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RESEARCH ARTICLE

Development and Validation of the Hungarian Short ECR-R in a Large Nationally Representative Study and a Large Community Study of Mothers Raising Young Children

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Introduction: The Hungarian version of the 36-item self-report Experiences in Close Relationships – Revised (ECR-R-HU) questionnaire assessing adult romantic attachment has been published recently. Short versions provide a useful tool for large-scale research and in the clinical field as well.
Aims: The present study reports developing and validating the short form of the Hungarian version of the ECR-R (ECR-R-HU-SF).
Methods: The development of the short form, data reduction, and item selection were performed in a nationally representative adult (18+) community sample (N = 958; Study 1). The newly developed ECR-R-HU-SF was then tested and validated in a different national study representative of children aged 3–36 months, using data from respondent mothers with diverse sociodemographic backgrounds (N = 980; Study 2).
Results: In Study 1, using randomly split subsamples, the ECR-R-HU-SF retained 8 items and confirmed the original two-factor structure of the measure. The subscales showed very good reliability and correlated highly with their corresponding original long versions. Psychometric properties, construct (convergent) validity, sociodemographic associations, and mean population scores for the short-version subscales *(Avoidance, Anxiety)* were compared with those of the long version. In Study 2, subscales were highly reliable, and scores correlated in the expected directions with related constructs (depressive mood, perceived stress).
Conclusions: In summary, the ECR-R-HU-SF is a valid instrument that can be used as an effective screening tool for measuring adult romantic attachment.

Keywords: adult romantic attachment, ECR-R-HU-SF, psychometric parameters, validation, large representative samples

Introduction

Attachment theory (Bowlby, 1969/1982) offers a complex framework for modern researchers and clinicians aiming at better understanding intrapersonal and relational outcomes, such as affect regulation and psychopathology. Although initially, attachment theory focused on the *asymmetric parent-child relationship*, its founder, John Bowlby,

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already described how attachment experiences might influence individuals over their entire life course. According to Bowlby, early attachment-related experiences are internalized and have a profound influence on later interactions with intimate partners, especially under stress. The so-called internal working models are mental representations of significant others, the self, and the self in relation to others that guide affect, cognition, and behavior in intimate relationships (Bowlby, 1973).

Hazan and Shaver (1987) proposed that Bowlby's attachment theory could be extended to *symmetric, romantic relationships*, introducing the concept of *adult romantic attachment*. Since their initial proposal, a multitude of cross-sectional studies have aimed at investigating the concept of romantic attachment and numerous questionnaires have been created measuring the construct, which were thoroughly reviewed by Ravitz et al. (2010).

An important milestone in the measurement of adult romantic attachment was the development of the Experiences in Close Relationships questionnaire (Brennan et al., 1998). The authors based their measure on all the items previously published in questionnaires measuring adult attachment styles. A pool of 323 items remained after eliminating redundant items, which the authors administered to 1,086 undergraduates. A detailed factor analysis yielded 36 items, which were grouped into two factors identified as attachment-related *Avoidance* and attachment-related *Anxiety*. The above-identified underlying factors of the ECR offered a new dimensional view of attachment styles, providing a more in-depth understanding of the earlier categorical classifications (Bartholomew & Horowitz, 1991).

According to modern taxometric analyses, the variation underlying adult romantic attachment is distributed continuously (Booth-LaForce & Roisman, 2014) on the two dimensions of attachment-related *Avoidance* and attachment-related *Anxiety*. Attachment-related *Avoidance* is associated with a tendency of feeling uncomfortable with closeness and even rejecting it, while attachment-related *Anxiety* is described as a strong desire for close relationships, which is coupled with the fear of abandonment and hypervigilance regarding rejection.

The Development of the ECR-R

To improve the accuracy and reliability of the ECR, Fraley et al. (2000) used factor analysis and item-response theory to develop a revised version of the measure: The Experiences in Close Relationships-Revised (ECR-R). This resulted in a partially new 36-item version of the original ECR questionnaire, maintaining the original subscales: *Avoidance* and *Anxiety*. Items were retained based on their discriminatory values. Although numerous researchers are still using the unimproved initial version (ECR; Brennan et al., 1998) and its short form (ECR-S; Wei et al., 2007), in the following, we will review uniquely validated versions of the ECR-R (Fraley et al., 2000) measuring solely romantic relationships and their short forms.

Since its conception, the ECR-R has been translated into 20 languages of which 14 are European (Czech, Danish, Dutch, French, German, Greek, Hungarian, Italian, Polish, Romanian, Russian, Serbian, Slovak, Spanish) and six are non-European (Arabic, Chinese, Hindi, Korean, Thai, Turkish). In most of the above-mentioned validation studies (16 out of 20), the authors found that the psychometric properties of the ECR-R were most parsimoniously described by a two-factor solution. However, the two-dimensional structure could not be fully confirmed by all authors and there were three studies that could not confirm the original two-factor model at all with Confirmatory Factor Analysis (Esbjørn et al., 2015; Kim et al., 2011; Lubiewska et al., 2016). Wording problems of the items was the most commonly cited limitation of the scale, which several authors (Dupont et al., 2022; Kim et al., 2011; Lubiewska et al., 2016) tried to solve statistically by using method factors. Others suggested shortening the scale by deleting items with similar wording or with low factor loadings to ameliorate the poor model fit (Fairchild & Finney, 2006; Hanak & Dimitrijevic, 2013; Kumar, 2022; Rotaru & Rusu, 2013; Wongpakaran et al., 2011).

Short Form Measures and Short Versions of the ECR-R

The development of short forms in clinical assessment dates back to the beginning of the 20th century (Doll, 1917). Although some reviews have been critical of the short-form methodology in general (Smith & McCarthy, 1995), researchers have developed short versions for virtually every conceivable topic of clinical assessment. The reasons behind opting for this alternative are numerous: developing a short form that can offer a valid and reliable timesaving alternative to the full-length version for e.g., screening purposes; fitting the short versions into large multivariate studies; for use with children etc. However, it is necessary for researchers to follow a thorough methodology to obtain rigorous, valid, comprehensive measures. Smith et al. (2000) offer such methodological guidelines for improving the validity of short-form measures.

The growing number of published short versions of the ECR-R reflects the need for a timesaving tool to be used not only for research but also for monitoring and screening purposes in clinical settings. According to a literature review, eleven different short forms of the ECR-R have emerged (Arab, Czech, Korean, Polish, Russian, Slovak, Spanish, and two different ones in Thai and German). According to Brenk-Franz et al. (2018), such concise measures should have good psychometric indicators and not consist of more than 10 to 15 items. The above-mentioned brief versions of the ECR-R consist of 8 to 18 items. To our knowledge, two English-language short-form variants exist so far. The ECR-R-GSF (Wilkinson, 2011) reports the psychometric properties of general (not specific to romantic relationships) attachment avoidance and anxiety in Australian adolescents and young adults. The other 9-item short Relationship Structures Questionnaire (ECR-RS; Franley, 2011), has been created to assess attachment patterns separately in a variety of close relationships. Here, we review nine of the above-mentioned studies that have been specifically designed to assess the representations of romantic relationships in adult populations and used the original 36-item ECR-R for validation.

The first short version of the ECR-R was developed by Wongpakaran and Wongpakaran (2012) in the Thai language and retained 18 items. The Czech and Polish versions (Kaščáková et al.; Lubiewska et al.) were published in 2016, each retaining 16 items. The Russian version (Chistopolskaya et al., 2018) was developed using 14 items, and the first German version retained 12 items (Brenk-Franz et al., 2018). A second German short form (Ehrenthal et al., 2021) included 8, and the Slovak version (Švecová et al., 2021) retained 14 items. Later, the Korean 12-item short version (Lee et al., 2023), and the second Thai short form (Wongpakaran et al., 2023), with only 10 items, were published. The two subscales (*Avoidance*, *Anxiety*) were represented with an equivalent number of items in all of the above-mentioned studies.

Below, we summarize the samples that have been used in the different studies. Only three of the studies (German, Czech, Slovak: Ehrenthal et al., 2021; Kaščáková et al., 2016; Švecová et al., 2021) used nationally representative samples, while the other six studies used convenience sampling. The Polish researchers (Lubiewska et al., 2016) applied the snowball method and included adults between 16 and 81 years in their sample, whereas the Russian study (Chistopolskaya et al., 2018) used a student sample. The Korean study (Lee et al., 2023) used an online sample of voluntary college students. The first German study (Brenk-Franz et al., 2018) used a sample of general practice patients and the two Thai studies (Wongpakaran et al., 2023; Wongpakaran & Wongpakaran, 2012) compared non-clinical and clinical (stable psychiatric patients) adult samples.

Item-selection was based on different (usually more than one) methodological considerations e.g., on model fit or modification indices in CFAs, high factor loadings in Exploratory Factor Analyses (EFAs), high item-scale correlations, Rasch analysis, views of experts, and content-analysis (where redundant items were excluded). Internal consistencies of the subscales calculated using Cronbach's alphas or McDonald's omegas were good to excellent (for *Avoidance*: .73 - .90; for *Anxiety*: .82 - .89). According to our review, only three studies (Ehrenthal et al., 2021; Lee et al., 2023; Lubiewska et al., 2016) mentioned the important results regarding correlations between the subscales of the short form and the full version. The subscales of these short versions correlated very highly with the full-scale version subscales (*Avoidance*: r = .90 - .96; *Anxiety*: r = .92 - .97).

It is important to mention that in the Polish sample (Lubiewska et al., 2016), a statistically significant difference manifested between the mean *Avoidance* scores when comparing the long (M = 3.00, SD = NA) and the short versions (M = 2.59, SD = NA). Other studies have not addressed this important methodological issue.

Authors mainly used Confirmatory Factor Analysis to analyze the factor structure of the newly developed short forms, to check if they corresponded to the original two-factor structure of the full-version scale. Ehrenthal et al. (2021) aimed at refining and evaluating the 12-item short version of the German ECR-RD by means of CFA. According to the authors, the earlier 12-item version (Brenk-Franz et al., 2018) that employed Principal Components Analysis (PCA) on a large sample of aggregated data from published and unpublished studies did not allow for a rigorous test involving the assumed two-factor structure of the ECR-R. Ehrenthal et al. (2021) used a large nationally representative sample (N = 2,508) to refine the ECR-RD-12. They further reduced the short form to 8 items to obtain a good model fit in CFA. The Czech, the Slovak, the two Thai and the Russian studies (Chistopolskaya et al., 2018; Kaščáková et al., 2016; Švecová et al., 2021; Wongpakaran & Wongpakaran, 2012) also employed CFAs. The method was unclear or not mentioned in the Polish study (Lubiewska et al., 2016). The problematic nature of reverse-coded items mentioned by several authors was addressed in two studies (Lee et al., 2023; Wongpakaran & Wongpakaran, 2012), in which the authors used method factors (for positively and negatively worded items) in order to obtain an acceptable level of fit for the model.

In summary, to improve the psychometric properties of the short forms, authors either excluded problematic items (reverse-coded items, low loadings, cross-loadings) (Ehrenthal et al., 2021; Švecová et al., 2021;

Wongpakaran et al., 2023) while maintaining important content, or used method factors (Lee et al., 2023; Wongpakaran & Wongpakaran, 2012).

Below, we review demographic associations of attachment-related *Avoidance* and *Anxiety* mentioned in five out of the eight reviewed short forms. Considering gender differences, only the 8-item German version found that females had slightly higher *Anxiety* scores (Ehrenthal et al., 2021), while none of the other studies found significant associations between gender and the two subscales (Brenk-Franz et al., 2018; Kaščáková et al., 2016; Švecová et al., 2021; Wongpakaran et al., 2023; Wongpakaran & Wongpakaran, 2012). Five studies mentioned associations with age. In one study, older age was associated with lower *Anxiety* (Brenk-Franz et al., 2018); in another, the older, 65+ age group showed higher *Avoidance* and lower *Anxiety* compared to the younger age groups of 18–24 and 25–34 years (Švecová et al., 2021). The three remaining studies (Brenk-Franz et al., 2018; Kaščáková et al., 2016; Wongpakaran et al., 2023) did not find any noteworthy associations with age. Two studies mentioned education level, one of which found no significant relationship with attachment insecurity (Brenk-Franz et al., 2018), while the other one reported that higher education level was associated with significantly lower *Avoidance* scores (Kaščáková et al., 2016). Relationship status was mentioned in three studies. Participants who were not in a relationship at the time of the study showed significantly higher *Avoidance* scores (Kaščáková et al., 2016), or higher scores in both the *Avoidance* and *Anxiety* subscales (Ehrenthal et al., 2021). Brenk-Franz et al. (2018) did not find any significant associations with relationship status.

Construct (convergent and divergent) validity was assessed in all but one study (Lubiewska et al., 2016) using a variety of different constructs (reassurance seeking, support seeking, loneliness, dyadic satisfaction, depression, anxiety, fear of intimacy, self-efficacy, perceived stress, self-esteem, neuroticism, positive and negative affect, positive and negative time perspective, hardiness), as well as another measure of attachment (The Relationships Questionnaire; Bartholomew & Horowitz, 1991). While associations between the above-mentioned constructs and the two subscales varied across studies, a predominant trend emerged, which revealed low to moderate significant correlations in the anticipated directions.

Aims and Hypotheses of the Present Study

In the present study, we aimed at developing and validating the short form of the Hungarian version, the ECR-R-HU (Dupont et al., 2022) by means of rigorous methods (Smith et al., 2000). Attachment-related *Avoidance* and *Anxiety* are important constructs for various academic and applied research areas. The different short forms of the ECR-R not only provide a useful tool for large-scale research where the number of possible items per instrument is limited, but may also be useful in the clinical field (e.g., in systemic family therapy, couples therapy, studies on parent-child relationship, other social connections and well-being) for short screening or assessment, and for follow-up measurements throughout therapy.

In Study 1, data reduction and item selection (based on EFA/PCA results and expert opinions) were performed on a randomly split subsample of the same nationally representative community sample ($N = 958$) that was used for validating the ECR-R-HU (Dupont et al., 2022). The factor structure (CFA) was examined and confirmed in the other randomly split subsample. Psychometric properties (Cronbach's alphas and McDonald's omegas), convergent validity, sociodemographic associations, and mean population scores (including standard deviations) for the short-version subscales (*Avoidance, Anxiety)* were checked and compared with the 36-item long version (Dupont et al., 2023a) in the entire sample.

In Study 2, for testing the newly validated short instrument, we used a sample from another national study called "Infancy in 21st century Hungary" (Danis et al., 2020). In this research, the primary respondents ($N = 980$) were mothers raising children aged 3–36 months. Although this sample was nationally representative in terms of the children's age, gender, and type of residence, consequently, it was also sufficiently diverse for sociodemographic parameters. This sample included a slightly higher proportion of families with low SES compared to a representative sample (See *Table 1*). This allowed us to test the cultural validity of the tool and address the following question: do the items work well with lower levels of education? Theoretically, the ECR-R-SF-HU was considered a valuable tool in the study of early development, since according to the literature (Meuti et al., 2015; Simpson & Rholes, 2019), adult romantic attachment representations may also serve as an important background variable for understanding the development of early parent-child relationships. The factor structure and the psychometric properties (Cronbach's alphas and McDonald's omegas) of the short-form measure were tested again, construct (convergent) validity, mean population scores and the relationships with sociodemographic characteristics were also examined (Dupont et al., 2023b).

Hypotheses:

1. The Hungarian short version demonstrates acceptable psychometric properties and aligns with the theoretically expected two-factor structure.
2. The factor structure and the psychometric properties of the scale are similar in both the nationally representative adult sample (Study 1) and the sample of Hungarian mothers of 3–36 months old children (Study 2).
3. The subscales (*Avoidance, Anxiety*) correlate in the expected directions with related constructs: positively with family functioning problems, perceived stress, and depressed mood, and negatively with well-being.

Methods

Participants and Data Collections

Development of the Short Form – Study 1

A nationally representative online sample was used to develop the Hungarian short version of the ECR-R (ECR-R-HU-SF). Data collection was carried out by a Hungarian research company with expertise in social surveys and data collection. Dupont et al. (2022) described the sampling and data collection methods in detail. To obtain a nationally representative sample, respondents were randomly selected following the stratification of the total voluntary sample according to gender, age, education and settlement type. For the stratification, besides gender, the sample was divided into five age groups (18–29, 30–39, 40–49, and 50–59 years of age, and 60 years of age or older) and three categories of education level (primary and vocational school, secondary, and higher education). The true proportions of settlement types (capital, cities/towns, and villages) and regions (Central, Eastern, and Western Hungary) were also among the stratification criteria.

The total sample size was $N = 993$, but the number of respondents to the ECR-R-HU questions was reduced to $N = 958$, as the questionnaire was not offered to participants who claimed that they had never been in a romantic relationship. Table 1 summarizes the sample characteristics.

After the first, main wave of data collection in December 2018, a second wave was carried out to assess the stability of the ECR-R-HU subscales. This secondary survey, completed after a four-month gap, was administered again to a smaller subsample ($N = 98$) of the original participant pool.

New Validation – Study 2

To test the short instrument developed in Study 1, we used a large parent survey (*Infancy in 21st Century Hungary;* Danis et al., 2020), in which families raising children aged 3–36 months were included. Here, we reported results from maternal data ($N = 980$). This sample was representative regarding children's age, gender, and type of residence, resulting in a high degree of diversity in sociodemographic characteristics (see Table 1) within the parent-family background. Data collection and sampling were also conducted by a Hungarian research institute in the winter of 2019–2020. The parents were interviewed using a CAPI (computer-assisted personal interview) instrument and they also completed a self-administered questionnaire (SAQ). The ECR-R-HU-SF as well as the instruments used for convergent validity were all part of the measurement package, which was planned by an interdisciplinary research network coordinated by the Institute of Mental Health at Semmelweis University. For this report, we only considered responses provided by the mothers. ECR-R-HU-SF was filled out by 953 mothers (for sample characteristics see Table 1). The data shows their romantic attachment orientation.

Measures

The Hungarian Version of the Experiences in Close Relationships – Revised Questionnaire (ECR-R-HU) – Study 1

ECR-R-HU (Dupont et al., 2022; Gervai et al., 2018; Hungarian translation: https://www.ttk.hun-ren.hu/wp-content/uploads/kpi-modszer/Tapasztalatok_Szoros_Kapcsolatokban_ECR-R-HU.pdf) is the adapted Hungarian translation of the ECR-R (Fraley et al., 2000). It is a self-report measure of adult attachment, containing 36 items and two subscales that assess attachment-related *Avoidance* and *Anxiety* (18 items each). Respondents use a 7-point Likert-type scale to indicate their level of agreement with each item, where 1 = strongly disagree and

7 = strongly agree. The following instructions are given to the participants: "Please take a moment to think about your previous and current romantic experiences and indicate the level of your agreement with each statement". According to a meta-analysis of self-report measures regarding adult attachment, the ECR-R had the highest reliability scores (Graham & Unterschute, 2015). In the Hungarian study (Dupont et al., 2022), the ECR-R-HU demonstrated high Cronbach's alpha values (*Avoidance*: α = .91 and *Anxiety*: α = .92) as well.

Table 1. Sample Characteristics of Study 1 & 2

		Study 1 Wave 1	Study 1 Wave 2	Study 2
		(N = 958)	*(N = 98)*	*(N = 953)*
		Frequency (valid %)	Frequency (valid %)	Frequency (valid %)
CATEGORICAL VARIABLES				
Gender	Male	467 (48.7%)	53 (54.1%)	0 (0%)
	Female	491 (51.3%)	45 (45.9%)	953 (100%)
Age	18–29 years	110 (11.5%)	9 (9.2%)	457 (47.9%)
	30–39 years	169 (17.6%)	22 (22.4%)	447 (46.9%)
	40–49 years	237 (24.7%)	23 (23.5%)	50 (5.2%)
	50–59 years	224 (23.4%)	17 (17.3%)	0 (0%)
	60 years or older	218 (22.8%)	27 (27.6%)	0 (0%)
Type of residence	Capital (Budapest)	194 (20.2%)	20 (20.4%)	148 (15.6%)
	Cities and towns	544 (56.8%)	56 (57.1%)	407 (51.1%)
	Villages	220 (23.0%)	22 (22.4%)	317 (33.3%)
Education	Primary school or less	46 (4.8%)	2 (2.0%)	108 (11.3%)
	Skilled worker / vocational school	275 (28.7%)	30 (30.6%)	216 (22.7%)
	Secondary school	373 (38.9%)	35 (35.7%)	456 (48.0%)
	College, university	264 (27.6%)	31 (31.6%)	171 (20%)
In a relationship currently?	Yes	749 (78.2%)	77 (78.6%)	899 (94.6%)
	No	209 (21.8%)	21 (21.4%)	52 (5.4%)
		Mean *(SD)* (range)	Mean *(SD)* (range)	
CONTINUOUS VARIABLES				
Age		47.89 (13.85) (18–89)	48.85 (14.63) (22–78)	30.32 (5.8) (18–47)
Length of being without a partner in years (in Study 1: *n* = 209; *n* = 21)		4.95 (5.08) (0–25)	4.00 (4.91) (0–20)	
Number of children		1.38 (1.21) (0–5)	1.32 (1.18) (0–5)	1.57 (0.98) (1–10)
Number of people living in the same household		2.75 (1.28) (1–8)	2.45 (1.07) (1–5)	3.70 (1.16) (2–10)

The WHO Well-Being Questionnaire (WBI-5) – Study 1

The WHO Well-Being Questionnaire (WBI-5; WHO, 1998; Topp et al., 2015; Hungarian version: Susánszky, 2006) is a widely used self-report measure that assesses psychological well-being using 5 short questions rated on a 4-point Likert-type scale. The previously validated Hungarian version had high internal consistency (α = .85). In Study 1, the Cronbach's alpha was α = .87.

Perceived Stress Scale-4 (PSS-4) – Study 1 & 2

The Perceived Stress Scale-4 (PSS-4; Cohen et al., 1983; Hungarian version: Stauder & Konkolÿ Thege, 2006) is a widely used shortened instrument for measuring the perception of current everyday stress. It contains four items that measure the degree to which one's life has been perceived as "unpredictable, uncontrollable, and overloading" (Cohen et al., 1983; p. 387) in the past month. A 5-point Likert-type scale is used for rating each item. Acceptable internal consistency (α = .79) and excellent test-retest reliability (*r* = .90) characterized the Hungarian version (Stauder & Konkolÿ Thege, 2006). Cronbach's alpha in Study 1 was α = .80, in Study 2 α = .70.

Depression Scale Questionnaire (DS1K) – Study 1 & 2

The Depression Scale Questionnaire has been developed by Hungarian researchers (DS1K; Halmai, 2008). It measures the depression construct and was derived from the Beck Depression Inventory (BDI; Beck et al., 1961) and the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). The 11-item single summary scale can be used for screening less severe stages of and a predisposition to depression. The items are rated on a 4-point Likert-type scale. It is a valid measure with high reliability (α = .88) and is widely used in Hungary. The Cronbach's alpha was α = .85 in Study 1 and for a 10-item version (because of more appropriate psychometric properties) α = .77 in Study 2.

The Family Assessment Device (FAD) – Study 1

The Family Assessment Device (FAD; Epstein et al., 1983; Hungarian version: Danis et al., 2005; Danis et al., 2022) is a self-report questionnaire that measures structural, organizational, and transactional characteristics of families and is widely used in both research and clinical practice. It is used for screening, for identifying specific problem domains and for assessing change. Family members (aged above 12 years) rate 60 statements concerning the family on a 4-point Likert type scale depending on how well each statement describes their family. In numerous international validation studies, the Cronbach's alpha values of the 6 subscales were around or above α = .70 (Hamilton & Carr, 2016; Staccini et al., 2015). The reliability scores of the subscales in the database of Study 1 were similar to the aforementioned studies: problems of affective involvement (α = .74), affective responsiveness (α = .86), behavioral control (α = .64), communication (α = .81), problem-solving (α = .80), and roles (α = .82) in the family; a seventh subscale measures the problem of general family functioning (α = .89).

Statistical Analyses

A Principal Component Analysis (PCA) with varimax rotation was conducted for data reduction in a randomly split subsample (*n* = 477) in Study 1. Our preliminary examinations showed that Principal Axis Factoring (PAF) for exploring the factor structure and PCA for maximizing the variance of the minimum number of latent components produced almost identical results, consistent with findings regularly reported in scientific literature (Avsar, 2022; Schreiber, 2021). PCA is still commonly recommended (Hind & Soussi Noufail, 2022) for dimension reduction and also item (feature) selection. It aims at selecting a subset of "highly predictive" variables from a larger group of variables. In varimax rotation, orthogonal principal components capture the maximum variance in the data and are linear combinations of the original variables. The components are ordered by decreasing importance and aim to maximize the independence of the factors, ensuring a more even distribution of items across the latent components. We used this method to examine and choose the most important items with the highest factor loadings, aiming to find a subset that provided the "best overall summary" of the dimensions. Item selection was based on statistical (factor loadings), theoretical and methodological considerations.

Confirmatory Factor Analyses were conducted using AMOS 21.0 in the other randomly split subsample (*n* = 481) of Study 1 and in Study 2 in order to test the original (Fraley et al., 2000) two-factor model for the

8-item short form in both samples. Maximum likelihood estimations were employed, and model fit indices were examined (Browne & Cudeck, 1992; Hu & Bentler, 1999). We applied the robust Chi Square Test of Model Fit (χ^2/df ratio; indicates a good model fit below 3), a baseline close fit index (Steiger-Lind Root Mean Square Error of Approximation – RMSEA), the standardized root mean square residual (SRMR), and three incremental close-fit indices (Comparative Fit Index – CFI, Tucker and Lewis's Index of Fit – TLI, and Normed Fit Index – NFI). CFI, TLI and NFI values that are equal to or above .90 indicate a satisfactory fit, while values close to 1.00 (> .95) suggest a very good fit. For RMSEA, a value < .11 indicates a reasonable fit, and a value ≤ .05 indicates a good model fit. For RMSR, if the value is < .05, it is excellent, between .05 and .08 it is adequate.

The internal consistencies of the two subscales (*Avoidance* and *Anxiety*) were evaluated by Cronbach's alphas and McDonald's omegas. Since according to the Kolmogorov-Smirnov Test the ECR-R-HU-SF subscale scores were not normally distributed in either sample, we used non-parametric statistical tests for further analyses. Since the sample in Study 2 was a weighted representative sample, non-parametric ranking procedures may change the sample size slightly according to the weights.

In Study 1, Spearman correlations were used to test temporal stability and compare the scales of the short form with the original, 36-item questionnaire. Mann-Whitney and Kruskal-Wallis tests were used in both studies to examine relationships between the ECR-R-HU-SF subscales and sociodemographic characteristics, while Spearman correlations were calculated to assess the convergent validity with different psychosocial constructs.

Results

Study 1

Data Reduction and Item Selection

In accordance with methodological guidelines, we conducted analyses on two randomly split subsamples (n = 477 and 481) of the entire sample. Following data reduction, we selected 8 items for the short version in the first random subsample (n = 477). Statistical considerations and experts' opinions on covering content dimensions as well as avoiding redundancy were combined in the course of item selection.

Statistically, for data reduction and selecting the most appropriate items, we used the Principal Component Analysis (PCA). In the Rotated Component Matrix obtained by PCA (KMO = .94; Bartlett's Test of Sphericity: p < .001; all items' communality values > .45; see item loadings in Table 2), the original two scales of the ECR-R published by Fraley et al. (2000) decomposed into two main factors (F1, F2) and two further factors (F3, F4) with balanced proportions of explained variances (59.4% explained; F1: 22.6%, F2: 18.5%, F3: 8.6%, F4: 5.7%). According to the scree plot and eigenvalue analyses, a fifth factor was also selected, but it had a low explained variance (F5: 4.0%) and no significant or distinct content.

Table 2. Rotated Component Matrix[a] in the Principal Component Analysis in a Randomly Split Subsample (n = 477) of Study 1

		Components				
		F1: Anxiety	F2: Avoidance (reversed items)	F3: Avoidance	F4: Anxiety (reversed items)	F5: Mixed
3	**I often worry that my partner doesn't really love me.**	**.83**				
8	When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.	.77				
7	**When my partner is out of sight, I worry that he or she might become interested in someone else.**	**.75**				
12	**I find that my partner(s) don't want to get as close as I would like.**	**.74**				
4	I worry that romantic partners won't care about me as much as I care about them.	.72				.37
17	I worry that I won't measure up to other people.	.70				

(continued on the next page)

Table 2. continued

		Components				
		F1: Anxiety	F2: Avoidance (reversed items)	F3: Avoidance	F4: Anxiety (reversed items)	F5: Mixed
14	My desire to be very close sometimes scares people away.	.70				
16	***It makes me mad that I don't get the affection and support I need from my partner.***	***.70***				
2	I often worry that my partner will not want to stay with me.	.69			-.41	
10	My romantic partner makes me doubt myself.	.68				
15	I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.	.64		.35		
18	My partner only seems to notice me when I'm angry.	.63				
13	Sometimes romantic partners change their feelings about me for no apparent reason.	.62		.36		
6	I worry a lot about my relationships.	.62				
5	I often wish that my partner's feelings for me were as strong as my feelings for him or her.	.51				.49
1	I'm afraid that I will lose my partner's love.	.50			-.47	.36
33	***I feel comfortable depending on romantic partners.***		***.80***			
29	***It helps to turn to my romantic partner in times of need.***		***.80***			
34	*I find it easy to depend on romantic partners.*		*.79*			
36	***My partner really understands me and my needs.***		***.75***			
28	***I usually discuss my problems and concerns with my partner.***		***.75***			
31	*I talk things over with my partner.*		*.72*			
30	*I tell my partner just about everything.*		*.69*			
20	*I feel comfortable sharing my private thoughts and feelings with my partner.*		*.64*			
22	*I am very comfortable being close to romantic partners.*		*.63*			
35	*It's easy for me to be affectionate with my partner.*		*.60*			
27	*It's not difficult for me to get close to my partner.*		*.56*			
26	*I find it relatively easy to get close to my partner.*		*.56*			
32	I am nervous when partners get too close to me.			.71		
25	I get uncomfortable when a romantic partner wants to be very close.			.71		
24	I prefer not to be too close to romantic partners.			.71		
23	I don't feel comfortable opening up to romantic partners.	.38		.56		
19	I prefer not to show a partner how I feel deep down.			.49		.40
11	*I do not often worry about being abandoned.*				*.68*	
9	*I rarely worry about my partner leaving me.*				*.59*	
21	I find it difficult to allow myself to depend on romantic partners.			.43		.44

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
[a] Rotation converged in 8 iteration.
[b] Item numbers according to Fraley et al. (2000). Bold numbers indicate the items retained in the ECR-R-HU-SF.
[c] Items in italics are reversed.

As shown in Table 2, *Avoidance* items were loaded highly on F2 and F3, while *Anxiety* items were loaded highly on F1 and F4. In our previous analyses and methodological article (Dupont et al., 2022), we identified a methodological issue in the wording of the ECR-R items. This problem led to splitting the dimensions into separate factors, which could be avoided by introducing method factors in CFA (For details on the problems of reversed items in modeling the factor structure, see Dupont et al., 2022). To prevent fragmentation of the dimensions in a very short instrument due to differences in wording and item content, only 4 items were selected from each of the two main factors (F1, F2). In earlier stages of our work, we tried selecting 6 items from each of the two dimensions: 4+2 items from the main and the secondary factors (F2+F3 for *Avoidance*; F1+F4 for *Anxiety*). However, in both the CFA and EFA analyses, we found that items were transferred from one dimension to the other according to wording and direction of meaning. We aimed to avoid such methodological inconsistencies in the short instrument by selecting items only from the two main factors. We preferred items with simple and clear psychometric characteristics that had higher factor loadings than .65. When we encountered redundancy between items, we preferred items with simpler wording, and items included in other European short versions if possible (Items 12, 16, 28, 29 were included in at least three other Central European versions). It was important that, in terms of content, each of the selected items highlighted a distinct aspect of the construct. The four selected *Avoidance* items were 28, 29, 33, 36, while the four items selected for *Anxiety* were 3, 7, 12, 16 (Gervai et al., 2019; Hungarian translation: https://www.ttk.hun-ren.hu/kpi/wp-content/uploads/sites/4/2024/09/Tapasztalatok-Szoros-Kapcsolatokban-rovid-valtozat-ECR-R-HU-SF.pdf). (Note: Here, in the article, item numbers correspond to Fraley et al., 2000). All four *Avoidance* items loaded highly (.75–.80) on the second component (*Avoidance* factor) and all four *Anxiety* items loaded highly (.70–.83) on the first component (*Anxiety* factor).

Confirmatory Factor Analysis - The Structure of the Short Form

After performing the necessary item reversals, we tested the theoretical factor structure of the 8 items using CFA in the other randomly split subsample (n = 481). The Chi^2 -test was significant (χ^2 = 95.79, df = 19; p < .001), and all model fit indices were satisfactory (NFI = .941; TLI = .929; CFI = .952; RMSEA = .092, CI [.074 – .110]). The SRMR value (= .067) was also adequate. Consequently, the original two-factor model (Fraley et al., 2000) for the ECR-R-HU-SF in the randomly split representative community subsample of Study 1 (Figure 1) was also confirmed.

CFA was also successful when applied to the whole sample. The Chi^2 -test was significant (χ^2 = 190.587, df = 19; p < .001), and all model fit indices were satisfactory (NFI = .943; TLI = .924; CFI = .948; RMSEA = .097, CI [.085 – .110]). The SRMR value (= .064) was also adequate.

After successful item selection and factor structure validation, further psychometric analyses were performed on the entire sample (N = 958).

Figure 1. CFA Model of the ECR-R-HU-SF Structure in a Randomly Split Subsample (n = 481) of Study 1

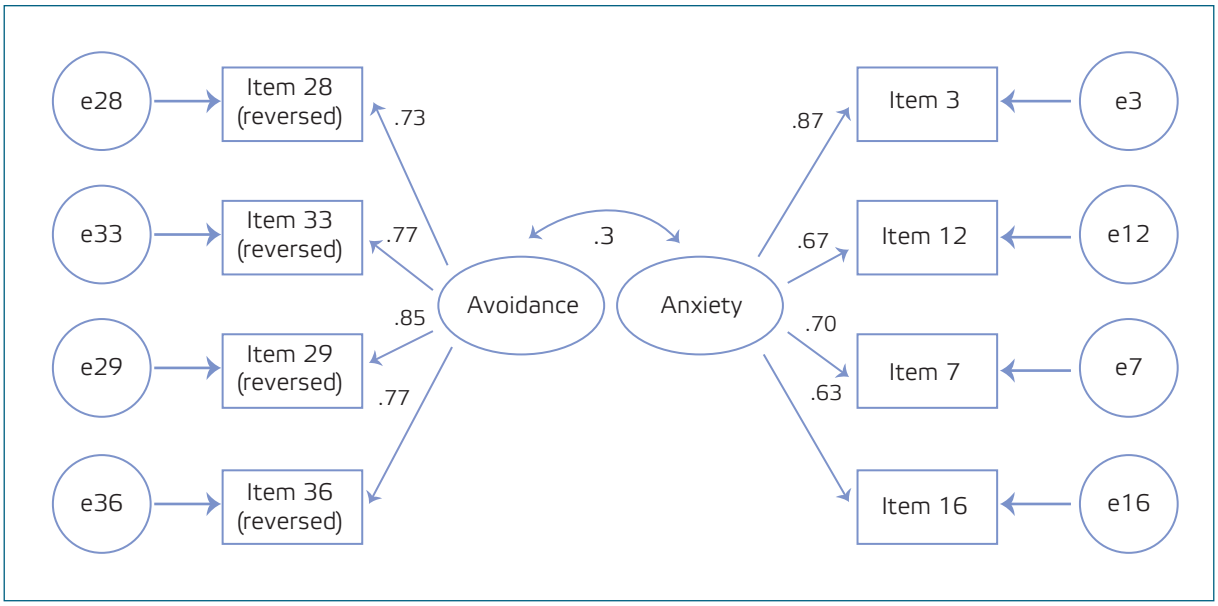


Table 3. Descriptive Statistics of the Avoidance and Anxiety Subscales in the 36-Item Long Version and the 8-Item Short Version of the ECR-R-HU

Table 3a.

ECR-R Subscales	*N*	Range	Min.	Max.	Mean	*SD*
ECR-R Avoidance - 18 items	958	4.56	1.00	5.56	2.68	1.08
ECR-R Avoidance - 4 items	958	6.00	1.00	7.00	2.65	1.38
ECR-R Anxiety - 18 items	958	5.83	1.00	6.83	2.95	1.23
ECR-R Anxiety - 4 itemsAnxiety	958	6.00	1.00	7.00	2.73	1.52

Table 3b.

		Percentiles						
ECR-R Subscales	Median	25th	50th	75th	Skewness	S.E. Skewness	Kurtosis	S.E Kurtosis
ECR-R Avoidance - 18 items	2.61	1.72	2.61	3.50	0.31	0.08	-0.75	0.16
ECR-R Avoidance - 4 items	2.50	1.50	2.50	3.75	0.70	0.08	0.00	0.16
ECR-R Anxiety - 18 items	2.83	1.94	2.83	3.83	0.49	0.08	-0.31	0.16
ECR-R Anxiety - 4 itemsAnxiety	2.50	1.25	2.50	3.81	0.69	0.08	-0.28	0.16

Relationships Between the Subscales of the 8-Item ECR-R-HU-SF and the 36-item Original Questionnaire (ECR-R-HU)

Spearman correlations of both 4-item subscales (*Avoidance, Anxiety*) proved very strong relationship with the corresponding 18-item subscales of the original questionnaire (*Avoidance*: *Rho* = .88, $p < .001$; *Anxiety*: *Rho* = .90, $p < .001$).

Internal Consistency

Both 4-item subscales demonstrated a high internal consistency; Cronbach's alpha and McDonald's omega values were both at .85 for *Avoidance* and .83 for *Anxiety*. These values were only slightly lower than those for the original 36-item questionnaire, which had Cronbach's alphas and McDonald's omegas of .91 and .92, for *Avoidance* and *Anxiety*, respectively.

Descriptive Statistics of the Avoidance and Anxiety Subscales and Relationships with the Demographic Variables

Avoidance items were all reversed items in the questionnaire; therefore, they measured the lack of *Avoidance*. As expected, after reversing the items, there was a moderate positive correlation between the two subscales (*Rho* = .42, $p < .001$).

As theoretically expected, both subscales of the short form were skewed towards lower values, indicating less anxiety and less avoidance. Since the subscale scores did not follow a normal distribution according to the Kolmogorov-Smirnov Tests ($p < .001$), we report the median and percentile values alongside the mean and standard deviation for the subscales in Table 3. This allows for a comprehensive comparison between the short 8-item questionnaire and the original 36-item version. Ensuring the alignment of the distributions and means between the two versions was a methodological requirement. Therefore, we expected that the means would not differ by more than 0.2. Although the differences were significant (Wilcoxon tests: *Avoidance:* $Z = -3.26$, $p = .001$; *Anxiety:* $Z = -10.63$, $p < .001$), the means and median values of the subscales in the original 36-item and the short form 8-item questionnaire were very similar. Based on the statistics indicating non-normal distributions, we used non-parametric tests in the subsequent analyses.

Mann-Whitney tests showed that no gender differences emerged on either scale (*Avoidance:* $Z = -.89$, $p = .371$; *Anxiety:* $Z = -1.75$, $p = .080$). There were no other noteworthy correlations between the short ECR-R-HU subscales and age (*Avoidance: Rho* = .01, $p = .850$; *Anxiety: Rho* = -.07, $p = .022$). Similarly, according to the Kruskal-Wallis tests, no significant differences manifested between the subscale means according to education (*Avoidance:* $\chi^2(3) = 1.40$, $p = .705$; *Anxiety:* $\chi^2(3) = 5.03$, $p = .170$) or type of residence (*Avoidance:* $\chi^2(2) = 1.88$, $p = .390$; *Anxiety:* $\chi^2(2) = 8.48$, $p = .786$). However, Mann-Whitney tests showed that participants who were in a relationship scored significantly

lower than single respondents on both *Avoidance: M(SD)* = 2.57(1.40) vs. *M(SD)* = 2.92(1.26), *Z* = –3.97; *p* < .001; Cohen's *d* = .26; and *Anxiety: M(SD)* = 2.56(1.45) vs. *M(SD)* = 3.33(1.59), *Z* = –6.33; *p* < .001; Cohen's *d* = .42.

Table 4. Correlations[a] of the ECR-R-HU-SF Subscales with the Validation Measures in Study 1

	Avoidance	Anxiety
FAD[b] Problem solving	.48**	.39**
FAD[b] Communications	.53**	.46**
FAD[b] Roles	.50**	.48**
FAD[b] Affective Responsiveness	.51**	.45**
FAD[b] Affective Involvement	.41**	.42**
FAD[b] Behavior Control	.24**	.24**
FAD[b] General Functioning	.56**	.50**
PSS-4[c] Perceived Stress	.32**	.41**
DS1K[c] Depressive mood	.39**	.44**
WBI-5[c] WHO Well-Being	-.31**	-.34**

[a] Values are Spearman correlation coefficients.
[b] *N* = 824, *p* < .001. [c] *N* = 958, *p* < .001.

Validation Measures

The construct (convergent) validity was examined by calculating Spearman correlations between the scores of the short ECR-R-HU subscales and measures of family functioning problems (FAD subscales), depressed mood (DS1K), perceived stress (PSS-4) and well-being (WBI-5). Both *Avoidance* and *Anxiety* were correlated systematically and moderately with all the measures of the related constructs (Table 4).

Temporal Stability

The ECR-R-HU-SF maintained the original two-factor structure (Fraley et al., 2000) in the Wave 2 subsample (*N* = 98) after a four-month gap. In CFA, the Chi-square test was significant (χ^2 = 24.153, *df* = 19; *p* < .001), and all model fit indices were satisfactory (NFI = .948; TLI = .977; CFI = .988; RMSEA = .017, CI [.000 – .035]. The SRMR value (= .046) was excellent. The item weights ranged from .66 to .96 for the *Avoidance* factor and from .75 to .85 for the *Anxiety* factor, with a coefficient of .47 between the two factors.

The internal consistencies of the subscales were also high in this subsample (Cronbach's alpha and McDonald's omega values were .87 for *Avoidance* and .89 for *Anxiety*).

Spearman correlations between data from Wave 1 and Wave 2 were strong (*Avoidance*: *Rho* = .74, *p* < .001, *Anxiety*: *Rho* = .79, *p* < .001). In Wave 2, Spearman correlations between the short ECR-R-HU subscales and the 36-item questionnaire were also strong (*Avoidance*: *Rho* = .90, *p* < .001; *Anxiety*: *Rho* = .88, *p* < .001).

Although the means of the short ECR-R-HU subscale scores showed significant differences according to the Wilcoxon test in the test-retest subsample (*N* = 95), they were very similar to the means of Wave 1 after 4 months, for *Avoidance:* 2.55 (1.16) vs. 2.34 (1.27); *Z* = -2.87, *p* = .004; for *Anxiety:* 2.63 (1.47) vs. 2.39 (1.46); *Z* = -2.31, *p* = .021.

Similarly, in the Wave 2 sample (*N* = 98), statistically significant but minimal differences emerged between the original 18-item and the shortened 4-item scales, for *Avoidance:* 2.55 (1.11) vs. 2.36 (1.25); *Z* = -3.48, *p* < .001; for *Anxiety:* 2.70 (1.18) vs. 2.45 (1.49); *Z* = -3.55, *p* < .001.

Study 2

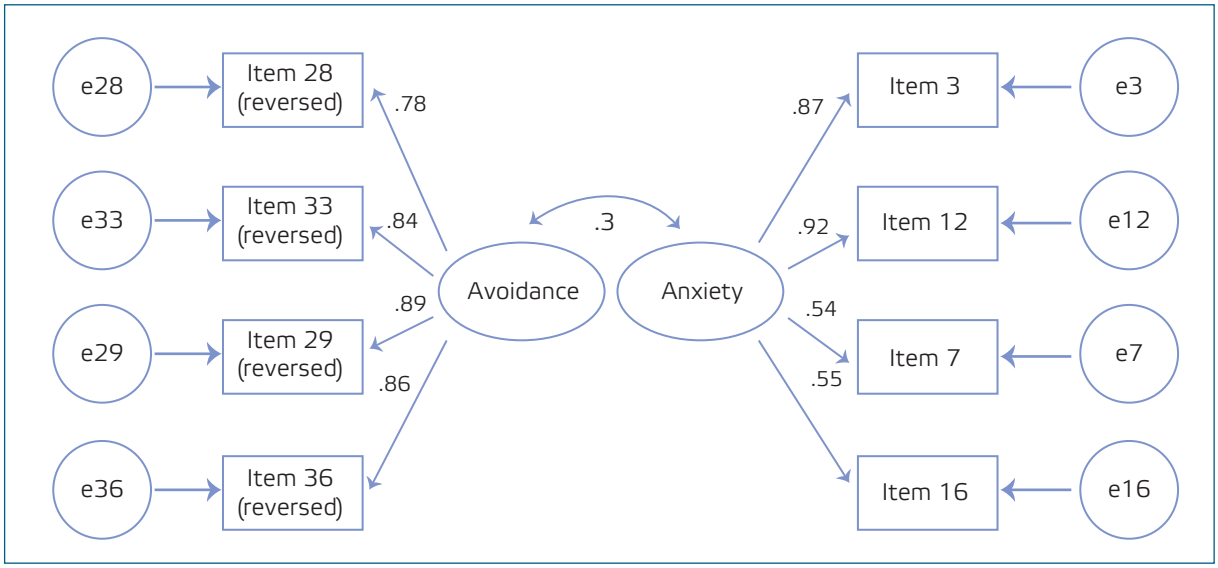
Confirmatory Factor Analysis – Structure of the Short Form in a Special Sample

A special sample of mothers of children between 3 and 36 months of age (after data imputation: *N* = 952) was used to test the theoretical two-factor structure of the short ECR-R-HU. The Chi[2] test was significant (χ^2 = 182,791, *df* = 19; *p* < .001), and all other model fit indices were satisfactory (NFI = .958; TLI = .944; CFI = .962; RMSEA = .095, CI [.083 – .108]). The SRMR value (= .031) was excellent. We concluded that the original two-factor model (Fraley et al., 2000) for the short ECR-R-HU in Study 2 (Figure 2) could be confirmed.

Internal Consistency

Cronbach's alpha and McDonald's omega values were high (.91 for *Avoidance,* and .81 for *Anxiety*), showing a very good reliability of the 4-item subscales.

Figure 2. CFA Model of the ECR-R-HU-SF Structure in Study 2



Descriptive Statistics of the Avoidance and Anxiety Subscales and Relationships with Demographic Variables

Subscale scores were computed for each participant by averaging the scores of the corresponding items. The average mean scores were 2.41 (*SD* = 0.05; range: 1–7) for *Avoidance*, and 2.17 (*SD* = 0.04; range: 1–7) for *Anxiety*. Kolmogorov-Smirnov tests showed that the subscale scores did not follow a normal distribution ($p < .001$). Compared to the nationally representative sample of Study 1, the mean scores of both subscales were slightly lower in early motherhood, .24 (9%) lower for *Avoidance* and .56 (21%) lower for *Anxiety*. Both subscales were even more skewed to lower values (less avoidance and less anxiety). Therefore, we used non-parametric tests in the following analyses.

As expected, a moderate correlation was observed between the two subscales (*Rho* = .46, $p < .001$).

There was a significant difference between the mean scores of both *Avoidance* and *Anxiety* according to the participants' education level ($\chi^2(3) = 13.22$, $p = .004$ and $\chi^2(3) = 9.76$, $p = .021$, respectively) and their type of residence ($\chi^2(3) = 80.50$, $p < .001$ and $\chi^2(3) = 9.94$, $p = .019$, respectively). Pairwise comparisons found that participants with lower education (primary school or less) showed significantly higher *Avoidance* scores compared to those who completed secondary school ($p = .034$) and those who had a college or university degree ($p = .002$). Participants with a college or university degree had significantly lower *Anxiety* scores than those who only completed secondary school ($p = .049$). Those living in Budapest (capital) produced significantly lower *Avoidance* scores compared to respondents from other types of residence ($p < .001$), and *lower Anxiety scores* than those from other cities or towns ($p = .039$). It is important to note that the ratio of participants with a college degree was much higher in Budapest than in other cities and towns. The means and standard deviations are presented in Table 5, although the differences were tested by non-parametric Kruskal-Wallis tests.

Table 5. Avoidance and Anxiety Scores According to Participants' Type of Residence and Education Level in Study 2

	Residence	*N*	*M*	*SD*	Education level	*N*	*M*	*SD*
Avoidance	Village	298	2.46	1.50	Primary school or less	108	**3.02**	1.94
	City / Town	354	2.77	1.76	Skilled worker/vocational school	216	2.42	1.55
	County Seat	152	2.31	1.52	Secondary school	456	2.34	1.50
	Capital (Budapest)	149	**1.54**	.95	College, university	171	2.19	1.53
	Total	953	2.41	1.59	Total	951	2.40	1.59
Anxiety	Village	298	2.14	1.26	Primary school or less	108	2.30	1.37
	City / Town	354	2.33	1.34	Skilled worker/vocational school	216	2.26	1.37
	County seat	152	2.10	1.39	Secondary school	456	2.19	1.29
	Capital (Budapest)	149	**1.93**	1.17	College, university	171	**1.92**	1.18
	Total	953	2.17	1.30	Total	951	2.17	1.30

Single mothers (n = 52) scored significantly higher on both *Avoidance* (Z = -9.01, p < .001; M = 4.78, SD = 1.76 vs. M = 2.27, SD = 1.47; Cohen's d = .58) and *Anxiety* (Z = -1.99, p = .05; M = 2.76, SD = 1.78 vs. M = 2.14, SD = 1.26; Cohen's d = .12).

Validation Measures

The construct (convergent) validity was examined by calculating Spearman's Rho correlations of the subscale scores of the ECR-R-HU-SF with depressive mood (DS1K) and perceived stress (PSS-4). As expected, both *Avoidance* and *Anxiety* correlated moderately with depressive mood (*Avoidance*: *Rho* = .42, p < .001; *Anxiety*: *Rho* = .43, p < .001) and with perceived stress (*Avoidance*: *Rho* = .53, p < .001; *Anxiety*: *Rho* = .43, p < .001).

Discussion

The two studies described in the present article aimed to validate a methodologically rigorous short version of the Hungarian ECR-R (ECR-R-HU-SF) (Smith et al., 2000). First, we used an adequately validated long version (ECR-R-HU; Dupont et al., 2022) that used a nationally representative large-scale community sample (N = 958) for validation. To develop the short form (ECR-R-HU-SF), the same nationally representative adult sample was used for item selection and assessment of psychometric characteristics (Study 1).

The expert team paid careful attention to item selection, which was based on a combination of statistical considerations as well as aspects related to content (items with highest loadings, preference for items included in other European short forms, avoiding redundancy, coverage of content dimensions). The development of the short form (ECR-R-HU-SF) resulted in 8 items (4 for *Avoidance*, 4 for *Anxiety*) confirming the underlying dimensions of attachment-related *Avoidance* and attachment-related *Anxiety* (Fraley et al., 2000).

The *Avoidance* items measure four different content themes that mostly overlap with the themes identified by Lee et al. (2023): a) fear of intimacy (Item 29), b) reluctance to dependency (Item 33), c) reluctance to self-disclosure (Item 28), and d) belief that one is not understood by one's partner (Item 36). Three content themes were represented in the *Anxiety* subscale, which corresponded with the themes found by Lee et al. (2023): a) fear of rejection by one's partner (Item 3, 7), b) excessive need for approval from one's partner (Item 16), and c) distress from one's partner's unresponsiveness (Item 12) (Note: Item numbers correspond to Fraley et al., 2000). When comparing the items of various short versions of the ECR-R, some variance is expected due to cross-cultural differences. Two of our *Avoidance* items (27, 33) can be found in all of the reviewed short forms except in the German short versions (Brenk-Franz et al., 2018; Ehrenthal et al., 2021), while two of our *Anxiety* items (26, 32) can be found in all existing European versions; however, are not present in the Thai (Wongpakaran et al., 2023) and Korean (Lee et al., 2023) versions. We also included an item (30), which overlaps with the Thai (Wongpakaran et al., 2023) and Korean (Lee et al., 2023) brief versions, but is not present in any of the other European short forms.

The second study was a new validation of the ECR-R-HU-SF on an independent, large sample of mothers coming from diverse sociodemographic backgrounds. There is a gap in research targeting adult romantic attachment in early motherhood when attachment representations and processes become again prominent. Activation of attachment representations occurs partly due to the often chronic stress associated with this period, but also because it may evoke memories of how individuals have been cared for by their own parents during childhood (Bowlby, 1988). The mental health of mothers in this sensitive period is influenced by their romantic attachment representations (Meuti et al., 2015; Simpson & Rholes, 2019). Study 2 aims at exploring special characteristics of romantic attachment in this life phase.

The following results of Studies 1 and 2 show the high validity and reliability of the ECR-R-HU-SF: (1) The two-factor structure of the 8-item ECR-R-HU-SF was confirmed by CFAs in both studies with satisfactory model fit indices. (2) The two subscales (*Avoidance; Anxiety*) displayed very good internal consistencies with Cronbach's alphas and McDonald's omegas above .81 in both studies. (3) The subscales of the 8-item version displayed very strong correlations with those of the full 36-item version suggesting that, despite its brevity, the short version could capture the essence of the constructs (with approx. 80% common variance). (4) Temporal stability was also high in Study 1.

Further statistical parameters echoed the results of previous studies and theoretical assumptions: (1) The subscales did not follow a normal distribution in either study, and were skewed towards more secure values, as expected. (2) We also detected a moderate correlation between the two subscales in both studies, which is in line with the assumption that the two subscales are not orthogonal (Cameron et al., 2012).

The mean scores of the current representative adult sample were in the middle of the range of mean scores obtained by other short forms. Examining the mean scores of both subscales in early motherhood (Study 2), we noticed that the scores were lower, especially for *Anxiety* (9% lower for *Avoidance* and 21% lower for *Anxiety)*. A longitudinal study by Galdiolo and Roskam (2017) echoes our findings, as primiparous parents had significantly lower scores on attachment-related anxiety and avoidance compared to childless couples at the baseline measure. Contradicting their expectations, they also found that attachment orientations around childbirth showed stability pre- and post-term. One of the explanations they offer might also explain our results concerning the difference between the mean scores of mothers (Study 2) and adults (Study 1). The authors (Galdiolo & Roskam, 2017; Luhmann et al., 2014) suggested that inherent differences might manifest, (e.g., personality or attachment factors) between individuals who undergo specific events and those who do not. Our finding of lower *Avoidance* (but not *Anxiety*) levels in motherhood is also in line with a study by Rholes et al. (1997), suggesting that lower levels of attachment-related avoidance are associated with the desire to have children. However, findings of the longitudinal study conducted by Simpson et al. (2003) contradicted our results, as they suggested that in the transition to parenthood, attachment-related anxiety and avoidance did not systematically trend in a singular direction; instead, they were mediated by the women's perception of their husbands' support and anger. Changes in attachment-related avoidance seemed to be mediated by women's support seeking levels and by their partners' avoidance levels.

The most salient demographic finding consistent across both studies is that participants engaged in a relationship were more likely to have lower scores on both *Avoidance* and *Anxiety,* suggesting a trend towards more secure attachment. This could imply that individuals with more secure attachment styles are inclined to become committed in a relationship. Alternatively, the very state of being in a relationship may reduce the intense search for comfort and closeness, as the attachment system is less activated, leading individuals in a relationship to report lower-level attachment-related avoidance and anxiety in a survey targeting romantic attachment. On the other hand, respondents who are not in a committed relationship are more likely to be actively seeking an emotional bond. This quest may activate their attachment system and "prime" attachment-related distress reflected in relatively higher scores on both dimensions compared to those in committed relationships. Our findings echo results from prior studies (Ehrenthal et al., 2021; Kaščáková et al., 2016). Single participants scored significantly higher on *Avoidance* and *Anxiety* in the adult representative sample and in early motherhood as well. This is consistent with previous research using a short form of the ECR-R (Ehrenthal et al., 2021) and partially consistent with the results from the Czech representative sample (Kaščáková et al., 2016), in which single participants had significantly higher avoidance scores.

Results concerning relationship status in early motherhood were similar and even accentuated for *Avoidance*. The average *Avoidance* score of single mothers was more than twice the *Avoidance* score of mothers in a relationship. In the case of *Anxiety,* a significant difference appeared between the scores of single mothers and mothers in a relationship, but the difference was not as great as for *Avoidance*. Attachment avoidance is associated with cognitive, affective and behavioral processes hindering the potential for intimacy (Simpson & Campbell, 2013). Accordingly, individuals with high avoidance are less likely to form committed romantic relationships (Schindler et al., 2010) and engage in new relationships following a break-up (Davis et al., 2003), and may tend to avoid relationships in general as a result of anticipated relationship disappointments and commitment aversion (Birnie et al., 2009). Bowlby (1988) believed that transition to parenthood provides a fertile ground for changes in attachment orientations, because of (1) the chronically stressful nature of having a child, (2) the reactivation of attachment-related memories from the past, (3) and also because caring for a baby exposes individuals to new personal and interpersonal experiences, which may either contradict or substantiate existing attachment working models. Simpson et al. (2003) confirm that attachment orientations do change in meaningful ways during the transition to parenthood and these changes are related to how individuals perceive themselves and their partners. Single mothers continue to perceive themselves and their social worlds in ways that actively justify their insecurity. Sharp increases in avoidance levels of single mothers echo the finding that women who enter parenthood seeking less spousal support or who have highly avoidant husbands tend to become more avoidant during the transition (Simpson & Rholes, 2019).

There were no gender differences for either scale in Study 1, which is consistent with the fact that short ECR-R versions have mostly confirmed invariance across gender groups (Brenk-Franz et al., 2018; Ehrenthal et al., 2021; Kaščáková et al., 2016; Švecová et al., 2021; Wongpakaran et al., 2023; Wongpakaran & Wongpakaran, 2012). Subscale scores did not show significant differences according to age, education, or type of residence in Study 1. In Study 2, mothers with lower education (8 years or less) had significantly higher *Avoidance* scores than mothers who completed secondary education or had a college or university degree. This is in line with the findings of

Kaščáková et al. (2016), namely that significantly lower avoidance scores were associated with higher educational levels. However, research on the relationship between romantic attachment and educational levels using the ECR-R and its short versions is lacking. Some studies have shown that attachment representations influence students' academic performance: secure attachment has been associated not only with higher grades, but with greater emotional regulation, social competence and willingness to take challenges (Bergin & Bergin, 2009; Moss & St-Laurent, 2001). Reio et al. (2009) have shown that secure attachment has a positive influence on learning-related outcomes.

We also found significant differences in attachment representations according to type of residence in Study 2. Individuals residing in Budapest (the capital) had a lower average score on both subscales compared to other residential areas (county seats, other cities/towns, villages) with varying levels of significance across groups. However, a greater proportion of participants from Budapest had completed college or university, which may have influenced the differences observed based on type of residence. To our knowledge, limited research exists addressing the connection between types of residence and attachment styles.

ECR-R-HU-SF subscales (*Avoidance; Anxiety*) correlated in the expected directions with related constructs, such as family functioning problems, depressive mood, perceived stress, and well-being in Study 1. Study 2 further confirmed the convergent validity of the two subscales on an independent sample: *Avoidance* and *Anxiety* showed positive correlations with depressive mood and perceived stress. Recent research supports our findings concerning the link between attachment insecurity and perceived stress (Thompson et al., 2018), while Conradi et al. (2018) identified a connection between insecure attachment styles and a more depressed mood. Conradi et al. (2018) indicated that insecure attachment had an adverse effect on the course of depression in primary care patients over a seven-year period. According to Jansen et al. (2023), insecure attachment correlated with higher levels of stress and depression in a student sample. Family functioning problems were closely tied to couple dynamics and marital satisfaction. The latter was associated with attachment-related *Avoidance* and *Anxiety* in earlier studies (Mikulincer & Shaver, 2016; Treboux et al., 2004). The link between attachment security and well-being was also highlighted in recent research. It appears that attachment security contributes to happiness (Diener & Seligman, 2002), while higher levels of attachment insecurity are associated with lower levels of psychological well-being mediated by dispositional mindfulness, psychological inflexibility, and resilience (Calvo et al., 2022). In summary, each measure that was chosen to test convergent validity affirmed the anticipated associations with the two attachment dimensions: *Avoidance* and *Anxiety*.

Strengths and Limitations

This study reports the validation of the Hungarian short version of the ECR-R (ECR-R-HU-SF). The psychometric assessment of the measure and item selection was based on data from a nationally representative community sample, offering greater heterogeneity than other validation studies. The item selection was meticulously carried out in a randomly split subsample of Study 1 and was based on a variety of aspects including coverage of thematic dimensions, statistical considerations and consideration of items included in other European short versions of the ECR-R. The resulting 8 items (4 for *Avoidance*, 4 for *Anxiety*) of the ECR-R-HU-SF confirmed the original two-factor structure of the measure in the other randomly split subsample of Study 1. The subscales (*Avoidance; Anxiety*) showed very good reliability and correlated highly with their corresponding original long versions. The newly developed ECR-R-HU-SF was tested on a special representative sample of mothers of children between 3 and 36 months of age (Study 2). The psychometric analysis of the second database confirmed the results in Study 1. In summary, we can conclude that the ECR-R-HU-SF can be used as an effective screening tool for measuring adult romantic attachment.

The greatest strength of our manuscript is that in creating a highly valid and reliable short form measure of the ECR-R in Hungarian, we adhered to methodological rigor in data collection, sampling, and data analysis.

In addition to the strengths of the research, several limitations must be considered when interpreting the results, which should be addressed in future studies:

1. Validation results were obtained through self-report questionnaires and might be biased by the common-method variance.

2. In the short form, all of the *Avoidance* items are reversed items, thus measuring the absence of avoidance (all items must be reversed when scoring the questionnaire). However, the correlation between the subscales of the full and the shortened questionnaire is extremely high, which supports our argument for further use of this item set. Since the main component of Avoidance in PCA contained reversed items, and in our previous paper

(Dupont et al., 2022) we experienced the confounding effect of mixed-direction items on pure factor structures, we decided to select items oriented in a single direction.

3. Our specialized independent sample (Study 2) for testing the validity of the instrument consisted solely of mothers. Therefore, the validity measures of the short scales in Study 2 are limited to this specific demographic group.

4. As the ECR-R is one of the most comprehensive and reliable instruments in the literature to test romantic attachment, we did not test its concurrent validity in our studies; only convergent validity measures were introduced.

Conclusion, Implications, and Future Directions

The ECR-R-HU-SF serves as a highly valid and reliable instrument for large-scale research particularly when there is a constraint on the number of items per tool. Its utility extends to the clinical realm (e.g., systemic family therapy, couples counseling, perinatal interventions), where it can be used for quick screening or facilitate evaluations and consistent monitoring throughout therapeutic processes. Highlighting the use of short forms in the clinical field, a recent study has demonstrated that national short forms of the ECR-R in Germany exhibit strict longitudinal measurement invariance and sensitivity to treatment (Müller et al. 2024). Hungarian researchers and clinicians working in the field of attachment gain an 8-item, time-saving instrument that has been developed on a representative community sample.

Future research should investigate whether the short *Avoidance* scale effectively captures the latent construct and the full continuum of the latent dimension. As mentioned earlier, all the *Avoidance* items are reversed, measuring the absence of avoidance. Further independent samples (even specialized samples) should be considered to test the validity and reliability of the instrument. Several Hungarian large samples are already available for analyses including several hundred mental health professionals trained in EFT couple therapy and multiple dyads (partners) in intervention studies. We plan to analyze these samples and publish our results in the future. Additionally, future research should examine the concurrent validity of the Hungarian ECR-R and its short form, as this has not yet been addressed.

Future research might also consider further investigation of underlying factors associated with lower attachment insecurity in early motherhood, but also higher avoidance levels in single mothers.

Considerations on cross-cultural validity frequently led to the choice of diverse items for short form validation procedures; however, countries sharing a similar cultural background within the same region might aim for congruence.

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Author contribution

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Declaration of interest statement
The authors have no conflicts of interest to disclose.

Ethical statement
This manuscript is the authors' original work.
All participants engaged in the research voluntarily and anonymously.
Their data are stored in coded materials and databases without personal data.
Studies were approved by the Research Ethics Committee of Semmelweis University Budapest, Hungary. The license number for Study: RKEB 197/2018, for Study 2: RKEB 240/2019.

Data availability statement
The data that support the findings of this study are available in figshare at https://figshare.com/s/d04ef25a1c48a273b599.

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