Development and validation of the Current Experiences of Warmth and Safeness Scale in community and residential care adolescents

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Abstract

Interpersonal experiences of warmth and safeness have a key role on emotion regulation and social development during childhood and adolescence. This paper presents a new and brief scale designed to assess the adolescents' perception of current experiences of warmth and safeness (CEWSS-A). Its dimensionality and psychometric properties were investigated using a Portuguese sample of 453 adolescents from the community and 319 adolescents from residential care facilities. A confirmatory factor analysis indicated that the 12-item scale has a one-factor measurement model. The CEWSS-A showed adequate internal consistency in the different samples ($\alpha > .92$) and construct validity in relation to external variables. The CEWSS-A proved to be group invariant. Community adolescents reported a higher frequency of current experiences of warmth and safeness in comparison with residential care participants, and boys showed significantly higher scores than girls, within both samples. The CEWSS-A is an appropriate self-report measure for clinical and research purposes.

Keywords: Warmth and safeness experiences; Psychometrics; Measurement Invariance; Adolescence; Residential care

Introduction

According to an evolutionary perspective, humans are a social species [1]. In order to survive, the human warmth system evolved in the context of supporting and nurturing social relationships [2]. Being affiliated with others is considered crucial to an individual's healthy development and psychological well-being across the life span [1].

It has been proposed that different types of psychosocial vulnerabilities can be understood taking into consideration the development, functioning, and interaction of three main affect regulation systems, specifically oriented toward threats, resources and affiliation, which are sensitive/responsive to different types of stimuli [3]. While the threat system alerts individuals and activates defensive strategies, the drive system is related to the availability of resources and rewards, activating seeking-engagement strategies; by its turn, the soothing system gives rise to positive affect, such as calmness, contentedness and reassurance, helping to regulate negative affect and behaviour (e.g., aggression, isolation) associated with the activation of the threat system [4].

The soothing system evolved in parallel with the attachment system, being shaped by the quality of the child-parent/caregiver relationship [5]. On the one hand, if the parents/caregivers nurture, reassure and soothe the child, feelings of soothing and social safeness will be further developed. On the other hand, if this relationship is poor, abusive, threatening or if no one is available as a source of care and support, the threat system will be mostly stimulated and the maturation of the soothing system will become compromised [6]. Consequently, those children will tend to be less emotionally regulated, more rank-focused and self-focused, and avoid interpersonal relationships or become more aggressive towards others [7, 8]. They may also struggle to feel safe and soothed in relationships later in life [6]. Feelings of connectedness have also been found to be related with the individuals' ability to be compassionate towards others, and, when

underdeveloped, can affect children's ability to trust and receive demonstrations of care and compassion from others [7, 9, 10]. Hence, the lack of secure relationships in early years as well as difficulties in activating the soothing system were conceptualized as vulnerability factors for both internalizing and externalizing problems [7]. Overall, affiliative experiences with others and the recall of warmth, safeness and nurturance will set the grounds for the development of the soothing system and regulation of threat-related emotions and behaviours [9, 11].

Throughout adolescence, living in a supportive and secure environment and feeling socially accepted and valued have been recognized as relevant factors affecting mental well-being [3]. Also, the occurrence of negative experiences within closer relationships (e.g., family, peers) has been suggested to negatively impact emotional and social changes across this developmental stage [12]. This seems to be of upmost relevance, since adolescence is considered a critical period for the emergence of mental health problems [13], including internalizing and externalizing disorders [14], with significant impact later in life [15]. Therefore, relationships with significant others (e.g., parents, peers, teachers) based in care, warmth, safeness and reassurance, play a central role not only in childhood, but also during adolescence, helping adolescents to better regulate their affect and behaviour [16], and enabling a better and smoother transition into adulthood [17].

In addition to the emotional, social and cognitive developmental challenges of adolescence [18], the majority of youngsters living in residential care homes (RCH) presents a personal history of maltreatment (psychological, physical and sexual abuse, and neglect) [19], having experienced disruptions in their attachment relationships with primary caregivers [20]. Since these adolescents did not receive appropriate and consistent levels of nurturance and warmth in early relationships, the opportunity to

develop their soothing system in a desirable manner might have been compromised, affecting their ability to feel safe and soothed in current relationships [3, 6]. Additionally, institutionalized adolescents tend to reveal interpersonal vulnerabilities such as withdraw, resistance to close relationships, less contact with significant adults and a fragile social support network [21, 22]. For these reasons, nurturance should not be neglected in the daily intervention in residential care settings [20]. As significant figures, caregivers should be able to support adolescents in regulating their emotions in a healthy and non-damaging way [23], in order to help them to cope with the negative events they were/are forced to face [24]. Since the quality of the adolescent-caregiver relationship has been recognized as a key mechanism of effective interventions serving at-risk adolescents [25], particular attention should be paid to the assessment and enhancement of such relationships.

Considering the relevance of caring experiences for the human development, the association between early memories of parental figures and later psychosocial adjustment and psychopathology has been largely investigated. Based on the assumption that it is important to assess the recall of how one felt in relation to others' behaviour, instead of others' behaviour per se [26], Richter, Gilbert and McEwan [27] developed the Early Memories of Warmth and Safeness Scale (EMWSS) to evaluate the recall of inner positive feelings and experiences of warmth and safeness during childhood. The EMWSS was also adapted and validated for adolescents [28, 29]. As in adults, the adolescents' version showed a one-factor solution, with good psychometric properties, both with forensic [29] and community samples [28]. Vagos and colleagues [29] made a brief version for adolescents of different samples (i.e., community and residential care/juvenile detention facilities), which also performed well from a psychometric point of view. Regarding gender comparisons, findings differed across

studies. While, Tahirović & Jusić [30] found that girls scored significantly higher than boys on the EMWSS, other studies revealed that boys and girls recalled similar levels of early warmth and safeness experiences [28, 29]. In what concerns different samples, community participants presented higher scores of early caring memories, when compared with behaviourally disturbed youngsters, both from residential care and juvenile justice settings [29]. Research also showed that early memories of caring experiences were negatively associated with symptoms of depression, anxiety and stress [28, 29], and were positively associated with self-reassurance and the recall of positive parental behaviour [28].

As stated above, adolescents present an increased vulnerability for the emergence of psychopathology. Considering that not only the early caring experiences with significant others, but also current feelings of being cherished, supported and valued associate with psychological well-being [9, 11], an instrument allowing to assess those experiences throughout adolescence would be useful for both clinical and research purposes. Nonetheless, there is no available self-report measure aiming to assess the current perception of such kind of experiences.

This study describes the development of a brief self-report measure designed to assess the frequency with which adolescents feel emotional experiences of warmth, care and safeness in current relationships: The Current Experiences of Warmth and Safeness Scale for adolescents (CEWSS-A). It includes research on the dimensionality, measurement invariance between boys and girls and between participants from the community and from residential care homes, test-retest reliability and validity in relation to external variables.

Methods

Participants

Participants included 772 Portuguese adolescents, from the general community and from residential care homes, aged between 14 and 18 years old (i.e., combined sample; cf. Table 1). Boys (M = 15.57; SD = 1.21) and girls (M = 15.67; SD = 1.30) had similar mean ages t(770) = −1.180, p = .238) and were similarly distributed by socioeconomic status (SES; $\chi 2(2)=1.901$, p = .387).

The community sample comprised 453 adolescents. Within this sample, no significant differences between boys and girls were found concerning age (t (451) = -1.111; p = .267; for boys M = 15.36, SD = 1.16 and for girls M = 15.49, SD = 1.28), number of school years (t(451) = -1.070, p = .285; for boys M = 9.76, SD = 1.10 and for girls M = 9.87, SD = 1.18) and SES distribution ($\chi 2(2) = .365$, p = .546).

Of the combined sample, 319 adolescents were placed in RCH[2], composing the at-risk sample. The length of placement in RCH ranged from 0 to 204 months (M = 35.90; SD = 37.56). Within this sample, no significant differences between gender were found regarding age (t (317) = -.454; p = .650; for boys M = 15.86, SD = 1.21 and for girls M = 15.93, SD = 1.29) and SES ($\chi 2(2) = 1.349$, p = .509). Girls completed more school years than boys (t(316) = -2.200, p = .029; for boys M = 8.89, SD = 1.58 and for girls M = 9.27, SD = 1.59).

Adolescents in RCH were significantly older than those in the community (t (770) = -5.221; p < .001). Additionally, adolescents in RCH completed significantly less schooling (t (769) = 7.476, p < .001) and were of a lower SES than their community

[2] Portuguese residential care homes (RCH) may vary in the number of children and youngsters fostered and may be mixed or segregated by gender. Most of the placements (89%) are due to history of maltreatment (neglect and psychological, physical and sexual abuse), and the remaining are related with abandonment by caregivers or the lack of family support [53]. Each RCH has a technical team (e.g. board members, psychologists, social workers), and education/support staff (e.g. educators, educational assistants).

peers ($\chi 2(2) = 37.665$, $p < .001$). The samples were not significantly different with regard to gender distribution ($\chi 2(1) = .103$, $p = .748$).

In order to study test-retest reliability, the CEWSS-A was filled out one month after the first measurement, by a subsample of 107 adolescents from the community sample, composed by 52 boys (49%) and 55 girls (51%), aged between 14 and 17 years old (M = 14.86, SD = .76), and a subsample of 110 adolescents from the at-risk sample, composed by 53 boys (48%) and 57 girls (52%), with ages ranging from 14 to 18 years old (M = 15.82, SD = 1.23).

Adolescents from the community in the retest subsample were significantly younger than those in the community sample (t (304) = -7.364; p < .001) and completed less schooling (t (436) = -8.303, p < .001). There were no significant differences regarding gender ($\chi 2(1) = .040$, p = .841) and SES distribution ($\chi 2(2) = .384$, p = .825). The retest subsample of at-risk adolescents did not differ from the RCH sample regarding age (t (317) = -.813, p = .417), gender ($\chi 2(1) = .001$, p = .981) and SES ($\chi 2(2) = 2.774$, p = .250), having though less schooling (t (187) = -2.262, p = .025).

Measures

Early Memories of Warmth and Safeness Scale - Adolescents (EMWSS-A) [27, 28]

EMWSS-A is a 21-item self-report scale designed to measure the recall of feeling warm, safe and cared for in childhood (e.g., 'I felt secure and safe', 'I felt that I was a cherished member of my family'). Participants are asked to rate how frequently each statement applied to them in their childhood, using a 5-point Likert scale (0 = No, never, to 4 = Yes, most of the time). The original version for adults revealed a one-factor solution and good psychometric properties, with excellent internal consistency (α =.97) and good test-retest reliability (r = .91) [27]. The Portuguese version for

adolescents confirmed a single factor structure as well and presented an excellent internal consistency value (α = .95) and good test-retest reliability (*r* = .92) [28]. In this study, the internal consistency value for the EMWSS-A was .98.

Depression Anxiety and Stress Scales (DASS-21) [31, 32]

DASS-21 is a 21-item self-report scale designed to assess symptoms of depression, anxiety and stress. Participants are asked to rate how much each statement applied to them over the previous week, using a 4-point Likert scale (0 = did not apply to me at all, to 3 = applied to me very much, or most of the time). On the original version, the DASS-21 subscales presented high internal consistency: Depression Subscale α = .91, Anxiety Subscale α = .84 and Stress Subscale α = .90 [31]. The Portuguese version showed good internal consistency (Depression α = .85, Anxiety α =. 74 and Stress α = .81) and good convergent and discriminant validity [32]. In this study, the internal consistency values were .87, .83 and .87 for Depression, Anxiety and Stress subscales, respectively.

Positive and Negative Affect Schedule (PANAS) [33, 34]

PANAS is a 20-item self-report scale designed to assess two mood states: positive affect (PA) and negative affect (NA). Each subscale is composed by 10 items that describe feelings and emotions (e.g., enthusiastic, proud and excited on the PA subscale, and afraid, hostile, guilty and sad on the NA scale). Participants are asked to rate the severity and frequency of these feelings and emotions in the last few weeks, using a 5-point Likert scale (1=nothing or very slightly, to 5=extremely). Cronbach's alphas values in the original version were .88 for PA and .87 for NA [33]. The Portuguese version revealed alphas of .86 for PA and .89 for NA [34]. In the present study, the internal consistency values coincided: .86 for PA and .89 for NA.

Compassion Scale - Adolescents (CS-A) [35, 36]

CS-A is a 24-item self-report scale that measures compassion for others. Participants are asked to answer each item according to how frequently they feel and act towards others in that way, using a 5-point Likert scale (1 = almost never, to 5 = almost always). In the original version for adults, a confirmatory factor analysis (CFA) showed the existence of six subscales (Kindness, Common Humanity, Mindfulness, Indifference, Separation and Disengagement) and a higher order factor labelled Compassion. The total scale presented an alpha of .90 and the subscales presented acceptable internal consistency values, ranging from $\alpha = .57$ for Disengagement to $\alpha = .77$ for Kindness [35]. For the Portuguese version for adolescents, CFA revealed the existence of six subscales and two higher-order factors: Compassion (comprising the positive subscales: Kindness, Common Humanity, Mindfulness) and Disconnectedness (comprising the negative subscales: Indifference, Separation and Disengagement). Considering the two higher order factors, Compassion showed an alpha of .90 and the Disconnectedness an alpha of .87 [36]. For parsimony reasons, only the two higher order factors, Compassion and Disconnectedness, were used in the current paper to examine the construct validity of the CEWSS-A. In the present study, alpha coefficients were .87 for Compassion and .85 for Disconnectedness.

Peer Conflict Scale (PCS) [37, 38]

PCS includes 40 items designed to assess four types of aggression (i.e., overt reactive aggression, overt proactive aggression, relational reactive aggression and relational proactive aggression). Each subscale is composed by 10 items, which are rated using a 5-point Likert scale (0 = has little to do with me, to 4 = has everything to do with me). These 4 subscales can be grouped into two aggression functions: Reactive

Aggression (composed of Overt Reactive and Relational Reactive Aggression) and Proactive Aggression (composed by Overt Proactive and Relational Proactive Aggression). The original version showed good internal consistency values, with alphas ranging from .79 for the Relational Reactive Aggression to .89 for the Overt Reactive Aggression [37]. In the Portuguese version, alphas ranged from .87 for the Relational Reactive Aggression, to .91 for the Overt Reactive Aggression [38]. Again, for parsimony reasons, only the Reactive Aggression and the Proactive Aggression were used. In the current study, alpha coefficients were .91 for the Reactive Aggression and .90 for the Proactive Aggression.

Procedures

Scale development

The Current Experiences of Warmth and Safeness Scale for adolescents (CEWSS-A) was based on the EMWSS-A [28] and was developed to assess how often adolescents felt emotional experiences of care, warmth and safeness with others, along the two previous weeks. After obtaining approval from the authors of the original scale [27], the verbal tense of the EMWSS-A items was adapted to the present perfect continuous. The content of four items was adapted in order to facilitate its comprehension or to adjust it to the diversity of adolescents' relationships (i.e., not limited to family experiences). As an example, item 9 ("'I felt that I was a cherished member of my family'.") from EMWSS-A was modified to "I have been feeling that I'm loved by the people I live with". Instructions were changed, asking to rate how frequently each statement applied to the participant over the past two weeks, rather than in their childhood. Like for the EMWSS-A, items are rated with a 5-point scale (ranging from 0 = No, never, to 4 = Yes, most of the time).

Considering that one latent construct could be over-identified using the 21 items [39], and that fatigue may influence answers to self-report measures, namely in more resistant and unmotivated respondents, such as adolescents [40], we proposed to reduce the number of items and to test if a shorter version would present good psychometric qualities. Hence, the most relevant items assessing the intended construct were selected, according to theoretical and statistical criteria [41]. Firstly, six experts in psychology rank-ordered the 21 items of the complete scale taking into consideration feelings and experiences more related to the soothing system (i.e., 1 = most relevant, 21 = less relevant). Experts considered that some items could also be related to the other affect regulation systems, such as the drive system (i.e., positive affect associated with excitement, joy and vitality) and the threat system (i.e., safety feelings associated with vigilance, escape from, and/or avoidance of threat scenarios, instead of feelings of safeness associated with warmth and calming experiences). Accordingly, items that were rated as potentially related to drive (e.g., I have been feeling happy) or threat (e.g., I have been feeling relaxed and comfortable) were eliminated. Items judged as better representing experiences of warmth and safeness, including those reflecting connection with others (e.g., I have been feeling comfortable sharing my feelings and thoughts with people around me), emotions associated with the soothing system (e.g., I have been feeling a sense of warmth by people around me), and social connectedness in suffering or difficult moments (e.g., I have been feeling it was easy to be soothed and comforted by those close to me when I was unhappy) were kept. Secondly, following the procedure by Vagos and colleagues [29], the item rankings were averaged and items with averages of 10 or lower were selected. These procedures resulted in the selection of 12 items, each one with CFA loadings greater than .50 based on the 21-item one-factor model. Item quality analysis revealed moderate to high values of item-total

correlations. Moreover, the alpha values did not decrease if the item was deleted. So, 12 items were kept as the best theoretical and statistical representation of the construct. This short version includes items 1, 3, 4, 5, 7, 9, 10, 12, 14, 17, 18, 20 of the initial full scale (cf., Table 2).

Data collection

Study procedures were approved by the institutional and national ethics committee and direction boards. The community sample consisted of adolescents from 8 schools and 4 sports/recreational groups based on convenience. The RCH sample consisted of adolescents from 34 RCH. Adolescents identified as cognitively impaired by school or RCH professionals were excluded. Eligible participants, aged between 14 and 18 years old, were invited to voluntarily participate. Adolescents with ages raging between 14 and 16 years old provided informed assent and youngsters older than 16 provided informed consent. Informed consent was also obtained from parents/legal guardians in the community and RCH samples. In the community sample, data was collectively collected during class time or drills in the presence of the researcher. In the RCH sample, data was collectively collected in small groups though some adolescents completed it individually if they showed difficulties in reading and understanding, with the assistance of a researcher. Given the similarity between the CEWSS-A and the EMWSS-A, the protocol was divided into two parts (A and B). Part A included the CEWSS-A, DASS-21, PANAS and CS-A, and part B included the EMWSS-A and PCS. Parts A and B were administered within one week of each other for each class/group in alternating order. Additionally, the order of the scales within an administration timepoint was randomized. To investigate test-retest reliability, the first 3 schools in the community and the first 13 RCH completed the CEWSS one month after the first measurement.

Data Analysis

Since the present scale was developed from previous research [27, 28, 29] and founded on theoretical assumptions, an unifactorial model structure was defined prior to the analyses. Based on a combination of theoretical and statistical criteria, a brief version of the CEWSS-A was developed according to the procedures previously described (c.f. procedures section). Then, we sought out to explore the adequacy of the final 12-item one-factor model, via Confirmatory Factor Analysis (CFA). The normality of the CEWSS-A variables was analysed using the Kolmogorov-Smirnov test. Results indicated that the data did not present a normal distribution ($KS = .108$, $p < .001$). Consequently, the CFA and multi-group analyses were conducted using the Maximum Likelihood Robust estimator. Chi square is the most commonly reported fit statistic; however, it is very sensitive to sample size and may overestimate the lack of model fit. To overcome this limitation, additional goodness-of-fit indexes were selected according to the guidelines provided by Hu and Bentler [42]: The Standardized Root Mean Square Residual (SRMR) ≤ .09 combined with either a Comparative Fit Index (CFI) ≥ .95 or a Root Mean Square Error of Approximation (RMSEA) ≤ .06.

The best fitting measurement model of the CEWSS-A was tested for gender and group (community *versus* at-risk samples) invariance, in order to be able to draw credible conclusions of between-group comparisons. Measurement invariance was conducted by testing configural, metric and scalar invariance. As suggested by Dimitrov [43], at least partial scalar invariance should be obtained in order to proceed with group comparisons. According to Chen [44], metric measurement invariance is determined when ΔCFI ≤ -.01 combines with ΔRMSEA ≤.015 or with ΔSRMR ≤ .03 and scalar invariance is established when ΔCFI ≤ -.01 combines with ΔRMSEA ≤.015 or with ΔSRMR ≤ .01. After establishing measurement invariance, mean comparisons were

computed with the nonparametric Mann-Whitney U test, for mean scores comparison of boys and girls from each sample and between samples. Effect sizes were calculated by dividing Z by the square root of N ($r = Z / \sqrt{N}$) [45].

Construct validity in relation to external variables (i.e. EMWSS-A, CS-A, PCS, PANAS, DASS-21) and test-retest reliability were examined by computing Spearman's correlation coefficient. Internal reliability analysis was conducted by examining the Cronbach's alpha.

The CFA and multi-group analyses were performed using Mplus v8 [46]. IBM SPSS Statistics 22 software was used to perform the descriptive and psychometric analyses of the scale, to compare gender and groups and to compute the Cronbach Alpha.

Results

Factor structure

The 12 items identified as best to represent the construct (cf. procedures section) were submitted to CFA, as representing one latent construct (cf. Table 2). The measurement model revealed an appropriate adjustment for the data taken from all samples, except for the data of girls from the community sample, which showed the following fit indicators $\chi^2/df=143.860/54$, $p<.001$; CFI = .938; RMSEA =. 085; SRMR = .037. In order to improve the quality of model fit, a correlation of the error covariance between items 10 and 12, based on the highest modification index, was performed. Moreover, this procedure was adopted because the measurement model of the scale is unidimensional and items 10 and 12 have a similar content (cf. Table 2). This measurement model achieved a good fit for the combined sample, community sample, at-risk sample and respective girls and boys samples (cf. Table 3), alongside with

significant loading values ($p < .001$) higher than .50, and excellent internal consistency values (cf. Table 4).

Measurement invariance

Concerning measurement invariance between the community and the at-risk samples, configural invariance was achieved (cf. Table 3). Consequently, metric and scalar invariance analyses were able to be conducted. Full metric (ΔCFI =-.005, ΔRMSEA =.001, ΔSRMR=.021) and scalar invariance (ΔCFI =.005, ΔRMSEA =.007, ΔSRMR=.021) were also found between samples.

Between gender measurement invariance was investigated in the complete sample, as well as in the community and at-risk samples, separately. Configural invariance was achieved for all samples (cf. Table 3). Full metric and scalar invariance were found for the complete sample (ΔCFI =-.001, ΔRMSEA =-.002, ΔSRMR=-.01; ΔCFI =-.003, ΔRMSEA=-.001, ΔSRMR=-.001, respectively), the community sample (ΔCFI =.003, ΔRMSEA =-.005, ΔSRMR=.011; ΔCFI =-.005, ΔRMSEA=.001, ΔSRMR=.017, respectively) and the at-risk sample (ΔCFI =-.007, ΔRMSEA =.002, ΔSRMR= .023; ΔCFI =-.005, ΔRMSEA=0, ΔSRMR=.006, respectively).

Measurement invariance across community and at-risk adolescents was also investigated for each gender separately. Configural invariance was achieved for boys of both samples, as for girls (cf. Table 3). After, both metric invariance (for boys ΔCFI =-.009, ΔRMSEA =.003, ΔSRMR= .035; for girls ΔCFI =-.003, ΔRMSEA =-.001, ΔSRMR=.015) and partial scalar invariance were found. Partial scalar invariance was obtained after allowing the intercepts of item 6 to vary between groups (for boys ΔCFI =-.002, ΔRMSEA =-.001, ΔSRMR= .003; for girls ΔCFI =-.007, ΔRMSEA =.002, ΔSRMR= .008).

Measurement invariance analyses showed that the same measurement model fits all samples (configural invariance) and that loadings across samples were similar (metric invariance). Finally, scalar invariance was found between groups (at-risk and community samples) and between gender (within the complete, the community and the at-risk samples), showing similar intercepts between community and at-risk adolescents, as well as between boys and girls. The CEWSS-A proved to be invariant, allowing further comparisons between groups.

Mean comparisons

Due to the non-normal distribution of the data, the Mann-Whitney U test was used for all comparisons between groups.

When comparing community and at-risk samples, adolescents from the community reported a higher frequency of current experiences of warmth and safeness with others, in comparison with at-risk adolescents (U = 41144, p < .001, r = -.3). This comparison achieved a medium effect size.

Gender comparisons were performed for the complete, the community and the at-risk sample. Boys and girls reported different frequencies of current experiences of warmth and safeness. Boys scored significantly higher than girls, in the complete (U = 56680, p = .001, r = -.123), community (U = 20252.5, p = .012, r = -.121) and at-risk (U = 9078, p = .024, r = -.132) samples; all comparisons with small effect sizes.

Comparisons between community and at-risk adolescents were also performed for each gender separately. Considering males, boys from the community scored higher in the CEWSS-A than boys from the at-risk sample (U = 9671.5, p < .001, r = -.3). Regarding females, girls from the community also scored higher in the CEWSS-A,

when compared with girls from the at-risk sample (U = 10894, p < .001, r = -.3; cf. Table 5). Medium effect sizes were found in both comparisons.

Construct validity in relation to external variables

Positive and significant correlation values were found between current experiences of warmth and safeness and early memories of warmth and safeness, compassion and positive affect. Current experiences of warmth and safeness and early memories of this kind of experiences proved to be moderately correlated (r>.5), while the association with the remaining variables was week [47].

Significant negative correlations were found between current experiences of warmth and safeness and depression, anxiety and stress symptoms, reactive/proactive aggression, negative affect and disconnectedness. Depression, stress and negative affect were moderately correlated with current experiences of warmth and safeness (r>.4), while the association with the remaining variables was week [47] (cf. Table 6).

It is also noteworthy that the correlations between early memories of warmth and safeness and the remaining variables followed a similar pattern of associations of the current experiences of warmth and safeness and the external variables. Nevertheless, the magnitude of the correlations is always stronger for the current experiences scale.

Test-retest reliability

Spearman correlation values between the scores of CEWSS-A at time 1 and 2 (retest) revealed an acceptable value in the community (r = .623, p < .001) and at-risk samples (r = .768, p < .001).

Discussion

The present study includes the development and validation of the Current Experiences of Warmth and Safeness Scale for adolescents (CEWSS-A), within a Portuguese sample of community and residential care adolescents. This new measure was designed to assess how frequently adolescents feel soothed, safe, connected, and warm in their current relationships. The CEWSS-A was built from the 21 items of the Early Memories of Warmth and Safeness Scale (EMWSS-A). Items were re-written in order to describe current experiences and a brief 12-item version of the CEWSS-A was proposed, based on theoretical and statistical criteria. The 12-item CEWSS-A presented a one-factor model solution, achieving a good fit for the data in all samples. Findings revealed an excellent internal consistency and acceptable test-retest reliability for a one-month time interval in both community and at-risk adolescents.

Considering that interpersonal experiences of care, warmth and safeness have been found to be linked to psychological adjustment [8, 27], and that adolescence is a period of relevant biopsychosocial changes and increased vulnerability for the emergence of psychopathology [13, 18], investigating caring experiences throughout this developmental stage may provide useful information on how adolescents perceive and feel their relationships, namely adolescents presenting psychological and social vulnerabilities, as is the case of youth placed in residential care facilities [21, 22].

Caring experiences have already been studied retrospectively as emotional memories of childhood, through research conducted with the EMWSS-A, aiming the assessment of emotional memories of affiliative experiences [27, 28, 29]. However, there was not any available measure designed to assess experiences of warmth and safeness within adolescents' current relationships.

Since a one-factor solution had formerly been proposed as an adequate measurement model for the EMWSS, with adult [27] and adolescent samples, either

from the community [28, 29], as from the child protection care services and juvenile justice facilities [29], the CEWSS-A was assumed to feature a unidimensional measurement model. A CFA procedure confirmed that the 12-item scale presented a one-factor measurement model, achieving an adequate internal consistency in the different samples. Additionally, the CEWSS-A measurement model proved to be group and gender invariant, thus allowing valid comparisons between adolescents from different samples [44].

Findings showed that adolescents from the community sample reported higher frequency of warmth and safeness experiences, when compared with adolescents from residential care facilities (medium effect size). Adolescents placed in residential care seemed to express more difficulties in feeling safe and cared within their current relationships. Comparisons between samples were also made for each gender separately. Boys from RCH reported a lower frequency of current experiences of warmth and safeness when compared with boys from the community, and girls showed a similar pattern (medium effect sizes).

These findings may be tied, at least partially, with the current living environments (i.e., family vs residential care homes). Despite residential care facilities efforts to simulate as much as possible a family environment, care provision is not consistently tailored, and the stability and responsiveness of caregivers is reduced due to the low ratio of caregivers per adolescent and the high turnover [48]. Thus, residential care workers may have difficulties in promoting significant emotional experiences [21]. This might mean that these adolescents have fewer opportunities to activate their soothing system, as a healthy way to regulate threat related emotions, usually more prominent given the amount of early toxic experiences they were exposed to (e.g., abandonment, neglect, emotional deprivation and abuse) [3], increasing their

vulnerability for the development of mental health problems [23]. Also, adolescents placed in RCH were taken away from their families due to either neglect and/or abusive relationships with primary caregivers, having experienced less consistent levels of nurturance and emotional warmth, as well as fewer secure attachment in earlier relationships [29, 30]. Consequently, they are more prone to possess an underdeveloped soothing system, making it harder to feel safe, soothed and reassured in their present relationships, and thus failing to perceive, seek out, and/or trust in others [6].

In fact, in this study, the CEWSS-A showed positive correlations with a measure of early memories of warmth and safeness, suggesting that adolescents' memories of their earlier relationships with primary caregivers are associated with their current view of relationships as being warmth and caring.

Differences between genders were found in both samples (community and at-risk adolescents), with boys reporting higher frequency of current caring experiences when compared to girls (small effect sizes). These findings might be related with girls' greater investment in social relationships [49], revealing more vulnerability to interpersonal relations. This may mean that girls tend to show more concerns about the quality and maintenance of their interpersonal relationships, tending to experience more feelings of loneliness and helplessness, fears of abandonment, and desires for intense closeness [50]. These findings may also relate to how boys and girls perceive and use social support as a coping strategy [49]. While girls are more likely to seek support from others, boys tend to resort more to avoidance or physical recreation [51].

Regarding the association between current experiences of warmth and safeness and other external variables, associations followed the expected directions, supporting that these experiences are significantly associated with measures of psychological (mal)adjustment. Adolescents reporting more experiences of warmth and safeness with

others, also reported higher positive affective states and showed to be more compassionate towards others. They also tended to experience less negative affective states, engage less in proactive/reactive aggressive behaviours, and feel less psychological distress and less disconnection from others. These findings are in line with the affect regulation systems theory [3]. As stated before, experiences of warmth and safeness with others are positively associated with positive affect and negatively associated with negative affect. Affiliative experiences may trigger the soothing system, which enhances specific positive affective states (e.g., warmth), and tones down the negative affect (e.g., fear) associated with the activation of the threat system.

Regarding associations with psychopathological symptoms, current experiences of warmth and safeness were negatively associated with both internalizing and externalizing problems. Particularly, negative associations of moderate magnitude were found between current experiences of warmth and safeness and depressive and stress symptoms. These findings are in line with previous research, stating that the way adolescents experience their interpersonal relationships has a significant impact over the development of internalizing disorders [50]. Also, current caring experiences showed to be negatively associated with aggressive behaviour, which can be conceptualized as an externalizing defensive response of the threat system [3]. These findings support the idea that, not only the recalling of feeling soothed, reassured, warmth, safe as a child [8, 27, 28, 29], but also current affiliative experiences with others, may function as triggers of the soothing system, which regulates negative affective states and behaviours associated with the activation of the threat system [9, 11]. Thus, throughout the human development (at least until adolescence), caring and supporting experiences seem to maintain a relevant role in affect and behaviour regulation.

Findings from previous research suggest that the soothing system sets the base for individuals' capacity for compassion [9]. In this study, current experiences of warmth and safeness revealed a positive association with compassion and a negative one with disconnectedness. When individuals feel safe with others, they might feel more comfortable sharing their difficulties and seeking support in difficult times, thereby being more open and connected with others [10]. Additionally, a compassionate posture is recognized as an important skill to cope with life struggles in an adaptive manner and to avoid more severe and persistent psychosocial difficulties, being associated with well-being and better treatment response [3]. This may be particularly relevant for at-risk adolescents.

The CEWSS-A could be relevant for research as for clinical purposes. Current interpersonal experiences based on nurturance, warmth, and safeness may play a relevant role on emotion regulation and may function as a protective factor over psychopathology, namely internalizing disorders. Given the major impact of such disorders on disease burden and suicide during adolescence [12], particularly among girls, who tend to reveal more emotional problems, both in residential care [21] and in community samples [52], current affiliative experiences should be further investigated concerning their relationship with different psychopathologies.

The CEWSS-A can be useful in clinical and care settings, informing about adolescents' perception of their current relationships and sense of safeness. Furthermore, this tool can be useful when assessing intervention outcomes, namely the impact of therapeutic interventions designed to stimulate the soothing system (i.e., Compassion Focused Therapy). Concerning residential care settings, it seems fundamental that adolescents in RCH could have a significant caregiver, who has been properly trained to play a role in trauma recovery and in promoting positive change

through nurturant relationships [24]. In this sense, the CEWSS-A could be used to assess if adolescents do feel soothed, safe, warmth and cared for by caregivers, functioning as a relational quality estimator, allowing to assess the impact of residential care interventions.

This study is not free of limitations. Since this is the first study examining the factor structure and psychometric properties of a new tool, future research should confirm current findings with different samples and within different settings and cultures. Findings from adolescents in residential care facilities may not generalize to at-risk adolescents from other settings. Other at-risk adolescents, living in their parents' house or in a different setting, may answer to the CEWSS-A in a different manner. Future research should also explore to what extent early childhood memories of warmth and safeness might influence current caring experiences during adolescence. Finally, this scale was developed and validated in Portuguese; thus, its structure and measurement invariance should be investigated in other languages.

In conclusion, and taking into consideration the psychometric properties of the CEWSS-A, this measure can be used as a brief, valid and reliable tool to assess current experiences of warmth and safeness in community and at-risk adolescents from both genders.

Summary

CEWSS-A is a new measure designed to assess the adolescents' perception of current experiences of warmth and safeness. Its dimensionality and psychometric properties (i.e., measurement invariance, test-retest reliability and validity in relation to external variables) were investigated, using a Portuguese sample of 772 adolescents (49% boys and 51% girls, with a mean age of 15.62 years old), from the community and residential care facilities. A confirmatory factor analysis supported a 12-item

unifactorial scale with good fit for the data from all samples. The CEWSS-A showed an adequate internal consistency in the different samples ($\alpha > .92$), acceptable temporal stability in the community ($r = .623$) and the at-risk ($r = .768$) samples, and construct validity in relation to external variables (i.e., early memories of warmth and safeness, compassion, negative and positive affect, aggressive behaviour and internalizing symptoms). The measurement model proved to be invariant across gender and samples. Community adolescents reported a higher frequency of current experiences of warmth and safeness in comparison with residential care participants, and boys scored significantly higher than girls, within each sample. This new measure can bring important contributions for research and clinical practice, providing a deeper understanding about the impact of this kind of caring experiences in the adolescents' psychological functioning.

Compliance with Ethical Standards

Funding: This study was developed within the framework of a PhD Grant, funded by the Portuguese Foundation for Science and Technology (SFRH/BD/132327/2017).

Conflicts of Interest: The authors declare that they have no conflict of interest.

Ethics approval: This research received approval from the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra (approved on 22 march 2018) and the Portuguese General Directorate of Education (n. º0638900001). All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: Adolescents aged between 14 and 16 years old gave informed assent, while the older than 16 years old gave written informed consent. A written informed

consent was also gathered from parents/legal representatives of all adolescent participants under 18 years old.

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Table 1. Demographic characteristics of the samples

	Gender		Age	Socioeconomic status			School years
	Male	Female		Low	Medium	High	
Complete sample	378 (49)	394 (51)	15.62 (1.25)	447 (57.90)	238 (30.80)	24 (3.10)	9.51 (1.41)
Community sample	224 (50)	229 (51)	15.43 (1.22)	244 (53.90)	186 (41.10)	17 (3.80)	9.82 (1.14)
At-risk sample	154 (48)	165 (52)	15.90 (1.25)	203 (77.50)	52 (19.80)	7 (2.70)	9.09 (1.57)

Footnote[3]

[3] Socioeconomic status (SES) was measured by parents' professions, considering the Portuguese professions classification [54]. Examples of professions in the high SES group are judges, higher education professors, or MDs; in the medium SES group are nurses, psychologists, or school teachers; and in the low SES group are cleaning staff or undifferentiated workers. Information for gender and socioeconomic status are presented as n (%); information for age is presented as M (SD). M= mean. SD = standard deviation.

Table 2. Psychometric properties of the CEWSS-A 12 items for the complete sample

Item	Expert average rating score	M	SD	r	Λ	α
1 …safe and secure	6.83	3.21	1.03	.68	.70	.94
2 …understood	9.00	2.69	1.09	.73	.74	.94
3 …a sense of warmth by people around me	7.00	3.00	1.06	.76	.77	.94
4 …comfortable sharing my feelings and thoughts with people around me	8.00	2.43	1.22	.68	.69	.94
5 …I could count on empathy and understanding of those closest to me when I was unhappy	7.50	2.94	1.06	.74	.77	.94
6 …I was cherished by the people I live with	6.83	3.10	1.02	.72	.75	.94
7 … it was easy to be soothed and comforted by those close to me when I was unhappy	9.00	2.88	1.08	.81	.84	.94
8 …comfortable turning to people important to me when I needed help or advice	9.00	2.94	1.09	.75	.76	.94
9 …loved even when people were bored with something I did	9.00	2.60	1.15	.70	.72	.94
10 …I could count on those close to me to comfort me when I felt down	7.00	2.93	1.06	.81	.82	.94
11 …others cared about me	7.67	2.87	1.06	.76	.78	.94
12 …I could count on the help of those close to me when I was unhappy	8.50	2.95	1.04	.80	.82	.94

Footnote[4]

[4] M = mean; SD = standard deviation; r = corrected item-total correlation; λ = loadings of items; α= alpha if item is deleted. All loading values were significant at $p < .001$.

Table 3. Fit indicators for CFA and multi-group configural invariance analyses by samples

	χ^2	df	RMSEA	90% CI for RMSEA	CFI	SRMR
Complete sample	158.025	53	.051	.042;.060	.971	.026
Male participants	107.412	53	.052	.038; .066	.965	.034
Female participants	126.454	53	.059	.046; .073	.968	.027
Community sample	120.220	53	.053	.040; .065	.968	.030
Male participants	81.990	53	.049	.027; .070	.965	.038
Female participants	110.973	53	.069	.051; .087	.960	.034
At-risk sample	99.424	53	.052	.036; .068	.970	.033
Male participants	82.560	53	.060	.033; .084	.957	.048
Female participants	90.437	53	.065	.041; .088	.961	.035

Footnote[5]

[5] $\chi 2$ values were always significant at $p < .001$. Acceptable fit indicators were achieved after allowing residual correlations between items 12 and 10. This residual correlation was equally applied in all models.

Table 4. Loading and internal consistency values for the 12 items-unifactorial model of the CEWSS-A by samples

Item	Complete sample			Community sample			At-risk sample		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
	α=.95	α=.94	α=.95	α=.94	α=.92	α=.95	α=.94	α=.94	α=.95
1	.70	.68	.71	.63	.59	.65	.69	.68	.70
2	.74	.77	.72	.73	.69	.74	.74	.81	.67
3	.77	.76	.78	.76	.72	.79	.75	.75	.75
4	.69	.66	.71	.67	.60	.73	.66	.66	.65
5	.77	.77	.78	.76	.72	.80	.75	.79	.73
6	.75	.73	.75	.68	.63	.71	.74	.73	.73
7	.84	.81	.86	.81	.78	.83	.83	.78	.86
8	.76	.75	.78	.76	.72	.79	.75	.74	.76
9	.72	.70	.73	.66	.57	.72	.73	.77	.71
10	.82	.78	.86	.81	.77	.83	.82	.75	.87
11	.78	.71	.83	.80	.76	.83	.76	.64	.85
12	.82	.78	.85	.83	.83	.83	.79	.69	.86

Footnote[6]

[6] All loading values were significant at p <.001.

Table 5. Descriptive measures for the CEWSS-A by samples

	M	SD
Complete sample	34.55	10.22
Male participants	35.90	9.54
Female participants	33.27	10.68
Community sample	37.18	8.45
Male participants	38.38	7.64
Female participants	36.01	9.04
At-risk sample	30.66	11.32
Male participants	32.12	10.86
Female participants	29.33	11.61

Footnote[7]

[7] M = mean; SD = standard deviation

Table 6. Correlation matrix between CEWSS-A and other variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) CEWSS-A	1.000	-	-	-	-	-	-	-	-	-	-
(2) EMWSS-A	.528**	1.000	-	-	-	-	-	-	-	-	-
CS-A											
(3) Compassion	.247**	.132**	1.000	-							
(4) Disconnectedness	-.172**	-.110**	-.439**	1.000	-	-	-	-	-	-	-
PANAS											
(5) Positive affect	.372**	.257**	.152**	-.033^{NS}	1.000	-	-	-	-	-	-
(6) Negative affect	-.428**	-.276**	.001^{NS}	.133**	-.095*	1.000					
DASS-21											
(7) Depression	-.560**	-.368**	-.042^{NS}	.149**	-.303**	.649**	1.000	-	-	-	-
(8) Anxiety	-.398**	-.297**	.007^{NS}	.122**	-.100**	.618**	.698**	1.000			
(9) Stress	-.450**	-.289**	.009^{NS}	.099**	-.148**	.675**	.789**	.780**	1.000	-	-
PCS											
(10) Reactive agression	-.253**	-.205**	-.233**	.264**	NS	.202**	.206**	.251**	.256**	1.000	-
(11) Proactive Agression	-.206**	-.170**	-.281**	.313**	NS	.181**	.134**	.175**	.169**	.730**	1.000

Footnote[8]

[8] CEWSS-A - Current Experiences of Warmth and Safeness Scale for adolescents; EMWW-A – Early Memories of Warmth and Safeness Scale for adolescents; CS-A - Compassion Scale-Adolescents; PANAS - Positive and Negative Affect Schedule; DASS-21 - Depression Anxiety and Stress Scales; PCS - Peer Conflict Scale
NS nonsignificant
** $p < 0.01$.
* $p < 0.05$.