



Research paper

The Early Memories of Warmth and Safeness Scale: Dimensionality and Measurement Invariance

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ABSTRACT

Objectives: Research has shown that rearing styles and early emotional memories, especially those related to feelings of threat or safeness, play a key role in subsequent emotional and social adjustment throughout the lifespan. Several authors have argued for the study of early memories of warmth and safeness rather than rearing styles. The Early Memories of Warmth and Safeness Scale (EMWSS) has proven to be a valid instrument to do so. This study adds to previous research about the EMWSS by investigating its dimensionality throughout confirmatory analysis procedures and its measurement invariance between male and females in an adult sample.

Methods: A sample of 502 adults (51.2% female, Mean age = 36.46 years, SD = 13.79) recruited from a community sample in Portugal was collected. In addition to the EMWSS, participants completed measures of recall of parental rearing behavior, attachment, self-criticism, self-reassuring, self-compassion and psychopathology.

Results: A one-factor measurement model revealed a good fit to the data and the instrument showed excellent internal consistency, with a Cronbach alpha of .96. The EMWSS also proved to be gender invariant. Regarding construct validity, the EMWSS was found to be associated with external variables in the expected direction.

Limitations: The convenience sample used might be not representative of the general population.

Conclusion: This work highlights the relevance of the EMWSS in helping to advance knowledge on how early memories of warmth and safeness impact on psychopathological outcomes, and of making it available for use in research and clinical settings.

1. Introduction

The importance of early relationships with parents and close relatives on the subsequent emotional, psychological, social and even physical adjustment has been widely established in previous research (e.g., Gilbert et al., 2006; Richter et al., 2009). The relationship with “attachment figures” (Bowlby, 1982), usually one’s parents during childhood, sets the bases for attachment styles, i.e., a person’s distinctive manner to relate to others in intimate caregiving relationships, including one’s confidence in the responsiveness and readiness of the attachment figure as a “secure base” and as a source of protection, soothing, and support when in distress (Levy et al., 2011). The experience of being cared for in a warmth and affectionate way, associated with feelings of being desired and wanted, impacts not only the psychological development, but also the child’s physiological maturation, brain

development and genetic processes (Cole, 2014; McCrory et al., 2012; Slavich & Cole, 2013).

Parenting styles have been studied for a long time (e.g., Baldwin & Dandeneau, 2005; Bowlby, 1982). Evidence has shown that rearing styles characterized by low affection, criticism, rejection and over-protection or control are associated with a range of emotional, psychological and interpersonal difficulties (Kim & Miller, 2019; Lavin et al., 2020; Parker, 1983; Perris, 1994; Teicher et al., 2006). Insecure attachment has been associated with anxiety and depression namely through their effect upon social rank variables, namely submissive behavior and negative social comparison (Irons & Gilbert, 2005). Memories of parents as rejecting figures have been found to have a negative effect on self-esteem (Petrovski et al., 2020), and to be linked with self-persecution and self-hatred (Irons et al., 2006). In contrast, secure attachment has been widely identified as crucial for the child’s

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healthy development (e.g., Baldwin & Dandeneau, 2005; Bowlby, 1982; Mikulincer & Shaver, 2020; Siegel, 2001). For example, parental warmth during childhood and adolescence has been associated with psychological and behavioral adjustment (LaFleur et al., 2016) and has shown to influence moral development (Darling & Steinberg, 1993). Early experiences of safeness and soothing, which include positive and affiliative signals of reassurance, warmth, or affection, have been associated with feelings of safeness and acceptance (Baldwin & Dandeneau, 2005; Gilbert et al., 2006; Mikulincer & Shaver, 2020). They seemed to play a key role in emotion regulation (Gilbert et al., 2006) and in the ability to establish and sustain healthy intimate relationships (Mikulincer & Shaver, 2020). Early experiences of receiving warmth and safeness from others are also critically related to one's capacities for self-compassion, self-warmth and self-reassurance in adulthood, and to the ability to cope with difficulties and failures (Gilbert & Procter, 2006; Irons et al., 2006).

According to Gilbert and Irons (2008), rearing experiences can function as conditioned emotional memories with an influence on self-identity and future relational patterns (Baldwin & Dandeneau, 2005; Mikulincer & Shaver, 2020; Pinto-Gouveia & Matos, 2011). Some authors (e.g., Gilbert et al., 2003; Richter et al., 2009) have argued that while many studies have focused on the recollection of how parents behaved towards the self (i.e., rearing styles or scenarios), research should focus on the memories of how one felt in those early interpersonal interactions (i.e., emotional memories). Recently, Vagos et al. (2017) compiled some arguments that lend support to this idea. First, they highlighted that the recollection of parental rearing styles may not be consistent with the way one feels about it (Gilbert et al., 2003; Richter et al., 2009). These authors also noted that emotional memories about parental behavior are a better predictor of psychopathology, self-criticism, self-reassurance and positive affect, than the recall of early rearing scenarios (e.g., Castilho et al., 2014; Gilbert et al., 2006; Richter et al., 2009). In fact, positive emotional memories seemed to fully mediate the relationship between the recall of rearing scenarios focused on emotional warmth (i.e., recall of parents' behaviors of emotional support, like encouragement or expressions of affection) and the ability to self-reassure when faced with setbacks (Richter et al., 2009). Vagos et al. (2017) also highlighted that different factors can interfere with the recollection of events, in particular, if these events have had traumatic qualities (Chu et al., 1999; Perry et al., 1995). On the other hand, the recall of emotional memories seems to remain stable, even in the presence of changes in the emotional states (Brewin et al., 1993). Finally, they argued that people may present different responses and coping styles, when facing similar behavior from significant others (Cicchetti & Rogosch, 2009), which may change the emotional impact of that behavior. Following this theoretical framework, the assessment of early emotional memories is of major importance to better understand people's psychological adjustment.

To allow for the assessment of these memories, Richter et al. (2009) developed the Early Memories of Warmth and Safeness Scale (EMWSS), a 21-item measure of personal emotional memories, i.e., one's recollection of feeling warm, safe, and cared for within the family during childhood. In the psychometric study of this original version (Richter et al., 2009), the exploratory factor analysis (EFA) of data from 180 undergraduate psychology students (82.8% females; Mean age = 22.05 years) identified a single factor solution and an excellent internal consistency (Cronbach's $\alpha = .97$). In the adaptation to the Portuguese population, based on a sample of 175 college students (95.1% females, Mean age = 23.09 years), the same one-factor solution and evidence for reliability was also found ($\alpha = .97$) (Matos, 2012). None of these studies explored sex differences. The EMWSS was also adapted for the Portuguese adolescent population. The EFA supported the same one-factor solution, and the results from confirmatory factor analyses (CFA) have proved the goodness of fit of the model in different samples (Cunha et al., 2014; Vagos et al., 2017). Vagos et al. (2017) also developed a brief version of the EMWSS for adolescents. Submitted to CFA, the

nine-item one-factor structure of this version achieved an acceptable fit for the data and evidence for sex invariance of the measurement model was found. Concerning the 21-item version, no sex differences were found in the EMWSS scores for the adolescents from the community in both studies (Cunha et al., 2014; Vagos et al., 2017). Nonetheless, one study found that Bosnian adolescent girls scored significantly higher than boys on the EMWSS (Tahirovic & Jusić, 2016). This same study also showed that securely attached adolescents scored higher on EMWSS, compared to their insecurely attached peers (i.e., ambivalently and avoidant attached adolescents), while these did not differ significantly between them.

The EMWSS has been used in different studies, with clinical and community samples (e.g., Marta-Simões et al., 2018; Matos et al., 2015; Oliveira et al., 2016; Steindl et al., 2018; Tahirovic & Jusić, 2016). Overall, these studies found that the presence of memories of feeling warm, safe, and cared for within the family during childhood was positively associated with the recall of supportive and affectionate parental behavior (and negatively associated with rejection and over-protection rearing practices), the ability of self-reassurance, higher self-compassion, and better social relationships (i.e., feeling accepted by others) (Cunha et al., 2016; Cunha et al., 2014; Oliveira et al., 2016; Richter et al., 2009; Steindl et al., 2018; Vagos et al., 2017). By contrast, the report of less memories of safeness and warmth within the family during childhood was associated with the presence of psychopathology (particularly, stress, anxiety and depression symptoms), and with higher levels of self-criticism and shame (Marta-Simões et al., 2018; Matos et al., 2015; Richter et al., 2009; Steindl et al., 2018; Vagos et al., 2017). These studies also pointed out the utility of the EMWSS. Specifically, this scale is particularly important if one considers that the presence of positive emotional memories showed to be able to buffer against the negative influence of early harsh experiences within the family (Matos et al., 2015) and foster one's ability to be self-compassionate in the face of suffering (Steindl et al., 2018).

1.1. The present study

The main objective of this study was to test the dimensionality of the EMWSS in a community sample of adults from the Portuguese population. Both in the original (Richter et al., 2009) and in the Portuguese validation studies (Matos, 2012), the samples were exclusively made of college students, predominately female (over 82%), and, on average, very young. These sociodemographic characteristics constitute an important methodological limitation that may compromise the generalization of the findings. Most importantly, to the best of our knowledge, the factor structure of the EMWSS had not yet been tested via CFA in the adult population, particularly in sex-balanced samples. Based on previous studies with adults and adolescents' samples (Cunha et al., 2014; Matos, 2012; Richter et al., 2009; Vagos et al., 2017), we expect to find evidence for a single-factor measurement model. This work also builds upon previous research in adult samples (Matos, 2012; Richter et al., 2009) by investigating measurement invariance. Measurement invariance across sex will assure that the instrument is assessing the same constructs in males and females. Therefore, it will avoid inference problems when comparing those groups and allow for more credible conclusions to be drawn (Dimitrov, 2010). Following the findings with community samples of adolescents (Cunha et al., 2014; Vagos et al., 2017), the same measurement model is expected to equally represent the early memories of warmth and safeness experiences of men and women. If that would be the case, sex differences will be explored. Findings on sex differences are only available to adolescent samples and results were not consistent (Tahirovic & Jusić, 2016; Vagos et al., 2017). Nevertheless, these results support an expectation for higher scores for women, if significant differences were to be found.

In this study, the psychometric properties of the EMWSS will also be examined, specifically items' analysis and internal consistency, and construct validity by associating the EMWSS with other measures,

namely, the recall of parental rearing behavior, attachment orientations in close relationships, self-criticism and self-reassurance responses, self-compassion, and psychopathological symptoms. Based on previous research (e.g., Cunha et al., 2016; Marta-Simões et al., 2018; Matos et al., 2015; Richter et al., 2009; Steindl et al., 2018; Vagos et al., 2017), positive correlations are expected to be found between the EMWSS and emotional warmth/emotional support practices of parental rearing behavior, self-reassurance, and self-compassion. Conversely, negative correlations are expected to be found with rejection and overprotection practices of parental rearing behavior, self-criticism, and psychopathological symptoms. Given that securely-attached adolescents score higher on the EMWSS (Tahirovic & Jusić, 2016), and that a secure attachment style requires a warmth and affectionate relationship with one's attachment figures to arise (Fraley et al., 2011; Levy et al., 2011; Moreira et al., 2015), a negative association between the EMWSS and insecure attachment orientations (i.e., higher scores on attachment-related anxiety and/or avoidance) in close relationships (i.e., mother and father) in adulthood is expected, even though this has not been explicitly assessed before.

2. Methods

2.1. Participants and procedures

Ethical approval for this study was obtained from the institutional ethics committee. Participants were invited to participate voluntarily, between March and October of 2019. This sample was recruited by convenience in the community and was collected cross-country, both in city and countryside areas. All participants provided oral and written consent for their participation in the study, after being informed of its aims and all ethical considerations. Participants autonomously responded to all the self-report measures. The confidentiality and anonymity of their responses were guaranteed by using a system code in each research protocol, and unpairing the set of questionnaires and the signed informed consent. Eligibility criteria were Portuguese nationality, age over 18 years, and not having a history of mental health issues (as signaled by self-reporting a mental health diagnosis or identifying a previous or current psychotherapy or psychiatric intervention). Of the contacted participants, 31 were excluded due to the presence of mental health issues, 20 participants were excluded because only sociodemographic information was completed (they did not respond to any questionnaire), and 40 participants were further excluded because of missing responses in some items (> 20%) of the questionnaires. No differences were found between participants excluded due to missing values and those included in the analyses regarding sex, marital status, educational level, or residence area. However, significant differences were found regarding age, $t(540) = -2.05$, $p = .018$; the results indicated that participants excluded due to missing values were older than those included in the analyses ($M = 41.18$ vs. 36.46 years).

2.2. Measures

2.2.1. Early Memories of Warmth and Safeness Scale

The Early Memories of Warmth and Safeness Scale (Richter et al., 2009; Portuguese version by Matos, 2012) is a 21-item self-report questionnaire designed to measure the recall of early (i.e., during childhood) positive memories of warmth, affect, and safeness within the family (e.g., "I felt safe and protected."). Each item is rated on a five-point response scale (ranging from 0 = "No, never" to 4 = "Yes, most of the time"). The psychometric properties of the Portuguese version of the EMWSS are detailed in the results section.

2.2.2. EMBU

The EMBU (Swedish acronym translated as "My memories of upbringing"; Perris et al., 1980; Arrindell et al., 1999; Portuguese version by Canavarró, 1996) is a 23-item self-report questionnaire designed to

measure the recall of parental rearing behavior. The EMBU has three subscales: rejection (nine items; e.g., "My parents criticize me in front of others."), (over)protection (seven items; e.g., "When I get home, I have to tell you everything I did."), and emotional warmth/emotional support (seven items; e.g., "My parents praise me."). Participants respond to each question using a four-point response scale (range from 1 = "No, never" to 4 = "yes, most of the time"), giving separate ratings for father and mother. Arrindell et al. (1999) found Cronbach's alphas above .72 for all subscales. In this study, the (over)protection subscale was not used in the analyses due to low reliability values (< .60) in this sample.

2.2.3. Experience in Close Relationships - Relationship Structures

The Experience in Close Relationships - Relationship Structures (ECR-RS; Fraley et al., 2011; Portuguese version by Moreira et al., 2015) is a 9-item self-report questionnaire designed to assess attachment orientations in different close relationships: mother, father, intimate partner and best friend. Given the purpose of this study, only the mother and father versions were used). The ECR-RS has two subscales: avoidance (six items; e.g., "I prefer not to show this person how I feel deep down") and anxiety (three items; e.g., "I'm afraid that this person may abandon me."). Participants respond to each item using a seven-point response scale (range from 1 = "Strongly disagree" to 7 = "strongly agree"). In the original version, for the mother, Cronbach's alphas of .84 and .91 were found respectively for the Anxiety and Avoidance subscale. For fathers, Cronbach's alphas of .87 and .92 were found for the Anxiety and Avoidance subscales, respectively (Fraley et al., 2011).

2.2.4. Forms of Self-Criticism and Self-Reassurance Scale

The Forms of Self-criticism and Self-Reassurance Scale (FSCRS; Gilbert et al., 2004; Portuguese version by Castilho & Pinto-Gouveia, 2011) is a 22-item self-report questionnaire designed to measure people's self-critical and self-reassuring self-evaluative responses to setbacks or disappointments. Each item is rated on a five-point scale (ranging from 0 = "not at all like me" to 4 = "extremely like me"). The questionnaire has three sub-scales: inadequate self (nine items; e.g., "I am easily disappointed with myself"), hated self (five items; e.g., "I have become so angry with myself that I want to hurt or injure myself"), and reassured self (eight items; e.g., "I am able to care and look after myself"). Cronbach's alphas above .86 were found in the original version (Gilbert et al., 2004).

2.2.5. Self-Compassion Scale

The Self-Compassion Scale - Short Form (SCS-SF; Raes et al., 2011; Portuguese version by Castilho et al., 2015) is a 12-item self-report questionnaire designed to assess self-compassion (e.g., "I try to see my mistakes and failures as part of the human condition."). Each item is rated on a five-point response scale (ranging from 1 = "almost never" to 5 = "almost always"). A Cronbach's alpha of .86 for the total scale was found in the original version (Raes et al., 2011).

2.2.6. Depression, Anxiety and Stress Scales

The Depression, Anxiety and Stress Scales (Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro et al., 2004) is a 21-item short-version self-report questionnaire designed to assess three dimensions of psychopathological symptoms: depression (e.g., "I couldn't seem to experience any positive feelings at all"), anxiety (e.g., "I was aware of dryness of my mouth") and stress (e.g., "I found it hard to wind down"). The items are rated on a four-point response scale (ranging from 0 = "did not apply to me at all, to 4 = "applied to me very much, or most of the time"). Cronbach's alphas were found to be .91 for depression, .81 for anxiety, and .89 for stress (Lovibond & Lovibond, 1995).

2.3. Data analysis

Statistical procedures were computed using MPLUS v8.3 (Muthén & Muthén, 2017) and IBM SPSS STATISTIC 22 software. IBM SPSS was

used to compute descriptive statistics, subscales reliability, mean comparisons between sex, and Pearson correlations between the scores on the EMWSS and other relevant measures. To assess reliability, two methods were used: the Cronbach α (to favor comparison with past studies), and the McDonald's ω (computed based on Hayes syntax; Hayes & Coutts, 2020), as some authors (e.g., Dunn et al., 2014; Zinbarg et al., 2005) argued that it may be a more appropriate estimate of reliability. MPLUS was used to conduct CFA, multi-group analyses, and latent mean comparisons. Delta parametrization was used. CFA provides a theory-based approach to data reduction with a robust statistical basis, improving statistical power by modeling measurement error (Kline, 2016). CFA was performed to assess the adjustment of the models, based on the two-index approach (Hu & Bentler, 1999). In order to decide the most appropriate estimator to use when conducting CFA and multi-group analyses, we started by testing the normality of the data and concluded it to be not multivariate normal [Mardia's χ^2 skewness = 8321.92, $p < .001$; Mardia's χ^2 kurtosis = 101.09, $p < .001$ (Korkmaz et al., 2014)]. Hence, the Maximum Likelihood Robust estimator was used. Considering both the sample size and the number of items of the scale, for the model to be considered a good fit for the data it was considered a Comparative Fit Index (CFI) $\geq .92$ combined with a Root Mean Square Error of Approximation (RMSEA) $\leq .07$ or a Standardized Root Mean Square Residual (SRMR) $< .08$ (Hair et al., 2010). Some authors have argued that when conducting a CFA, one should never rely on the fit indices alone (Byrne, 2016; Chen, 2007). Therefore, the factor loadings of the observed variables were also analyzed. The loading values should be equal to or higher than .50 (Hair et al., 2010). Multi-group analyses were conducted to investigate sex invariance following a forward approach (Dimitrov, 2006). Configural invariance (i.e., the measurement models should adequately fit each group separately) was tested first, then metric invariance (i.e., the loading values for each item should be similar across groups) and then scalar invariance (i.e., the intercept values for each item should be similar across groups). For invariance to be established, the fit indicators of the measurement model should not significantly worsen as each new constraint is forced upon the data. Hence, metric measurement invariance was determined when the $\Delta CFI \geq -.010$ combined with $\Delta RMSEA \leq .015$ or $\Delta SRMR \leq .030$ and scalar invariance is established when $\Delta CFI \geq -.010$ combined with $\Delta RMSEA \leq .015$ or $\Delta SRMR \leq .010$ (Chen, 2007). At least partial scalar invariance should be obtained before groups can be compared based on the factor variables. As scalar invariance was achieved, groups were then compared based on latent mean comparisons (Dimitrov, 2006). The data that support the findings of this study are available from the corresponding author upon request.

3. Results

3.1. Demographics and descriptive statistics

The study sample was composed of 502 Portuguese adults from the community (51.2% female), aged between 18 and 79 years old (Table 1). No sex differences were found concerning age, $t(500) = 0.57$, $p = .566$, marital status, $\chi^2(5) = 5.57$, $p = .351$, or residence, $\chi^2(1) = 0.27$, $p = .604$. Sex differences were found in the education level, $\chi^2(4) = 13.25$, $p = .010$, with the majority of women reporting a college degree, while most of men specified having 10 to 12 years of education. Sex differences were also found in the professional situation, $\chi^2(3) = 16.56$, $p = .001$. Most participants were employed, but the female sample had a higher percentage of students, while the male sample had a higher percentage of unemployed participants.

3.2. Factor structure and measurement invariance

First, a CFA was conducted to test if the one-factor solution of the EMWSS demonstrated to be a good fit for the data of this Portuguese sample. We started by testing the original one-dimensional model

Table 1
Demographic characteristics of the complete sample, and by sex.

	Total (n = 502)		Female (n = 257)		Male (n = 245)	
	M	DP	M	DP	M	DP
Age	36.46	13.79	36.11	13.63	36.82	13.99
	N	%	N	%	N	%
Education level						
One to four years	34	6.8	18	7.0	16	6.5
Five to six years	51	10.2	31	12.1	20	8.2
Seven to nine years	61	12.2	22	8.6	39	15.9
Ten to twelve years	184	36.7	85	33.1	99	40.4
College degree	172	34.3	101	39.3	71	29.0
Marital status						
Married	247	49.2	125	48.6	122	49.8
Single	115	22.9	52	20.2	63	25.7
Dating	80	15.9	47	18.3	33	13.5
Cohabiting	37	7.4	20	7.8	17	6.9
Divorced/Separated	15	3.0	7	2.7	8	3.3
Widowed	8	1.6	6	2.3	2	0.8
Professional situation						
Employed	334	68.5	166	64.6	178	72.7
Student	110	21.9	63	24.5	7	2.9
Unemployed	31	6.2	24	9.3	47	19.2
Retired	17	3.4	4	1.6	13	5.3
Residence						
Countryside	307	61.2	160	62.3	147	60
Urban	195	38.8	97	37.7	98	40

(MODEL 1) and the results indicated an adequate fit for the total sample and threshold values for male and female samples, supporting configural sex invariance (Table 2). Nevertheless, metric invariance was not assured ($\Delta CFI = .001$; $\Delta RMSEA = .020$; $\Delta SRMR = .080$). Thus, residual covariances were allowed to occur between items 2 and 3. This was the suggested residual covariance with the highest modification index for MODEL 1 in the three samples ($MI = 53.81$ for the total sample, $MI = 23.94$ for the female sample, and $MI = 34.55$ for the male sample). This improved one-factor solution (MODEL 2) was found to be a good representation of the data for the total sample, as well as for the male and female samples (Table 2), demonstrating configural sex invariance. Evidence for metric sex invariance ($\Delta CFI = .000$; $\Delta RMSEA = .001$; $\Delta SRMR = .008$) and scalar sex invariance ($\Delta CFI = .003$; $\Delta RMSEA = .001$; $\Delta SRMR = .003$) was also found. The loading values for the items under these factorial solutions, internal consistency values and descriptive statistics are presented in Table 3.

Table 2
Fit indicators for CFA and configural invariance by sex.

	χ^2	df	RMSEA	90% CI for RMSEA	CFI	SRMR
MODEL 1						
Total sample	585.86***	189	.065	.059; .071	.919	.040
Female sample	466.18***	189	.076	.067; .084	.912	.043
Male sample	399.63***	189	.067	.058; .077	.905	.047
MODEL 2						
Total sample	528.85***	188	.060	.054; .066	.930	.038
Female sample	441.32***	188	.072	.064; .081	.920	.042
Male sample	362.67***	188	.062	.052; .071	.921	.045
Unconstraint model	802.48***	376	.067	.061; .074	.920	.043
Loading constraint model	823.61***	396	.066	.059; .072	.920	.051
Intercept constraint model	858.91***	417	.065	.059; .071	.917	.054

Note. χ^2 = Chi-Square; df = degrees of freedom for Chi-square; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; SRMR = standardized root means square residual; *** $p < .001$.

Table 3
Loadings, internal consistency values and descriptive statistics for the EMWSS, for the total sample and by sex.

	Total sample	Male	Female
Item 1	.65	.63	.65
Item 2	.68	.68	.69
Item 3	.68	.67	.69
Item 4	.73	.69	.77
Item 5	.70	.67	.73
Item 6	.73	.73	.74
Item 7	.81	.80	.82
Item 8	.68	.66	.69
Item 9	.67	.65	.69
Item 10	.80	.78	.82
Item 11	.76	.71	.81
Item 12	.74	.73	.75
Item 13	.71	.65	.75
Item 14	.77	.77	.77
Item 15	.80	.75	.83
Item 16	.77	.71	.83
Item 17	.82	.79	.85
Item 18	.85	.80	.89
Item 19	.76	.79	.75
Item 20	.86	.83	.87
Item 21	.76	.72	.80
Cronbach's α	.96	.96	.97
McDonald's ω	.96	.96	.97
M	67.82	67.75	67.89
DP	13.85	13.23	14.43

3.3. Construct validity in relation to external variables

Significant and positive correlations were found between memories of positive early experiences of warmth and safeness within the family as a child, and the recall of emotional support from the father and the mother (as assessed by EMBU), the ability to reassure oneself, and self-compassion. Significant and negative correlations were found between the recollection of early memories of warmth and safeness within the family and the recall of rejection and of overprotection from both the father and the mother. Negative significant correlations were also found between the total score of the EMWSS and the attachment orientations of avoidance and anxiety in relation to mother and father. Early memories of warmth and safeness were also significant and negatively associated with inadequate self and hated self-responses to setbacks or disappointments, as well as with depression, anxiety and stress symptoms (see Table 4).

3.4. Known-groups validity

Known-groups validity was assessed based on attachment styles. Participants were first assigned to their respective attachment style based on whether their scores for attachment-related anxiety and avoidance were above or below the scale midpoint. Then, based on the ECR-RS scores for the mother and the father, participants were categorized in four styles: secure (low avoidance and low anxiety), dismissing-avoidant (high avoidance and low anxiety), fearful-avoidant (high avoidance and high anxiety), and preoccupied (low avoidance and high anxiety) (Gillath et al., 2016). Overall, most participants were classified as having a secure attachment style in relation to both mother and father. The results indicated significant differences in the report of memories of warmth and safeness by the participants with different attachment styles, both in relation to mother, $F(3,498) = 23.57, p < .001$, as in relation to father, $F(3, 498) = 18.12, p < .001$ (Table 5). Overall, securely attached individuals reported more memories of warmth and safeness than those with insecure attachment styles. Moreover, individuals who had an attachment style characterized by higher scores on avoidance reported less memories of warmth and safeness. The lowest levels of these memories were reported by those with a fearful-avoidant attachment style.

Table 4
Descriptive statistics and reliability of external variables and correlations with EMWSS.

	M	SD	Cronbach's α	McDonald's ω	EMWSS_total
EMBU father					
Emotional support	20.68	4.84	.86	.87	.43**
Rejection	10.13	2.61	.66	.66	-.34**
EMBU mother					
Emotional support	21.81	4.40	.85	.85	.55**
Rejection	11.91	3.58	.78	.79	-.40**
Attachment Avoidance					
Mother	15.06	7.12	.83	.83	-.43***
Father	17.58	8.00	.85	.85	-.30***
Attachment Anxiety					
Mother	7.29	5.07	.83	.83	-.25***
Father	7.62	5.19	.85	.85	-.23***
Self-criticism and reassurance (FSCRS)					
Inadequate self	10.76	6.99	.85	.86	-.21***
Hated self	1.70	2.69	.71	.72	-.19***
Reassured self	21.50	6.18	.84	.85	.36***
Self-compassion (SCS)	42.28	7.20	.82	.82	.33***
DASS					
Depression	2.28	3.15	.84	.85	-.30***
Anxiety	2.19	3.08	.82	.82	-.21***
Stress	4.41	4.07	.87	.87	-.19***

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

Table 5
Known-groups validity based on attachment styles.

Attachment style	n	%	M	SD	F	Post-hoc
Mother						
1. Secure (S)	272	54.18	71.31	11.79	23.57***	S > DA*
2. Dismissing-avoidant (DA)	62	12.35	64.10	11.16		S > FA***
3. Fearful-avoidant (FA)	69	13.75	57.20	17.12		DA > FA***
4. Preoccupied (P)	99	19.72	67.97	13.90		P > FA***
Father						
1. Secure (S)	219	43.63	72.24	11.12	18.12***	S > DA***
2. Dismissing-avoidant (DA)	105	20.92	64.58	13.22		S > FA***
3. Fearful-avoidant (FA)	95	18.92	61.27	14.83		S > P*
4. Preoccupied (P)	83	16.53	67.73	15.93		P > FA**

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

Note. Post-hoc calculated by Bonferroni test. Only significant differences are reported.

3.5. Sex differences

Considering that full invariance was found, sex differences were assessed based on latent mean comparisons between the scores of male and female participants. No sex differences were found for the EMWSS (latent mean for females = 0.20, $p = .816$) indicating that men and women presented the same levels of early memories of warmth and safeness. These results reflect those found using descriptive measures of the summed score of the 21 items ($Z = -0.64, p = .525$), which are presented in Table 3.

4. Discussion

The present study assesses the measurement model and psychometric properties of the Portuguese version of the Early Memories of Warmth and Safeness Scale (Richter et al., 2009) throughout CFA procedures and its invariance across sex, which is, to our knowledge, the first to do so in an adult community sample. Our main findings show the goodness of fit of a one-factor measurement model for the EMWSS. This finding is in line with the results from EFA in adult samples (Matos, 2012; Richter et al., 2009) and from CFA in adolescent samples (Cunha et al., 2014; Vagos et al., 2017). Regarding the psychometric properties, the findings provided solid evidence supporting the validity and reliability of the EMWSS.

In this study, whereas the one-factor measurement model achieved a good fit for the total sample without any residual covariance, sex invariance was not possible to assure. Given that all items of the EMWSS assess the same latent construct, modification indices were then considered. Therefore, residual covariance between items 3 (“I felt understood”) and 2 (“I felt appreciated the way I was”), which content convey a similar idea of a sense of acceptance of the self, was allowed. This improved the fitness of the model and allowed measurement invariance to be established across sex. Also, loading values were higher than .50 for the three samples (total, male and female), suggesting items statistical and practical relevance in reflecting the construct with which they are associated (Hair et al., 2010). Measurement invariance implies that the EMWSS is assessing the same construct in male and female samples, allowing for meaningful comparisons (Dimitrov, 2010). Sex mean differences were analyzed, and the results show that males and females do not differ in the levels of recollection of early positive memories of warmth and safeness within their families. These finding reinforces the conclusions of previous studies, with both adults and adolescents (Matos, 2012; Richter et al., 2009; Vagos et al., 2017), which suggested that the recollection of positive emotional memories is similar for both sex in non-clinical populations. Furthermore, the EMWSS demonstrated very good internal consistency, not only for the total sample, as well as for the male and female samples. Similar coefficients were found in other versions (Richter et al., 2009; Tahirovic & Jusić, 2016; Vagos et al., 2017), which support that the EMWSS is a reliable instrument.

Associations between the score on EMWSS and other relevant variables occurred in the expected direction. The presence of memories of warmth and safeness within the family as a child is significantly and positively associated with the recall of parental rearing behavior characterized by emotional support from the father and the mother. These are the strongest associations found between the EMWSS and the recollection of parental rearing behavior. Significant and negative associations between the presence of positive emotional memories and the recall of parents having rejection or (over)protection rearing behaviors were also found. These findings are congruent with the idea that parents that exhibit more emotional support will generate more memories of warmth and safeness as opposed to those who reject or overprotect their children (Richter et al., 2009).

The scores on the EMWSS are also significantly and negatively associated with attachment-related avoidance and anxiety for mother and father relationships. This finding indicates that higher sensitivity to rejection and abandonment, and worries about another person’s availability or support in times of need (i.e., higher attachment anxiety) is associated with lower levels of memories of warmth and safeness. The same seems true for individuals who tend to feel greater discomfort with intimacy and closeness in relationships and to distrust their significant others’ good intentions, striving to maintain emotional distance (i.e., higher attachment avoidance). Higher scores on attachment-related avoidance and/or anxiety may express styles of insecure attachment. This pattern of associations is not surprising, given that feelings of being cared for in a warmth and affectionate way by one’s attachment figures are an important basis for a secure attachment style in close

relationships in adulthood (Fraley et al., 2011; Levy et al., 2011; Moreira et al., 2015). The assessment of the known-groups validity of the EMWSS also reinforces this idea. Specifically, higher EMWSS scores were consistently found among securely attached individuals, and lower scores were found among individuals with attachment styles characterized by higher scores in attachment-related avoidance, both in relation to mother and father. This means that those who have less memories of their parents as being warmth and responsive, are also the ones who show negative internal representations of others, which characterizes avoidant individuals.

In line with previous research (Richter et al., 2009; Vagos et al., 2017), our findings also indicate that participants reporting higher levels of memories of warmth and safeness tend to be more self-reassuring in response to setbacks or disappointments, and to be less self-critical engaging in less inadequate self or hated self-responses. Moreover, they have greater tendency to be caring and kind towards the self when facing personal suffering (that is, to report higher self-compassion). This outcome, as already found (Cunha et al., 2016; Marta-Simões et al., 2018; Steindl et al., 2018), is in line with the proposed relation between self-compassion and an evolved mammalian physiological system (linked to secure attachment) that is activated by and developed from other people’s caring and kindness signals and behaviors towards oneself (Gilbert, 2010), which are reflected in memories of feeling cared for, safe and nurtured as a child. Our findings also indicate that higher levels of memories of warmth and safeness are associated with lower levels of depression, anxiety and stress symptoms. This association is not surprising and is in accordance with empirical evidence demonstrating that recollections of feeling soothed, reassured, warmth, safe, and cared for as a child are negatively associated with psychopathology in adults (e.g., Marta-Simões et al., 2018; Matos et al., 2015; Oliveira et al., 2016; Steindl et al., 2018) and in adolescents (Cunha et al., 2016, 2014; Vagos et al., 2017).

The findings of study need to be carefully interpreted due to some limitations. First, the use of a convenience sample, even being sex-balanced and collected in a large area of the country, does not ensure full representativeness. Thus, the results should be carefully interpreted as their generalization may be compromised. The reliability of the EMWSS over time (test-retest stability) was not tested. However, this limitation may not be particularly problematic because it is not expected that early memories of warm and safeness within the family may change across time. Indeed, research has found support to the idea that the recall of emotional memories is stable (Brewin et al., 1993; Kensinger & Schacter, 2008). However, this study did not assess age-related invariance, which could provide important inputs on how personal emotional memories change (or do not change) throughout adulthood. In addition, the fact that participants excluded due to missing values were significantly older than those who were included should also be considered, as it implies greater caution in the interpretation of the results and its generalization regarding older individuals. Future research should address these limitations. Given the Portuguese legislation, the ethnic/racial background of participants was not assessed. In future studies it would be valuable to include this variable. This would be particularly relevant, considering available evidence showing differences in cultural beliefs about the emotional expression and experience (Hochschild, 1979), and that those different beliefs can lead to cultural/ethnic group differences in emotional responses (Mauss et al., 2010), as well as in emotion regulation strategies (Condesine et al., 2005). Despite these limitations, our findings provide a good indication that the EMWSS is a good psychometric tool for measuring one’s feelings of being cared for, soothed, safe, and warm in childhood in the Portuguese adult population. The sex invariance of the EMWSS, also allows for accurate comparisons between males and females. The pattern of associations with other relevant measures also provides points for reflection that can help to advance knowledge on how emotional memories can impact psychopathology and even therapy outcomes.

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CRedit authorship contribution statement

Marta Capinha: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft. **Marcela Matos:** Resources, Writing - review & editing. **Marco Pereira:** Conceptualization, Methodology, Validation, Supervision, Writing - review & editing. **Marlene Matos:** Conceptualization, Methodology, Supervision, Writing - review & editing. **Daniel Rijo:** Conceptualization, Methodology, Supervision, Writing - review & editing.

Declaration of Competing Interest

None

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Supplementary materials

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