Rethinking Leahy's Emotional Schema Scale (LESS): Results from the Portuguese Adaptation of the LESS

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Abstract

This study aims to contribute to the study of emotional schemas, through the adaptation of the Leahy Emotional Schema Scale (LESS) to Portuguese. The LESS is a 50 item self-report with 14 theoretical dimensions, representing concepts, evaluations, attributions of emotions, and strategies of emotion regulation (Leahy in Cognit Behav Pract 9(3):177–190, 2002. https://doi.org/10.1016/S1077-7229(02)80048-7). Translation, back-translation and pilot assessment of LESS's Portuguese version were completed. Data was collected online with 396 participants. An exploratory principal component analysis was conducted. Parallel analysis revealed a 5-component structure, which after the deletion of eight items generated a final solution explaining 48% of the variance. Components internal consistency was adequate and convergent validity supported with significant correlations with difficulties in emotional regulation and emotional processing, and psychopathology. It presents dimensions that are highly relevant for assessment, case conceptualization and clinical decision making. Although this scale is related to a specific cognitive theory, the construct and its subscales may be useful beyond the psychotherapeutic model, stressing the transtheoretical potential of the scale.

Keywords Emotional schemas · Emotional processing · Attributions of emotions · Strategies of emotion regulation · Clinical assessment

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Introduction

Both in clinical practice and research, especially in cognitive-behavioral interventions, the evaluation of cognitive schemas and beliefs is highly relevant (Beck, 1995)—to reveal emotional schemas blocking therapeutic changes during the psychotherapy process such as cognitive-behavioral therapies. However, many of the client complaints also have an emotional dimension, which has been overlooked. The construct of emotional schemas adds this component in evaluation and intervention. An emotional schema is an instance of modes of responses and feelings towards a person or event that can be transferred to analogous situations and similar persons (Leahy, 2002).

Modes are a network of cognitive, emotional, behavioral, and motivational components designed to address specific demands. Beck (1996) introduced the concept of mode to represent a complex organization of schemas relevant to expectations, self-assessments, rules, and memories. Thus, modes are specific sub-organizations of personality and incorporate the relevant components of the basic personality systems: cognitive, emotional, behavioral, and motivational. Each one of these systems is composed of schemas: the cognitive system is composed of cognitive schemas, the emotional by emotional schemas, the behavioral by behavioral schemas, and the motivational by motivational schemas. Mode theory (Beck, 1996) refers to this network that can be invoked to explain the pursuit of life goals and the management of different situations or problems. For example, the fight-flight mode is composed of threat perception (cognitive system), feelings of anxiety or anger (emotional system) that stimulate the individual to do something, an impulse to act (motivational system), and the action itself (behavioral system).

Emotional schemas are distinct from other cognitive schemas since they derive primarily from personal interactions and are dominated by the affective core, consisting of somatic, sensory, and motor experiences. In this sense, it seems relevant as well as the evaluation of the cognitive schemas to have an evaluation of emotional schemas, to facilitate the conceptualization and integration of these different components, both at research and clinical intervention (Leahy, 2002, 2003, 2016).

According to emotion processing theories (e.g., Greenberg, 2015 [2002]), the ability to regulate emotions implies that the person experiences, is aware of, symbolizes and labels emotions to cope with stress. In the case of Emotion Focused Therapy (Elliott et al., 2004) a core construct for differentiated psychotherapeutic interventions are the emotional processing difficulties (EPD), which calls for specific interventions (e.g., tasks) for each EPD within an expected adaptive end state (for a review see, Elliott et al., 2004; Greenberg, 2015). EPD´s are described as problematic reactions, lack of meaning, unfinished business, self-critical splits, self-interruptive splits, and vulnerability. Thus, the resolution of these tasks leads to new adaptive meaning-making restructuring affective-cognitive structures (e.g., schemes), which are core structures of the self (Greenberg, 2015). Curiously, the EFT model assumes that beginning in childhood, the experience

becomes organized into "emotional schemes." The author (Greenberg, 2015 [2002]) proposed the term *schemes* instead of *schema*s to capture its processual nature, instead of a static concept. These emotional schemes always include feelings and action tendencies, and sometimes include beliefs (Greenberg & Paivio, 1997).

Considering different theorizations, Gratz and Roemer (2004) proposed an integrative conceptualization of emotion regulation as involving not just the modulation of emotional arousal, but also awareness, understanding, acceptance of emotions, and the ability to act in desired ways regardless of the emotional state.

Even though these constructs may have some similarities, the emotional schema model (Leahy, 2002) proposes that individuals differ in their theories about emotions and emotion regulation, and those theories give rise to problematic strategies to cope with emotion (Leahy, 2019). In this model, the term emotional schemas refer to plans, concepts, and strategies employed in response to an emotion (Leahy, 2002). So, this model is more of a model of theories about emotion, and less a model of the content of thoughts (Leahy, 2019). For example, like other fears that are intensified by the belief that "If I am afraid, then it is dangerous," in case of jealousy, the individual uses his emotional intensity as evidence that the threat is real. However, just as the individual uses his emotions to evaluate reality, there is a corresponding belief that one cannot tolerate uncomfortable emotions (Leahy, 2002, 2007). This includes emotional schemas that one's jealousy is out of control, dangerous, or a "bad sign." Other emotional schemas include the belief that ambivalence about one's partner—or the partner's ambivalence about the patient – cannot be tolerated (Leahy, 2019).

To access emotional schemas, Leahy (2002) developed the Leahy Emotional Schema Scale (LESS). The LESS is a 50 item self-report questionnaire with a six-point Likert scale (very true of me—very untrue of me). According to the psychometric study by Leahy (2002), the scale consists of 14 sub-dimensions, each containing two to seven items, representing concepts, evaluations, attributions of emotions, and strategies of emotion regulation. The scale can be used to reveal emotional schemas blocking therapeutic changes during the psychotherapy process, such as cognitive-behavioral therapies. In the original study of the LESS's development (Leahy, 2002), 53 adult psychotherapy clients were assessed and their responses on the emotional schema's assessment were correlated with depression and anxiety, measured by the Beck Depression Inventory and the Beck Anxiety Inventory. There was strong support for a cognitive model of emotional processing.

Leahy (2002) suggested 14 different dimensions and strategies (summarized at Table 1; for a full presentation of each of the 14 dimensions see Leahy, 2002).: Invalidation; Low comprehensibility; Guilt; Simplistic view of emotion; Lack of higher values; Loss of control; Numbness; Need to be rational; Duration; Low consensus; Lack of acceptance of feelings; Rumination; Low expression; and Blame.

Depression was related to greater guilt over emotion, expectation of longer duration, greater rumination, and viewing one's emotions as less comprehensible, less controllable, and as different from others' emotions. Anxiety was related to greater guilt over emotion, a more simplistic view of emotion, greater rumination, viewing one's emotions as less comprehensible, less acceptance of feelings, viewing emotions as less controllable, and as different from others' emotions.

Table 1 Fourteen dimensions of the LESS

Dimension	Description
Invalidation	The belief that there is (or is not) a receptive audience for his emotions as indicated by responses such as "Others understand and accept my feelings,"; "No one really cares about my feelings."
Low comprehensibility	Regards if emotions make sense to the self. This is reflected in responses to the following: "There are things about myself that I just don't understand," "My feelings don't make sense to me". This dimension reflects a cognitive appraisal of emotion
Guilt	Represents shame, guilt, and embarrassment about an emotion, the belief that one should not have certain feelings. This is reflected by responses to the following: "Some feelings are wrong to have," "I feel ashamed of my feelings,"
Simplistic view of emotion	Represents a limitation in the ability to understand that one can have conflicting and complicated feelings about self and others. More differentiated thinking allows the individual the opportunity to coordinate apparently conflicting feelings, which are inevitable at times
Lack of higher values	Emotions might help the individual clarify what "really matters," thereby allowing emotional processing to occur: "When I feel down, I try to think of the more important things in life-what I value," "I think of myself as a shallow person"
Loss of control	Represents the perception that intense negative emotions are uncontrollable: "If I let myself have some of these feelings, I fear I will lose control," "I worry that I won't be able to control my feelings"
Numbness	Items that reflect emotional numbness include: "Things that bother other people don't bother me" and "I often feel 'numb' emotionally like I have no feelings."
Need to be rational	The overemphasis on rationality and logic over emotion. Over-rationality may inhibit the expression, validation, acceptance, and self-understanding that follow from allowing oneself emotional experiences: "It is important for me to be reasonable and practical rather than sensitive and open to my feelings," "I think it is important to be rational and logical in almost everything," and "You can't rely on your feelings to tell you what is good for you."
Duration	The belief that emotions will last for too long: "I sometimes fear that if I allowed myself to have a strong feeling, it would not go away" and "Strong feelings only last a short period of time."
Low consensus	The idea of naturalization or normalization of one's feelings: "I often think that I respond with feelings that others would not have," "I am much more sensitive than other people," "Everyone has feelings like mine," and "I think that I have the same feelings that other people have."
Lack of acceptance of feelings	Acceptance or non-acceptance of one's feelings: "When I have a feeling that bothers me, I try to think of why it is not important," "I think that there are feelings that I have that I am not really aware of," "I try to get rid of an unpleasant feeling immediately," "I accept my feelings," and "I don't want to admit to having certain feelings–but I know that I have them"

Table 1 (continued)

Dimension	Description
Rumination	Lack of acceptance of emotion and overthinking about that emotion: "When I feel down, I try to think about a different way to view things", "When I have a feeling that bothers me, I try to think of something else to think about or to do", "When I feel down, I sit by myself and think a lot about how bad I feel," "I often say to myself, 'What's wrong with me?'" and "I focus a lot on my feelings or my physical sensations."
Expression	Willingness to experience and express feelings and the acceptance of that expression: "I believe that it is important to let myself cry in order to get my feelings out" and "I feel that I can express may feelings openly."
Blame	Focus on others for being somehow responsible for my feelings: "If other people changed, I would feel a lot better" and "Other people cause me to have unpleasant feelings."

Dimensions related to the strict ventilation model—such as validation, numbness, and expression—were not related to depression or anxiety, although acceptance of feelings was related to less anxiety. Support was found for the emotional-focus model. Validation was related to less guilt, to a less simplistic view of emotion, to an expectation of a shorter duration, to less rumination, and to viewing emotion as more comprehensible, more controllable, more like others' emotion, and to being more acceptant of feelings (Leahy, 2002).

This scale, and its reduced version (LESS-II), were translated and adapted to several populations, such as Turkish (Batmaz & Özdel, 2015; Yavuz et al., 2011), Russian (Sirota et al., 2016), Persian (Khanzadeh et al., 2013) and Korean (Suh et al., 2018). Many of these studies (e.g., Suh et al., 2018; Yavuz et al., 2011) have tried to study the factor structure of LESS although there have been some challenges, especially regarding cultural aspects. Indeed, emotions, as understood from emotional schema theory, are socially constructed (Leahy, 2016). Since the emotional schema model proposes that socially constructed cognitive biases influence how individuals interpret and respond to emotions, it follows that individuals of different cultural backgrounds should hold different understandings of emotions (Suh et al., 2018).

Nevertheless, is should be noteworthy, that its original 14-dimension theoretical proposal wasn't validated in any study using exploratory or confirmatory factorial analysis. So, even though cultural aspects may have an important impact in these versions, there can be other aspects of the original scale that may influence these results.

Successful interventions rely on assessment and case conceptualization. Therefore, it is key that, both clinicians and researchers, can rely on culturally adapted, valid and precise measurements to identify emotional schemas. Although the psychometric properties of the LESS have not been investigated yet in the Portuguese population. Also, previous examinations of the LESS have mostly focused on the relationships among its dimensions (Leahy, 2002; Leahy et al., 2012; Silberstein et al., 2012).

The aim of this study was to provide preliminary evidence of prototypical variables for the Portuguese version of the Leahy Emotional Schema Scale (LESS, Leahy, 2002) and contribute to the study of the emotional schema theory. By applying an exploratory data reduction technique, we aim to inform on the psychometric properties of the LESS scale as to our knowledge there are no such studies on the LESS scale. Considering the cultural aspects previous mentioned, besides translate and preliminary inform on the LESS structure we aim to explore its internal consistency and test its convergent validity with difficulties in emotion regulation, processing and psychological symptoms, we aim to contribute to the study of the emotional schema model.

Method

Participants

This study was conducted in Portugal, with a convenience sample recruited online of 396 participants. For this study, participants were asked for written consent and assured of confidentiality. Inclusion criteria were: 18 years of age or older and having Portuguese nationality. Participants were mostly females ($n = 331$). Mean age was 29.47 (± 11.91) and age range was between 18 and 99. Fifty seven percent of participants were undergraduate students or graduated from university, 35.4% concluded high school and 5.1% completed middle school. Forty eight percent were working, 43% were students, 8% were unemployed and 1% were retired. Seventeen percent (17.4%) were on psychotherapy and 9% were doing some type of psychiatric medication. The mean values for depression were 0.45 ($SD = 0.61$) and 0.39 ($SD = 0.51$) for anxiety.

Measures

Leahy Emotional Schema Scale (LESS, Leahy, 2002). Consists of a 50-items scale consisting of statements on how a person copes with his/her beliefs and emotions about his/her own emotions, with an answering scale from 1 (very untrue of me) to 6 (very true of me). Items no. 1, 2, 3, 5, 7, 9, 10, 12, 16, 19, 20, 25, 27, 28, 29, 33, 36, 44, 45, 49 and 50 were reverse scored and scores in each dimension were scored and weighted so that total scores of each dimension represented the negative polarity of an emotional schema. The measure consists of 14 dimensions: Invalidation; Low comprehensibility; Guilt; Simplistic view of emotion; Lack of higher values; Loss of control; Numbness; Need to be rational; Duration; Low consensus; Lack of acceptance of feelings; Rumination; Low expression; and Blame. Psychometric properties of the scale will be provided in the results section.

Difficulties in Emotion Regulation Scale (DERS, Gratz & Roemer, 2004, adapted for the Portuguese Population by Vaz et al., 2010)—is a 36-item self-report measure designed to assess the complexities and clinically-relevant difficulties of emotion regulation: items are rated on a 5-point scale, ranging from 1 (Almost never

0–10%) to 5 (Almost always 91–100%). To assess difficulties regulating emotions during times of distress, many items begin with "When I'm upset…". This scale is composed of six factors with appropriate level of internal consistency in the original version (from $\alpha=0.75$ to $\alpha=0.94$; Vaz et al., 2010). In the present sample the whole scale ($\alpha=0.89$) and all the factors presented good internal consistency: (1) Nonacceptance of Emotional Responses (nonacceptance; $\alpha=0.89$); (2) difficulties engaging in goal-directed behavior (goals; $\alpha=0.87$); (3) impulse control difficulties (impulse; $\alpha=0.89$); (4) lack of emotional awareness (awareness; $\alpha=0.79$); (5) limited access to emotion regulation strategies (strategies; $\alpha=0.87$); (6) lack of emotional clarity (clarity; $\alpha=0.76$).

Emotional Processing Difficulties Scale—revised version (EPDS; Barreira & Vasco, 2016; revised by Faustino et al., 2022). It is a 22 item self-report questionnaire, with five sub-scales, with an answering scale ranging from 1 (never) to 5 (always). It assesses Emotional Processing Difficulties (EPD) as described by Elliott and collaborators (2004). EPD are described as problematic reactions, lack of meaning, unfinished business, self-critical splits, and self-interruptive splits. The vulnerability factor was traverse within the other five factors. In psychometric terms it reveals a high internal consistency for total score ($\alpha=0.90$) and its subscales ($\alpha \geq 72$). In the present sample, both total score ($\alpha=0.89$) and factors presented good internal consistency: Problem Reaction ($\alpha=0.79$); absence of meaning ($\alpha=0.876$); self-critical split ($\alpha=0.89$); self-interruptive splits ($\alpha=0.66$) and unfinished business ($\alpha=0.85$).

*Brief Symptoms Inventory (*BSI, Derogatis, 1993, adapted for the Portuguese population by Canavarro, 1999). Is a 53-item self-report, constituting a reduced version of the SCL-90, in which participants rate the extent to which they have been disturbed in the past week by several symptoms on a scale from 0 (not at all) to 4 (extremely). The BSI has nine subscales designed to assess individual symptom groups (e.g., somatization, depression, anxiety). The Portuguese version (Canavarro, 1999) showed good psychometric properties – alphas ranging from 0.70 and 0.80. In a sample of non-clinical participants, the GSI average was 0.48 ($SD=1.43$) and test–retest reliability of 0.79. In a clinical sample, the author obtained an average of 1.43 ($SD=0.94$). A value $\geq$ to 1.7 may point to an emotion disturbance (Canavarro, 1999). In the present study, the total score ($\alpha=0.96$) sowed high internal consistency and all the subscales showed form acceptable to good internal consistency: (1) somatization ($\alpha=0.86$); (2) obsessive–compulsive ($\alpha=0.77$); (3) interpersonal sensivity ($\alpha=0.81$); (4) depression ($\alpha=0.86$); (5) anxiety ($\alpha=0.81$); (6) hostility ($\alpha=0.72$); (7) phobic anxiety ($\alpha=0.74$); (8) paranoid ideation ($\alpha=0.81$); (9) psicoticism ($\alpha=0.69$).

Procedure

Permission was sought and obtained from Robert Leahy for the Portuguese adaptation of the measure. The LESS (Leahy, 2002) was translated individually into Portuguese by each of the authors. The different versions were discussed to reach an agreement between the authors. Subsequently, a Portuguese version was back

translated into English (retroversion) by an experienced Portuguese psychotherapist highly proficient in English language. Finally, Robert Leahy approved the back translation.

Afterwards, data was collected on-line through the Qualtrics platform. Data collection was done only once per participant and the estimated duration of completion of all instruments was 20 min. Sociodemographic data was collected, such as age, sex, education level, professional status, psychological and psychiatric accompaniments, and medication. There were no missing values, as all questions were mandatory.

Data Analysis

We started by verifying the absence of missing data and analyzing the descriptive statistics of LESS 50 items, translated, and adapted to the Portuguese population, for the total sample ($N = 396$). Second, Horn's parallel analysis (Horn, 1965) was used to determine the number of components to be extracted, followed by a principal components analysis (PCA) using direct *oblimin* rotation and polychoric correlations for ordinal Likert-type items. The PCA was used to facilitate the item selection by examining the matrix of the item correlations and proposing a reduction of the information by extracting a smaller set of components for the Portuguese version of LESS that can inform about possible prototypical variables. In addition, we used PCA as a descriptive tool not requiring distributional assumptions, following the work of Joliffe (2002) to provide an adaptive exploratory solution to assess the preliminary structure of the Portuguese version of LESS. Components were interpreted and items excluded using item communalities (cut-off above 0.20; Child, 2006), components loadings (cut-off above 0.30; Field, 2013) cross-loadings, and theoretical content analysis. Third, we computed descriptive and reliability statistics (coefficient omega) for the extracted components. Finally, bivariate correlations using the Spearman correlation coefficient were calculated to examine convergent validity with DERS, EPDS, and BSI and considered significant when $p < .05$.

Descriptive and correlational analyses were performed using IBM SPSS v25 (IBM, 2018), while parallel and principal component analyses were computed using the psych package (Revelle, 2020) designed for the R environment (R Core Team, 2021).

Results

Item Analysis

In Table 2, the descriptive statistics for the LESS items are presented. In all of them, the whole range of the scale was used (from 1 to 6), means ranged from 1.66 to 5.29, and standard deviations ranged from 1.04 to 1.72. Despite PCA following Joliffe (2002) have no need for explicit distributional assumptions, as previously stated, skewness and kurtosis absolute values are reported in Table 2.

Table 2 Descriptive statistics and distribution of the 50 items translated and adapted to the Portuguese population (N = 396)

Original scale dimension	Items	M	SD	|Skewness|	|Kurtosis|
Rumination	1. When I feel down, I try to think about a different way to view things	4.44	1.34	5.88	0.29
Lack_Acceptance of feelings	2. When I have a feeling that bothers me, I try to think of why it is not important	3.3	1.48	0.33	4.27
Low_Consensus	3. I often think that I respond with feelings that others would not have	3.08	1.63	1.86	4.86
Guilt	4. Some feelings are wrong to have	2.15	1.53	9.69	0.99
Low comprehensibility	5. There are things about myself that I just don't understand	3.35	1.69	0.34	5.27
Low expression	6. I believe that it is important to let myself cry in order to get my feelings "out."	5.29	1.08	15.99	16.90
Lost of control	7. If I let myself have some of these feelings, I fear I will lose control	2.73	1.58	4.64	3.59
Invalidation	8. Others understand and accept my feelings*	4.01	1.38	4.17	2.39
Lack of acceptance of feelings	9. You can't allow yourself to have certain kinds of feelings—like feelings about sex or violence	2.11	1.31	9.71	2.76
Low comprehensibility	10. My feelings don't make sense to me	2.10	1.39	9.59	1.72
Blame	11. If other people changed, I would feel a lot better*	2.45	1.35	4.59	3.15
Lack of acceptance of feelings	12. I think I have feelings that I am not really aware of	3.26	1.61	0.37	4.78
Duration	13. I sometimes fear that if I allowed myself to have a strong feeling, it would not go away	2.86	1.68	3.12	4.72
Guilt	14. I feel ashamed of my feelings	2.07	1.35	9.35	1.53
Numbness	15. Things that bother other people don't bother me	2.91	1.51	3.13	3.54
Invalidation	16. No one really cares about my feelings*	2.13	1.38	8.80	0.73
Need to be rational	17. It is important for me to be reasonable and practical rather than sensitive and open to my feelings	3.27	1.50	1.22	3.87
Simplistic view of emotion	18. I can't stand it when I have contradictory feelings—like liking and disliking the same person	3.34	1.67	0.40	5.15
Low consensus	19. I am much more sensitive than other people	3.47	1.58	0.36	4.59
Lack of acceptance of feelings	20. I try to get rid of an unpleasant feeling immediately	3.41	1.45	0.05	3.58
Higher values	21. When I feel down, I try to think of the more important things in life—what I value	4.40	1.46	6.37	0.94
X	22. When I feel down or sad, I question my values	2.92	1.49	2.22	4.13
Low expression	23. I feel that I can express my feelings openly	3.97	1.46	3.24	3.16
Rumination	24. I often say to myself: "What's wrong with me?"	3.31	1.68	0.42	5.13
Higher values	25. I think of myself as a shallow person	1.66	1.05	15.24	13.84

Table 2 (continued)

Original scale dimension	Items	M	SD	|Skewness|	|Kurtosis|
Guilt	26. I want people to believe that I am different from the way I truly feel	2.53	1.46	5.58	2.04
Lost of control	27. I worry that I won't be able to control my feelings	2.98	1.69	2.35	4.91
Lack of acceptance of feelings	28. You have to guard against having certain feelings	3.10	1.68	1.10	5.21
Duration	29. Strong feelings only last a short period of time	2.93	1.57	2.50	4.27
Need ti be rational	30. You can't rely on your feelings to tell you what is good for you	2.56	1.48	5.57	1.93
Guilt	31. I shouldn't have some of the feelings I have	2.53	1.59	5.91	2.60
Numbness	32. I often feel numb emotionally, like I have no feelings*	2.30	1.57	7.94	1.15
Low comprehensibility	33. I think that my feelings are strange or weird	2.14	1.46	9.03	0.38
Blame	34. Other people cause me to have unpleasant feelings	2.81	1.46	3.30	3.34
Simplistic view of emotion	35. When I have conflicting feelings about someone, I get upset or confused	3.31	1.50	0.33	4.14
Rumination	36. When I have a feeling that bothers me, I try to think of something else to think about or do	3.79	1.42	2.20	3.08
Rumination	37. When I feel down, I sit by myself and think a lot about how bad I feel	3.46	1.60	0.20	4.59
Simplistic view of emotion	38. I like being absolutely definite about the way I feel about someone else	4.53	1.32	6.21	0.21
Low Consensus	39. Everyone has feelings like mine	3.95	1.59	3.37	3.51
Lack of acceptance of feelings	40. I accept my feelings	4.73	1.32	7.61	1.05
Low consensus	41. I think that I have the same feelings other people have	4.21	1.46	4.25	2.22
Higher values	42. I aspire to higher values*	4.72	1.21	6.58	0.62
X	43. I think that my feelings now have nothing to do with how I was brought up*	2.49	1.53	6.67	1.41
Lost fo control	44. I worry that if I have certain feelings, I might go crazy	2.44	1.73	6.98	2.84
Low comprehensibility	45. My feelings seem to come from out of nowhere	2.53	1.59	6.28	2.34
Need to be rational	46. I think it is important to be rational and logical in almost everything	3.77	1.47	1.40	3.27
Simplistic view of emotion	47. I like being absolutely definite about the way I feel about myself	4.69	1.23	7.76	2.42
Rumination	48. I focus a lot on my feelings or my physical sensations	4.14	1.29	4.05	1.23
Invalidation	49. I don't want anyone to know about some of my feelings*	3.70	1.65	1.05	4.78

Table 2 (continued)

Original scale dimension	Items	M	SD	ISkewnessI	IKurtosisI
Lack of acceptance of feelings	50. I don't want to admit to having certain feelings, but I know that I have them	3.45	1.72	0.38	5.30

*Items excluded. Range for all items: Min = 1, Max = 6

Principal Component Analysis of the LESS-PT and Reliability

Horn's parallel analysis suggested five components should be extracted. Thus, an principal component analysis was run on five components (KMO = 0.92; Bartlett's χ^2 (1225) = 7903.65, $p < .001$). This solution explained 44% of the total variance, and communalities ranged from 0.65 to 0.12. Next, a second solution was estimated after content analysis and excluding items with low content adequacy as well as low communalities/loadings (< 0.20) like items 8, 11, 16, 19, 32, 42, 43, and 49. The second solution was adequate (KMO = 0.92; Bartlett's χ^2 (861) = 6547.58, $p < .001$). As shown in Table 3, a five-component solution was extracted with 42 items that explain 48% of the variance.

This final five-components model included items, 5, 7, 10, 12, 13, 14, 18, 22, 24, 26, 27, 28, 31, 33, 34, 35, 37, 40, 44, 45, 50 which reflected incomprehensibility, control, guilt, non-acceptance of feelings, duration, simplistic view of emotions and rumination, in factor one. Component two included items 1, 2, 20, 21, 23, 36, which reflected higher values, non-acceptance of feelings, low expression, and rumination. Component three included items 3, 4, 9, 39, 41, which reflected low consensus, guilt, and non-acceptance of feelings. Component four included items 6, 15, 17, 25, 29, 30, and 46, which reflected the need to be rational, higher values, numbness, duration and low expression dimensions of LESS. Component five included items 38, 47, and 48, which reflected a simplistic view of emotion and rumination. Items 1, 2, 20, 21, 23, 36, 39, 40, 41, are reversely scored.

Component's reliability ranged from acceptable to very good internal consistency: component 1 referring to negative evaluation of emotion (21 items; $\omega = 0.93$); component 2 (6 items; $\omega = 0.66$) suggesting difficulties in reappraisal; component 3 (5 items; $\omega = 0.72$) representing difficulties in naturalizing one's feelings; component 4 (7 items; $\omega = 0.83$) illustrating the need to be rational; and component 5 (3 items; $\omega = 0.70$) referring to a simplistic view of emotion.

Convergent Validity

In Table 4, are presented the descriptive statistics and Spearman correlations between components and between these and DERS, EPDS and BSI. Correlations between components were moderate to small. A negative association occurred between component 2 and 5. To evaluate convergent validity, as shown in Table 4, Component 1 of the LESS was positively and significantly correlated with every sub-scale of the DERS, the EPDS and the BSI. Component 2 was positively and significantly correlated with all sub-scales of DERS, BSI and EPDS despite lacking a significant correlation with the EPDS Self-Critical Split dimension. Component 3 showed a positive association with every sub-scale of the DERS, the EPDS and the BSI. Component 4 showed positive correlations with all scales from DERS, BSI and EPDS but did not reveal an association with the EPDS dimension of Unfinished Business. Finally, component 5 showed positive correlations with some sub-scales from EPDS (Unfinished business and Problematic reaction), as well as some positive

Table 3 Principal components standardized loadings (pattern matrix) based upon polychoric correlation

Items	Components				
	Component 1	Component 2	Component 3	Component 4	Component 5
	Negative evaluation of emotion	Difficulties in reappraisal	Difficulties in Naturalizing one's feelings	Need to be Rational	Simplistic view of emotion
QEE_5	**0.79**	0.00	− 0.05	− 0.05	− 0.06
QEE_27	**0.73**	0.04	− 0.02	0.03	0.02
QEE_14	**0.69**	0.02	0.11	0.07	− 0.10
QEE_12	**0.69**	− 0.06	− 0.11	− 0.02	− 0.13
QEE_10	**0.68**	0.02	0.16	− 0.01	− 0.09
QEE_35	**0.68**	− 0.05	− 0.12	− 0.10	0.22
QEE_13	**0.66**	− 0.09	0.11	− 0.13	0.12
QEE_44	**0.65**	− 0.01	0.09	0.08	0.00
QEE_45	**0.64**	− 0.04	0.04	− 0.02	0.06
QEE_24	**0.62**	0.13	0.06	− 0.07	0.09
QEE_7	**0.62**	− 0.05	− 0.03	0.08	− 0.02
QEE_33	**0.60**	0.13	0.14	0.16	− 0.02
QEE_22	**0.60**	− 0.06	− 0.08	− 0.01	− 0.12
QEE_28	**0.57**	− 0.03	0.10	0.17	0.10
QEE_37	**0.54**	0.09	− 0.01	− 0.10	0.27
QEE_26	**0.50**	0.04	− 0.07	0.29	− 0.05
QEE_50	**0.50**	0.10	0.05	0.07	0.27
QEE_34	**0.47**	0.17	− 0.01	0.08	0.08
QEE_18	**0.46**	− 0.10	0.02	− 0.02	0.32
QEE_40R	**0.44**	0.32	0.19	0.10	− 0.21
QEE_31	**0.44**	0.07	0.27	0.22	0.08
QEE_23R	0.37	**0.35**	0.06	0.25	0.05
QEE_1R	0.10	**0.72**	0.11	0.06	0.09
QEE_2R	− 0.17	**0.68**	0.01	− 0.04	0.14
QEE_21R	0.20	**0.68**	− 0.02	0.01	− 0.06
QEE_20R	− 0.14	**0.57**	− 0.26	− 0.12	− 0.14
QEE_36R	− 0.14	**0.57**	0.07	− 0.08	− 0.16
QEE_17	0.03	− 0.01	− 0.08	**0.76**	0.00
QEE_46	− 0.09	− 0.03	− 0.02	**0.70**	0.33
QEE_6	− 0.02	0.05	− 0.08	**0.55**	0.27
QEE_15	− 0.03	− 0.20	0.12	**0.43**	− 0.09
QEE_30	0.35	0.08	0.09	**0.40**	− 0.07
QEE_25	0.31	0.06	− 0.08	**0.39**	− 0.13
QEE_29	0.13	− 0.11	− 0.05	0.30	− 0.09
QEE_39R	− 0.09	0.03	**0.87**	− 0.07	− 0.03
QEE_41R	0.06	0.06	**0.81**	− 0.08	− 0.04
QEE_4	0.10	− 0.12	**0.56**	0.23	0.05
QEE_9	0.03	− 0.11	**0.45**	0.25	0.07
QEE_3	0.36	− 0.12	**0.39**	0.03	0.10

Table 3 (continued)

Items	Components				
	Component 1	Component 2	Component 3	Component 4	Component 5
	Negative evaluation of emotion	Difficulties in reappraisal	Difficulties in Naturalizing one's feelings	Need to be Rational	Simplistic view of emotion
QEE_47	0.01	0.01	− 0.03	0.15	**0.79**
QEE_38	0.02	0.00	− 0.04	− 0.01	**0.78**
QEE_48	0.05	− 0.02	0.07	− 0.17	**0.58**

Bold values indicate that item may be integrated in that component

associations with DERS sub-scales (Nonacceptance of Emotional Responses, Difficulty in Goal Oriented Behaviors, Limited Access to Emotion Regulation Strategies) and a negative association with DERS Lack of Emotional Awareness. Component was positively associated with and all the BSI sub-scales. Correlations between components and these sub-scales were small to large.

Discussion

In this study, we aimed to provide preliminary evidence of prototypical variables for the Portuguese version of the Leahy Emotional Schema Scale (LESS, Leahy, 2002) and contribute to the study of the emotional schema theory. This is an essential methodologic contribution to the study of emotional schemas. These results should be understood considering the differences between samples: the sample of the original study (Leahy, 2002) and the current study. The original study had a smaller number of participants, with no factors or components analysis, and they were from a clinical sample. Our study sample was from the general population including clinical and non-clinical participants. Also, different studies aiming to adapt the LESS and LESS-II suggested that modifications may be needed to simplify the relevant emotional beliefs and that those beliefs and the consequent emotion regulation strategies may be partly culturally based (Leahy, 2019).

A series of statistical analyses showed that the five-component model with 42 items (referred to from now on as the Portuguese version of the LESS – LESS_PT) was a more appropriate model for the LESS_PT with the current data.

The five components of the LESS_PT demonstrated adequate consistency measured by the omega. Most components were positively and significantly associated with each other and were positively correlated with almost all variables in study (Table 4). There was a negative correlation between component 2—Difficulties in reappraisal—and component 5—Simplistic view of emotion. Even though they both are emotional schemas that may hinder clinical intervention, they may not coexist in the same client. For example, component 5 have items that represent the need to know exactly how one feels (e.g., I like being absolutely definite about the way I feel about someone else) while component 2 presents items that represent difficulties in

Table 4 Descriptive statistics and spearman correlations

Variables	M (SD) [Min–Max]	1	2	3	4	5
1. Component 1	2.83 (1.01) [1.00–5.76]	–				
2. Component 2	3.12 (0.88) [1.00–6.00]	.25***	–			
3. Component 3	2.63 (1.05) [1.00–5.80]	.53***	.08	–		
4. Component 4	3.20 (0.70) [1.00–5.43]	.42***	.02	.26***	–	
5. Component 5	4.45 (1.00) [1.00–6.00]	.22***	–.10*	.06	.12*	–
EDPE_Self_Critical_Split	21.78 (6.09) [2.00–41.00]	.49***	.31***	.25***	.17***	.07
EDPE_Absence_Meaning	11.25 (3.72) [4.00–23.00]	.47***	.26***	.26***	.16**	.07
EDPE_Unfinished_Business	14.35 (4.62) [3.00–26.00]	.51***	.34***	.27***	.10	.13*
EDPE_Problematic_Reaction	7.51 (2.37) [3.00–15.00]	.58***	.14**	.35***	.33***	.16**
EDPE_Self_Interruption_Split	7.49 (2.20) [3.00–14.00]	.18***	–.05	.21***	.18***	.04
EDPE_Total	62.19 (14.27) [2.00–104.00]	.62***	.35***	.37***	.22***	.10*
EDRE_Nonacceptance_Emo_Res	12.05 (5.41) [2.00–30.00]	.63***	.25***	.38***	.28***	.12*
EDRE_Diff_eng_GOALS	12.44 (4.30) [1.00–25.00]	.49***	.25***	.24***	.13**	.13**
EDRE_Impulse	10.70 (4.69) [2.00–30.00]	.52***	.32***	.30***	.15**	.07
EDRE_Awarness	10.26 (4.30) [1.00–30.00]	.17***	.20***	.13*	.14**	–.11*
EDRE_Strategies	18.11 (6.59) [5.00–39.00]	.68***	.41***	.35***	.19***	.19**
EDRE_Clarity	9.18 (3.67) [3.00–33.00]	.50***	.23***	.30***	.22***	.02
EDRE_Total	72.36 (21.41) [17.00–157.00]	.72***	.41***	.38***	.24***	.12*
BSI_Somatization	0.19 (0.40) [0.00–3.00]	.39***	.17***	.18***	.11*	.11*
BSI_Obsessive_compulsive	0.54 (0.56) [0.00–2.67]	.58***	.20***	.34***	.18***	.21***
BSI_Interpersonal_Sensitivity	0.39 (0.59) [0.00–3.00]	.58***	.26***	.35***	.16**	.15**
BSI_Depression	0.45 (0.61) [0.00–3.00]	.60***	.27***	.31***	.20***	.12*
BSI_Anxiety	0.39 (0.51) [0.00–2.50]	.48***	.19***	.24***	.15**	.18***
BSI_Hostility	0.30 (0.41) [0.00–2.00]	.55***	.19***	.31***	.21***	.16**
BSI_Phobic_Anxiety	0.18 (0.38) [0.00–2.40]	.35***	.20***	.20***	.11*	.10
BSI_Paranoid Ideation	0.44 (0.60) [0.00–2.80]	.51***	.16***	.36***	.21***	.15**
BSI_Psicoticism	0.34 (0.48) [0.00–2.60]	.67***	.28***	.38***	.30***	.16**
BSI_GSI	0.36 (0.39) [0.00–2.08]	.68***	.26***	.39***	.24***	.19***
BSI_TOTAL	19.14 (20.87) [0.00–110.00]	.68***	.26***	.40***	.24***	.20***

***p < .001; **p < .01; *p < .05 (2-tailed)

reappraisal and avoidance of feelings (e.g., When I feel down, I try to think about a different way to view things—reversed).

The structure of the LESS_PT did not match with the theoretical conceptualization developed by Leahy (2002), which was somehow expected because of the functional aspect of the scale. This is not something new since it has also happened in other studies trying to develop measure to assess schemas, such as for example the Inventory of Schematic Modes (Pereira, 2009) or the States of Mind Questionnaire

(Faustino et al, 2020). One major issue of the assessment of different functional aspects of psychological constructs is that individuals may have several ways to manage their internal experience. Even though Leahy (2002) wanted to assess emotional beliefs, he developed a scale with 14 dimensions, representing concepts, evaluations, attributions of emotions, and strategies of emotion regulation. Therefore, it was expected that some dimensions would be mixed, because individuals may have different ideas as how to deal with inner suffering as well as emotion regulation strategies (Dimaggio et al., 2015; Faustino et al., 2020; Young et al., 2003). Also, considering that some dimensions only had two items, such as numbness, duration, and expression, it would difficult future studies on estimation models.

Additionally, schemas are better when they are flexible, and that's not different for emotional schemas. For example, the need to be rational, can be a problem when it blocks your emotional processing, but it can be helpful at some specific situations. Imagine that you are having a panic attack—thinking "Strong feelings only last a short period of time" may be adaptive.

Even though the 14 dimensions associated with emotional functioning may be theoretically distinguished they may be more related within themselves because they depend on other ways of the person's functioning, such as for example emotion regulation. We believe that a five factors solution may be a more parsimonious one that do not minimize schemas' theory and can be useful for clinical decision making.

Having in mind that modes are a network of cognitive, emotional, behavioral, and motivational components designed to address specific demands, the LESS_PT seem to address aspects that are related not only with emotional schemas but also with all other three components. Emotions, and emotional processing and regulation are highly complex constructs, and this measure seems to capture some interrelations between different components of modes. For instance, negative evaluation of emotion could be seen as a more purely emotional schema, even though there are items that refer to a worry dimension which could be seen as a more cognitive dimension (e.g., I worry that I won't be able to control my feelings). Difficulties in Reappraisal could be seen as encompassing an emotional dimension as well as a motivational and a behavioral dimension. When Beck introduced the concept of mode it had the goal to represent a complex organization of schemas relevant to expectations, self-assessments, rules, and memories. The LESS_PT seems to capture some of the essence of that organization.

Considering that successful interventions rely on assessment and case conceptualization and that most of the five final components included items from different factors of the original scale, we suggest renaming the components to be more integrated with the clinical work and intervention the items of the component may encompass.

Component 1 is the component with more items and showed the highest positive correlations with all dimensions of psychopathology, emotional dysregulation, and emotional processing difficulties. It explained most of the variance encompassing items and may be viewed as the high distress factor. This component has several items that reflect some type of control, incomprehension, or non-acceptance. Some items seem also to reflect a secondary emotion towards the emotion felt. We suggest

calling this factor negative evaluation of emotions, considering also what was previously discussed by Suh et al. (2018).

Even though Component 2 shares two dimensions of the previous LESS dimension with component 1 (non-acceptance and rumination), when looking at the items they all encompass the idea of "When I feel down, I try to think …", "When I have a feeling that bothers me, I try to think…" (see Table 2) which seems to refer to a dimension of a cognitive emotion regulation, suggesting a reappraisal dimension. We suggest naming this factor Difficulties in Reappraisal.

Component 3 has integrated items from dimension such as Low consensus, guilt, duration, and non-acceptance of feelings. Taken together, the content of these items seems to represent a dimension of difficulties in naturalizing emotion, not only capturing a non-acceptance of what the individual is feeling, but also that he doesn't feel the same as other human beings: *Everyone has feelings like mine*; *I think that I have the same feelings other people have.*

Component 4 includes items that were associated with the Need to be rational, Low expression, Higher values, and Numbness dimensions of the LESS-50. The content of the items reflect not only the need to be rational but also a devalue of emotions. Considering these we decided to name the dimension Need to be rational.

Component 5 is the component with less items—only three—two associated with the dimensions simplistic view of emotion and one with the dimension rumination of the LESS-50. Considering that we choose to preserve the nomenclature simplistic view of emotion.

These different components—(1) Negative evaluation of emotions; (2) Difficulties in Reappraisal; (3) Difficulties in naturalizing emotion; (4) Need to be rational and; (5) Simplistic view of emotion—may help to build up case conceptualization by assessing important features that give clinicians clues to areas needing deeper exploration, or aspects that may hinder clinical intervention.

Considering the perspective that the model of emotional schemas is more a model of theories about emotion, and less a model of the content of thoughts (Leahy, 2019), we believe that these five components capture relevant aspects to consider in clinical settings, by helping to assess these difficulties in clients. It may help capture differences in the theories about emotions and emotion regulation clients have that may give rise to problematic strategies to cope with emotions.

One important aspect is that this assessment can be relevant regardless of the theoretical orientation. Even if the emotional schema model derives from a cognitive behavioral perspective, it has been recently mentioned as a meta-experiential model (for a review see, Leahy, 2016). The construct of emotional schemas shed light to a dimension that is highly relevant for case conceptualization. For, example, Leahy (2007) proposed that aspects such as noncompliance, including early dropout rates, can be decreased by dealing with emotional dysregulation and theories of anxiety or discomfort that interfere with effective treatments. This aspect has been reinforced by Suh et al. (2018) showing that the identification of individuals' emotional schemas may help overcome some of the longstanding obstacles that have been faced by cognitive behavioral therapies. Thus, identifying an individual's emotional schemas has a clinical benefit that goes beyond understanding how an individual experience and responds to emotions.

From an integrative perspective assessing client's emotional schemas may help the therapist understand the way the client thinks about emotions, and then work on the best strategies: increasing awareness, acceptance, cognitive restructuring, a more experiential approach.

All dimensions of the PT_LESS significantly correlate with depression and anxiety, as also shown in previous studies, but also with other psychopathology dimension as can be seen at Table 4. Most of these correlations are weak. These significant correlations may be understood considering the idea that all psychopathology is associated with emotional dysregulation and emotional schemas. Nevertheless, this was a community sample. Also, emotional processing and emotional dysregulation must be better thought of in a continuum with a general population sample still presenting these associations but with weaker values. Stronger correlations were expected at a clinical level.

The correlation of all the components of the LESS_PT with the different dimensions of the DERS, the EPDS and the BSI seem to highlight its importance to emotion regulation and emotional processing.

Even though the structure of the LESS_PT is different from the theoretical proposal of Leahy (2002), it presents dimensions that are highly relevant for assessment, case conceptualization and clinical decision making. Having a smaller number of factors may also help to enhance its association with different clinical strategies/interventions, which may enlarge its usefulness regardless of the theoretical orientation. Also, a psychometric structure with factors that have at least three items benefits research since it allows for the study of estimation models.

This was a preliminary validation of the LESS to Portuguese. We suggest that more studies are needed regarding the structure of the PT_LESS. Because we used a non-clinical convenience sample, we recommend future studies should expand the study of the current psychometric properties with samples with larger number of men and collected in clinical settings. The variance explained was only 48%, which requests for further research. For future studies we also suggest that the suitability of a factorial model should be tested, with confirmatory factor analysis, for example, of a bifactorial or 2nd order structure.

Additionally, being a cross sectional study does not allow for the exploration of its value regarding case conceptualization. A longitudinal study with pre post intervention assessment would help to better understanding and validated its usefulness from that perspective. To extend its association with Beck's mode's theorization it would be interesting to integrate the assessment of schematic modes with the emotional schemas' assessment to create a more integrated model that could improve clinical decision. Nevertheless, we hope to have contributed to the study of emotional schemas, help to disseminate this concept, and find better ways to assess it usefully in clinical settings.

Declarations

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

Ethics Approval Ethics approval was obtained from the ethics committee of the first author's university.

Consent to Participate All individual participants were informed of detailed information about the risks/benefits, rights as participants, voluntariness of answering questions, and right to withdrawal. All participants provided written informed consent before initiating study participation.

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