**

Note: * p<.05; ** p<.01

Table 3

Hierarchical Regressions of Psychopathology (total Millon MCMI score) on Mindfulness, Irrational Beliefs and Trait EI

	MCMI ^a		MCMI ^b		MCMI ^c			
Step 1	F _(2, 118) = 38.13 ^{**} , R ² _{adj} = .38		Step 1 F _(7, 113) = 14.53 ^{**} , R ² _{adj} = .44		Step 1 F _(7, 113) = 14.53 ^{**} , R ² _{adj} = .44			
Step 2	F _(3, 117) = 31.27 ^{**} , R ² _{adj} = .45		Step 2 F _(8, 112) = 14.20 ^{**} , R ² _{adj} = .50		Step 2 F _(11, 109) = 13.15 ^{**} , R ² _{adj} = .53			
	Beta	t	Beta	t	Beta	t		
Step 1:			Step 1:		Step 1:			
FFMQ	-.451	5.03 ^{**}	Descriptive	-.168	1.86	Descriptive	-.168	1.86
Irrational	.241	2.68 ^{**}	Observe	.128	1.63	Observe	.128	1.63
Beliefs			Awareness	-.012	.13	Awareness	-.012	.13
			Non-judgement	-.333	3.38 ^{**}	Non-judgement	-.333	3.38 ^{**}
			Non-reaction	-.138	1.24	Non-reaction	-.138	1.24
			EIB	.265	2.65 ^{**}	EIB	.265	2.65 ^{**}
			SIB	.029	.34	SIB	.029	.34
Step 2:			Step 2:		Step 2:			
FFMQ	-.258	2.47 [*]	Descriptive	-.007	.07	Descriptive	-.022	.99
Irrational	.088	.91 ^{**}	Observe	.140	1.83	Observe	.127	1.70
Beliefs			Awareness	-.033	.34	Awareness	-.020	.23
			Non-judgement	-.260	2.60 [*]	Non-judgement	-.220	2.22 [*]
Trait EI	-.386	3.32 ^{**}	Non-reaction	-.150	1.37	Non-reaction	-.110	1.01

		EIB	.094	.80	EIB	-.020	.18
		SIB	.006	.07	SIB	-.021	.27
		Trait EI	-.347	2.59*	Well-being	-.469	4.08**
					Self-control	-.009	.11
					Emotionality	-.151	1.54
					Sociability	.082	.91
F _{change (1,117)} = 11.04**, R ² _{change} = .05		F _{change (1,112)} = 6.72*, R ² _{change} = .03			F _{change (4,109)} = 6.13**, R ² _{change} = .10		

Note. ^aRegression was based on total scores for irrational beliefs, mindfulness, and trait EI. ^bRegression was based on factor scores for irrational beliefs and mindfulness, and total scores for trait EI. ^cRegression was based on factor scores for irrational beliefs, mindfulness, and trait EI. EIB = Emotional irrational beliefs. SIB = Social irrational beliefs. *p<.05; **p<.01

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Running Head: PATHWAYS INTO PSYCHOPATHOLOGY

Pathways into Psychopathology: Modelling the Effects of Trait Emotional Intelligence, Mindfulness, and Irrational Beliefs in a Clinical Sample

For Peer Review

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Figure 1

Path Model of Trait Emotional Intelligence, Mindfulness, and Irrational Beliefs as Predictors of Psychopathology

