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Experiences in Close Relationships Revised Child version (ECR-RC): Psychometric evidence in support of a Security factor

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ABSTRACT

Attachment refers to the innate tendency to form strong and close interpersonal bonds, from infancy through adulthood. Many different ways to assess attachment have been developed, one of them being the use of self-report questionnaires. The Experiences in Close Relationships-Revised is one of the most commonly used instruments to assess adult and late adolescent attachment. Recently, a new and brief child version of this instrument has been published, the 12-item ECR-RC short form. The purpose of the current study was threefold: (1) to test the factorial structure of this form in a sample of Italian adolescents, (2) to test the loadings overlap between the mother and the father forms, and (3) to investigate factors reliability. Using a sample of 961 adolescents (M_{age} = 14.25, SD_{age} = 1.57), a series of Confirmatory Factor Analyses were performed. The Avoidance – Anxiety structure was not supported, whereas a factor structure including Anxiety, Avoidance, and Security, had a very good fit. Item loadings on these factors were largely equal across mother and father, and internal reliability was high. The results of this study show that the ECR-RC short form is a quick and reliable way to assess attachment in early adolescents. This study also initiates the proposal of an ECR-RC Security factor, to be further validated in future studies.

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KEYWORDS ECR-RC; attachment; adolescents; Italian sample; confirmatory factor analysis; psychometric proprieties

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Introduction

Relevance of attachment

Interpersonal relationships are important throughout the course of the lifetime. One prominent relational construct is that of attachment (Bowlby, 1969), which refers, in general, to the way we form relationships. According to Bowlby's theory of attachment, humans are characterized, among other things, by the Attachment Behavioural System. This system is innate and helps in forming bonds between the neonate and an adult, who is usually called the 'attachment figure'. These bonds consist of behavioural (e.g., infant approaches attachment figure in stressful situations) and cognitive-emotional (e.g., child develops expectations regarding attachment figure's availability) aspects, and they promote the protection of the neonate by the adult, and therefore are conducive to the survival of the species (Bowlby, 1969).

The everyday parent–child interaction gives rise to attachment styles, patterns of relational expectations, emotions, and behaviours about the self and the significant other that, resulting from early experiences, affect interpersonal behaviour strategies and development throughout the lifespan, 'from the cradle to the grave' (Bowlby, 1969; Chopik, Edelstein, & Fraley, 2013). Attachment's significance for adaptation has been well documented in childhood, as well as in adolescence and adulthood (Barone & Lionetti, 2012; Mikulincer & Shaver, 2007), in different typologies of families and cultures (van Ijzendoorn & Sagi-Schwartz, 2008). With a specific focus on adolescence, longitudinal studies have shown that attachment predicts changes in some of the core features of psychological adjustment, like self-esteem, psychological symptoms, and identity development (Doyle & Markiewicz, 2005; Hankin, Kassel, & Abela, 2005).

Measurement of attachment

Since John Bowlby elaborated the theory of attachment (Bowlby, 1969), two broad assessment traditions have been developed: one consisting of observations and interviews, the other of self-report questionnaires. The former has mostly informed studies interested in investigating the parent–child dyadic bond in infancy and conceptualized attachment as categorical, proposing a distinction amongst secure, insecure-avoidant, insecure-ambivalent and disorganized (Ainsworth, Blehar, Waters, & Wall, 1978). The latter assessment tradition, conversely, has been mainly disseminated in studies investigating attachment from school-aged years and onwards; it is supposed to emphasize the conscious and behavioural aspects of close relationships, and conceptualizes attachment as a dimensional – rather than categorical – construct. Within this perspective, two underlying dimensions, usually named Anxiety and Avoidance, have most often been proposed (Mikulincer & Shaver, 2007). People high on Anxiety present a tendency to worry whether their partner is available, responsive and

attentive; conversely, people high on Avoidance are usually less comfortable being intimate and prefer not to rely on others for emotional support. For school-aged children from around 8 to 11 years, the assessment of a continuous Security dimension has also been proposed to investigate the degree to which the significant other is perceived as able to provide emotional support and care (Kerns, 2008).

The Experiences in Close Relationship-Revised questionnaire

One of the most commonly used self-report instruments to assess attachment (Graham & Unterschute, 2015) at a dimensional level is the Experiences in Close Relationships-Revised; a 36-item questionnaire proposed by Fraley and colleagues to assess Anxiety and Avoidance (2000). Originally developed for assessing the romantic attachment relationship, the ECR was shown to present good psychometric properties in many different contexts (e.g., Mastrotheodoros, Chen, & Motti-Stefanidi, 2015) and has recently been adapted for children and adolescents with the Experiences in Close Relationships Scale – Revised Child version (ECR-RC, Brenning, Soenens, Braet, & Bosmans, 2011).

The authors of this revised version simplified the items to better reflect the developmental level of middle childhood, and slightly changed these in content to be more pertinent to the parent–child bond. From the initial pool of 36 items, Brenning and colleagues subsequently selected 12 items, based on a Principal Component Analysis of the original version, for a short version of the ECR-RC, which was considered to be more suitable for children due to its length (Brenning, Van Petegem, Vanhalst, & Soenens, 2014). The six highest loading items for the Anxiety dimension were included; on the contrary, for Avoidance, given that the six items with the highest loadings were all reverse-coded items (e.g., 'I talk things through with my father/mother') risking to tap into secure attachment representations, the authors selected three non-reversed items and three-reversed items for the Avoidance factor. This 12-item version has been shown to have reasonably good psychometric properties suggesting that it may be a promising tool for assessing attachment in children and adolescents.

The present study

The aim of the present study was to test the ECR-RC short-version psychometric properties for adolescents' perceptions of their attachment to mothers and fathers (Brenning et al., 2014) in Italian adolescents. The importance of the study rests upon the need to further explore the properties of a newly constructed instrument, which is promising for research, particularly due to its short form in an age range where less assessment procedures are available if compared to infancy and adulthood. Specifically, we aimed at (1) examining the factorial structure of ECR-RC towards mothers and fathers within a Confirmatory Factor

Analysis approach; (2) comparing the factor loadings of ECR-RC mothers and fathers by means of a bootstrap procedure; (3) examining scales reliability. To the best of our knowledge, this is the first study to investigate the factor structure as well as the psychometric properties of this form in a different population from the one in which it has been originally tested.

Method

Participants and procedure

A total of 961 Italian students from Tuscany, Italy(45.6% female, M_{age} = 14.25, SD = 1.57, range = 12–19), participated in the study. Data collection was part of a larger research project named *NoTrap!* (Palladino, Nocentini, & Menesini, 2016). Most students (63%) attended 9th and 10th Grade (high school), and the rest attended 7th and 8th Grades (middle school). 905 subjects completed the questionnaire towards both mother and father and were thus considered for the analyses that follow. Missing items in the current sample were <3%. Study approval was obtained from both the school and class council. All participants and their parents received an information sheet under the Italian Law and they were asked to give signed consent by both parents and the participant him/herself. The paper-pencil questionnaire was administered in class by trained researchers during school time (Masters or Ph.D. level students).

Measure

The ECR-RC in its short, 12-item version (Brenning et al., 2014), was used. In the original 12-item version, 6 items pertain to Avoidance and 6 items to Anxiety (see Table 1). Each item is available for the mother and the father. All items are rated on a 7-point Likert-scale, ranging from strongly disagree (1) to strongly agree (7).

Table 1. ECR-RC short-version items content.

Item	Proposed dimension
1. Worried that parent wants to leave the child	Anxiety
2. Worried that parent doesn't love the child	
3. Worried that parent doesn't love as much as the child loves him/her	
4. Afraid that parent doesn't love when the child shows love	
5. Think that parent has changed feelings without reason	
6. Afraid that parent does not like to be close	
7. Don't like telling parent about being sad	Avoidance
8. Not easy to tell parent about her/himself	
9. Prefer not to get too close to parent	
10. Talk to parent about problems	
11. When in bad mood, helps to talk to parent	
12. Tell to parent nearly everything	

Analytic plan

First, we explored items distribution using a graphical representation. Second, for examining the factor structure of ECR-RC, we used a Confirmatory Factor Analysis approach using the Diagonal Weighted Least Squares estimator (DWLS) suggested for Likert-scale data (Flora & Curran, 2004). Compared to the well-known Maximum Likelihood estimator, DWLS allows a more accurate estimation of parameters when items are not normally distributed, and performs as other estimation methods suitable for continuous variable when Likert-scale data do not significantly deviate from a normal distribution (Lionetti, Keijsers, Dellagiulia, & Pastore, 2016). Because each adolescent responded to a set of items pertaining to mother, and to a set of items pertaining to father, we included all responses in a single model correlating residuals of each item toward mother and father. The following fit indices were considered overall for model evaluation: Chi Squared *p*, although this is particularly sensitive to the sample size; CFI and TLI (Bentler, 1990) – optimal fit when these are higher than .95; RMSEA (Steiger & Lind, 1980) – optimal fit when less than .06; WRMR (Yu & Muthén, 2001). The last index is suitable for models where sample statistics have widely disparate variances and when sample statistics are on different scales such as in models with mean and/or threshold structures and it is also suitable with non-normal outcomes. Values < 1.0 are suggested to be indicative of adequate model fit.

Third, for estimating the degree of overlap of ECR-RC factor loadings toward mother and father, we used an ad hoc technique based on a bootstrap procedure, setting 3000 replications. Specifically, we estimated the empirical distribution of the bootstrapped standardized loadings of the final model and calculated the overlapping area for each pair of items (mother–father).

Finally, the internal consistency of the scales was estimated based on Cronbach's alpha and the greatest lower bound (glb) computed on the polychoric correlation matrix (Ten Berge & Sočan, 2004).

Listwise deletion for missing values was adopted (N = 830). The lavaan R package (Rosseel, 2012) was used for performing Confirmatory Factor Analyses, the overlapping R package (Pastore, 2016) was adopted for estimating the mother–father overlap of ECR-RC factor loadings. Data-set, fully anonymized, is available on the journal website.

Results

Factorial structure

Most of the items presented an asymmetric distribution (see Figure 1), supporting DWLS as a suitable estimator for our data. The first tested model was the well-known factor solution including Avoidance and Anxiety (Figure 2). CFA led to unacceptable values in three out of five fit indices, i.e., Chi Squared *p*, RMSEA and WRMR (Table 2). Thus, we tested a second model with a third factor, labelled

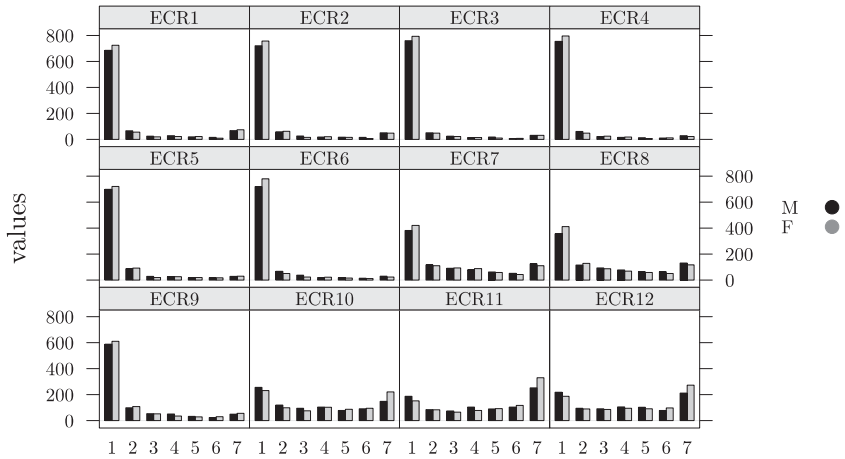

Figure 1. Items distribution of ECR-RC towards mother (M) and father (F).

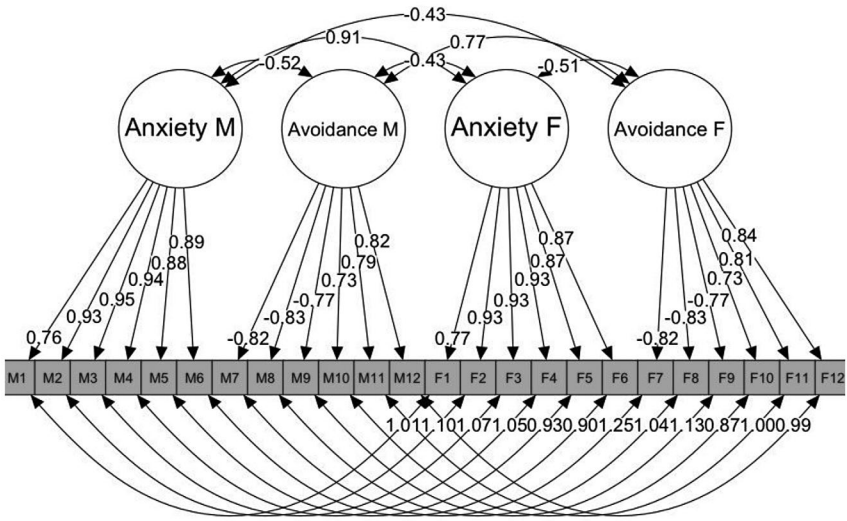

Figure 2. ECR-RC Anxiety – Avoidance Factors Model.
Notes: Latent factors labelled with M refer to ECR-RC towards mother; with F towards father. Standardized parameters are reported.

Security (see Figure 3). This factor included items, which were already proposed by Brenning and colleagues (2014) as potentially tapping into secure attachment representations instead of insecure avoidant representations and which were semantically similar to those investigating attachment security in other attachment-based questionnaires (see Kerns, 2008; e.g., *some kids like telling their mom/dad what they are thinking or feeling* and items 10 to 12, Table). For the three-factor model, fit indices were all satisfactory except for Chi Squared

Table 2. CFA fit indices of the ECR-RC towards mothers and fathers ($N = 830^{*}$).

	χ^2(df)	*p*	CFI	TLI	RMSEA [95% C.I.]	WRMR
Anxiety – Avoidance factors solution	3669.095 (*234*)	<.001	.984	.981	.133 [.129–.137]	2.956
Anxiety – Avoidance – Security factors solution*	398.626 (*225*)	<.001	.999	.999	.031 [.026–.035]	0.974

Note: Items included in the security factor were 10 to 12 as reported in Table 1.
*listwise deletion for missing values, DWLS estimation method adopted.

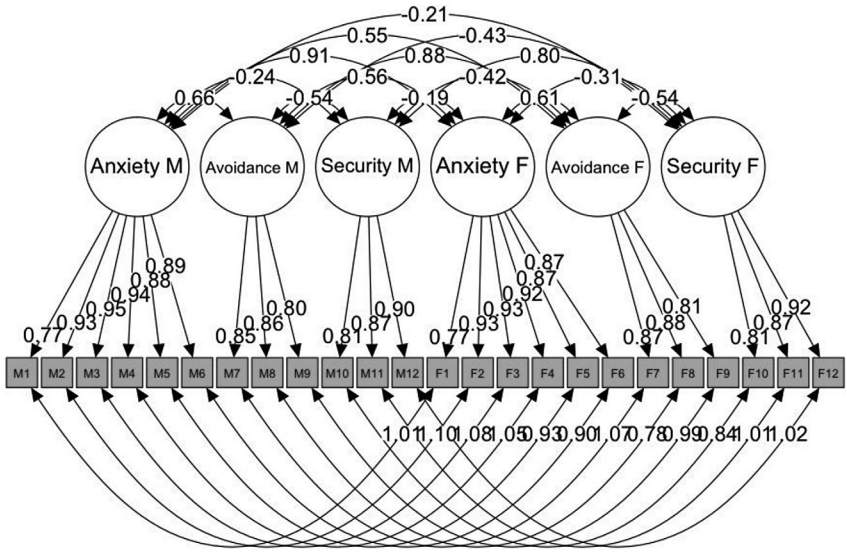

Figure 3. ECR-RC Anxiety – Avoidance – Security Model.
Notes: Latent factors labelled with M refer to ECR towards mother; with F towards father. Standardized parameters are reported.

p, which is especially sensitive to sample size. Specifically, RMSEA and WRMR, which were unsatisfactory in the Avoidance-Anxiety factor solution, reached optimal values in the Avoidance Anxiety – Security solution (Table 2).

Factor loadings overlap

The overlaps of factor loading distributions, derived from a bootstrap procedure (Pastore, 2016) are reported in Figure 4. The bootstrapped distributions were approximately normal and overlap percentages were overall high suggesting that items for mother and father load into the latent factors in a similar way. Specifically, they ranged from 72.5% (item 4) to 94% (item 11), with only two exceptions below 60%: item 3 (51.8%) and item 6 (58%). In the latter, mother and father distributions are similar in their shapes, with only slightly lower mean values for father items.

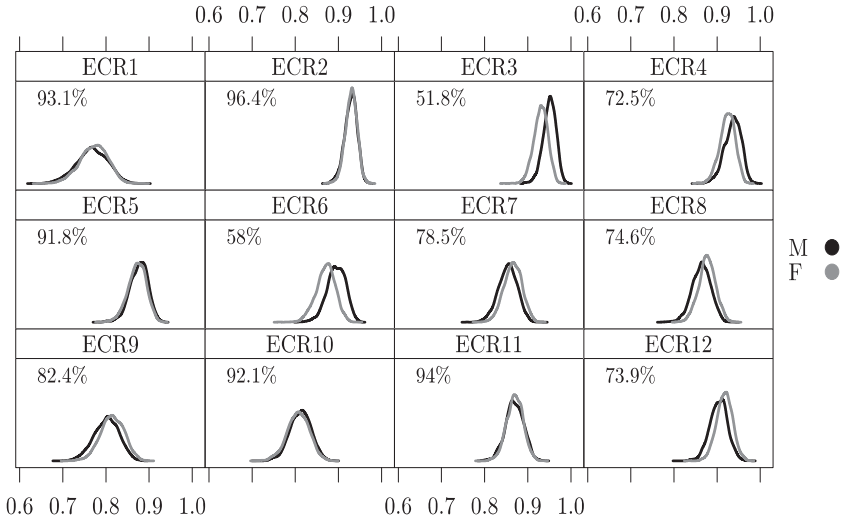

Figure 4. Overlap of factor loadings, estimated using a bootstrap procedure, of ECR-RC items towards mother (M) and father (F).

Table 3. Reliability indices for both Anxiety – Avoidance and Anxiety – Avoidance – Security factor solution.

	Factor	Items*	Greatest lower bound	Cronbach's alpha [95% CI]
Anxiety	Towards mother	1–6	.97	.96 [.96–.96]
	Towards father	1–6	.93	.95 [.94–.95]
Avoidance (6 items)	Towards mother	7–12	.80	.87 [.86–.88]
	Towards father	7–12	.73	.87 [.85–.88]
Avoidance (3 items)	Towards mother	7–9	.87	.86 [.84–.88]
	Towards father	7–9	.80	.87 [.85–.89]
Security	Towards mother	10–12	.90	.90 [.89–.91]
	Towards father	10–12	.84	.89 [.88–.90]

*Items content is reported in Table 1.

Reliability

Reliability values – Cronbach's alpha and glb – of scales derived from the two models we tested, are reported in Table 3. Again, results supported a 3-factor solution.

Discussion

Attachment is a relevant construct for understanding social and emotional developmental pathways well beyond infancy, with longitudinal and concurrent studies reporting the positive role of attachment security for positive youth development. However, adolescence is a period in which fewer attachment

assessment procedures are available and further methodological studies are thus called for.

In the current paper we aimed at contributing to the study of the psychometric properties of the ECR-RC short version, suitable for adolescence, in a sample of Italian participants. Our results converge with the Brenning et al. (2014) data supporting the ECR-RC as a promising tool for assessing attachment in adolescence and partially diverge from this Belgian study in proposing a three-factor solution including Avoidance, Anxiety, and the added Security factor, not tested yet in the literature. Our Anxiety and Avoidance factors, as it was for the original validation study (Brenning et al., 2011), were overall moderately correlated. Whether this association between these two dimensions pertains to developmental aspects of the attachment construct in this age range, or whether it could be explained by children's cognitive capacities and response biases, is still not clear. Also, we identified high correlation between mother and father attachment factors. To be further explored in future studies, this association may suggest that in this age range there exists a unique perception of parental figure in terms of attachment bonds not that much differentiated between mother and father.

For what pertains specifically to the added Security factor that we propose in this paper, the fact that some items of the ECR-RC questionnaire could tap into security was already proposed (Brenning et al., 2014; p. 121), but not formally tested thus far. Our data provided preliminary evidence that these items may reflect a common latent factor. The content similarities between these items and those investigating secure attachment in other self-report questionnaires for children and adolescents (e.g., *some kids go the their mom when they are upset* – see Kerns, 2008, and *I do talk to my mother about my problems and worries* – see Brenning et al., 2014) support the hypothesis that the third latent factor that we identified may reasonably reflect a Security factor. Further studies should investigate its construct validity by its associations with other attachment measures and/or with measures of social-emotional development (i.e., inquiring if these items predict better adjustment). Lastly, the replication of the present findings with representative samples from different countries could confirm our proposed security factor for ECR-RC.

Even in the absence of a test–retest assessment, and though lacking additional measures for estimating convergent, predictive and discriminant validity – which represent the main limitations – the present study has several strengths relevant for the field of developmental psychology assessment. First, we tested ECR-RC measurement properties for the first time in a different population from the one in which it had originally been validated (Brenning et al., 2011, 2014); second, we took into account the ordinal nature of its items in line with statistic recommendations in this field (Flora & Curran, 2004); third, we correlated residuals of ECR-RC items towards mother and father for taking into account the non-independence of observations in a single tested model;

lastly, we estimated with a newly developed and easily replicable technique the overlap of the parameters (loadings) of items toward mother and father. Future studies investigating construct validity may support or disconfirm the proposed Security dimension, one of the novel results of our study. If confirmed, this would allow the overcoming of the absence of a dimension tapping into the security construct in the ECR-RC questionnaire, with positive outcomes for the study of both protective and risk factors in child and adolescent development.

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Disclosure statement

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