DIMENSIONALITY AND PSYCHOMETRIC PROPERTIES OF A NEW CHILD ATTACHMENT ASSESSMENT INSTRUMENT

DIMENSIONALIDAD Y PROPIEDADES PSICOMÉTRICAS DE UN NUEVO INSTRUMENTO DE EVALUACIÓN DEL APEGO EN NIÑOS

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Abstract

The Children Attachment Interview (EAN) is a new instrument based on story telling reports. The main purpose of this study is to analyze the structure and basic psychometric properties of the EAN through exploratory factor analyses based on a sample of 115 Spanish children aged 8 to 13 years (63 % boys). Another two matched samples from the risk social population and clinical population were compared with the main sample in order to obtain criterial validity. Findings reveal a multi-internal structure composed of four factors that refer to children´s reactions (positive, trustful, negative and mistrustful) and five factors that refer to child-attachment figure interactions (empathic, trustful, positive, rivalry and pro-arousal). Scales demonstrated adequate internal consistency. The comparison of scales between general and criterial groups, and correlations with related constructs indicate good construct validity.

Keywords: Telling stories; Children; Assessment; Working internal model; Attachment.

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Resumen

La Entrevista de Apego para Niños (EAN) es un nuevo instrumento de evaluación del apego basado en un procedimiento de completar historias. El objetivo principal de este estudio se basa en el análisis de la estructura y las propiedades psicométricas del EAN a través de análisis factoriales exploratorios sobre una muestra constituida por 115 niños y niñas españoles de entre 8 y 13 años (63 % niños). Otras dos muestras procedentes de una población en situación de riesgo psicosocial y de una población clínica fueron comparadas con la muestra principal con el fin de obtener evidencias de validez criterial. Los resultados obtenidos revelan una estructura interna compuesta de 4 factores que se refieren a reacciones del niño (positiva, confiada, negativa y desconfiada) y cinco factores referidos a interacciones niño-figura de apego (empática, confiada, positiva, negativa y desconfiada). Las escalas han demostrada una adecuada consistencia interna. La comparación de las escalas entre el grupo general y los grupos criteriales, y las correlaciones con los constructos relacionados indicaron una buena validez de constructo.

Palabras clave: Tareas narrativas; Niños; Evaluación; Modelo interno de trabajo; Apego.

Introduction

Internal working models (IWM, hereafter) as an *individual´s representation of the world, and himself in it* refers to structures that organize mental activity and behavior (Bowlby, 1973). Assessment of IWM uses multiple approaches to inferring its content and organization. One of the most commonly used from an early age is called the Story Completion Task or the Telling Story Interview (TSI forward) (e.g., Target, Fonagy, & Shmueli-Goetz, 2003). This methodology is based on utterances that follow the presentation of stressful events relevant to attachment, and allow for validly and reliably analyzing the IWM of the relationship. Its use has a number of advantages. Firstly, it operates on explicit and bounded situations in response to specific objectives. This can deepen children's expectations for significant events that elicit their need for protection and security. These expectations arise directly from learning situations that are affectively meaningful over their history of interaction. Secondly, strategic and open-ended questions encourage the spontaneous account of the child, and also follow the course of their thinking. Using these responses, the evaluator has access not only to the content of the mental representation of the emotional relationship but also the way it is structured in the child's mind. Finally, the child feels confident and secure in addressing the different emotions that can arise during this friendly and playful method of administration.

In most cases children respond to the TSI in a categorical manner quite consistent with the traditional patterns of behavioral attachment proposed by Ainsworth, Blehar, Waters and Wall (1978). In recent years, however, authors such as Fraley & Splieker (2003) have proposed a different vision for attachment strategies and a method of their analysis from a dimensional perspective.

In Spain, there is little tradition in developing instruments that are able to assess children´s representations of attachment that lend sufficient scientific credence to support their use based on psychometric criteria of validity and reliability. Additionally, to the best of our knowledge, neither does there exist any study of the Spanish population that uses a methodology that allows for the evaluation of attachment representations from a dimensional perspective. The main aim of this study is to analyze the psychometric properties of the Child Attachment Interview (Sierra, Carrasco, Moya, & Del Valle, 2011) (hereafter EAN for its Spanish acronym, Entrevista de Apego para Niños) from a dimensional perspective.

The contribution of this instrument includes several issues, challenges and features. On the one hand, the use of this instrument has increased the number of stories relative to those elicited from the use of other instruments. It has also included new everyday situations that may be experienced by the child as threatening from the standpoint of attachment. Another novel aspect of EAN is that it, in each of the stories, explicitly asks the child how s/he represents him or herself as well as how s/he represents his/her attachment figure. With other instruments, although the child identifies with the doll, the evaluator’s questions are

posed by appealing to the child and/or mother in abstract or general terms.

The analysis of the responses of children are made according to a dimensional perspective that takes into account key issues such as: (a) the fitness and adequacy of the child's responses to the situation; (b) the consistency of the responses; (c) the child's prediction about his or her own feelings, cognitions and behaviors given the situation; and, (d) predicting the sensitivity of their attachment figure when facing the situation in terms of contingency, affective involvement and consistency in relation to the situation (traditional items associated with sensitivity).

So far, few instruments have combined into a single assessment tool both traditional patterns of attachment as well as the basic behavioral, emotional and cognitive components.

The EAN incorporates this set of qualities that are analyzed in relation to three distinct elements from the child's verbal responses to the evocative situation: the children themselves, their attachment figure, and their interaction. Previous studies (Sierra et al., 2011; Sierra, Carrasco, Moya, & Del Valle, 2009) with this instrument have an exploratory nature with promising properties. However, its dimensionality and psychometric analysis in larger samples has not yet been analyzed, and these are the challenges proposed in the present study.

Method

Sample

The total sample was composed of 147 subjects. The participants were grouped into three samples: a general sample (n = 115; 63 % boys; mean age, M = 9.7; standard deviation, SD = 1.64), a maltreated-risk social sample (n = 13; 62 % boys; Mage = 6.88; SD = .77), and a clinical sample (n = 19; 63 % boys; Mage = 10.78, SD = 1.76).

Maltreated/risk social sample and clinical sample were matched by age and sex with two samples extracted from the general sample. All children were from the European Caucasian ethnic background.

The general sample was randomly selected from a private school (publically supported/financially supported by the Government). All of the children attended school, live in two-parent households, and represent the middle-high socioeconomic level.

The maltreated risk social sample was recruited from a foster care center associated with the public Department of Social Services (DSS). According to the DSS, these children have been identified as having experienced substantial maltreatment (87 % emotional and neglect maltreatment, 3 % sexual abuse, 10 % physical abuse). Risk-social families come from a low socioeconomic level.

The clinical sample was recruited from the public Health Psychological Service (HPS). Children were referred to the Children´s Department of HPS for emotional and behavioral problems. Families of referred children come from a low-middle socioeconomic level.

For the purposes of this study these various samples (maltreated/risk social, clinical and general) were considered as a whole. No specific types of child maltreatment or child psychological problems were analyzed. These two additional samples were used to compare the data with two matched sub-samples extracted from the general sample.

Instruments

Children Attachment Interview (EAN): description and scoring

The instrument is composed of the following materials: pictures that represent the different stories, neutral wooden figures (i.e., man, woman, girl, boy), and a score sheet to take notes. Each story is presented with its subsequent picture and figures. At the beginning of the evaluation, the child selects a figure that represents him or herself, and selects another figure that represents his or her attachment figure. The attachment figures employed in the evaluation is designated by a preliminary questionnaire that serves to determine who fulfills the role of primary caregiver to the

child. The EAN has a total of nine stories. An initial and neutral story, called "birthday party", is presented as an introduction to the train participants about the interview procedure. The rest of the stories are eight attachment-related situations. In the first situation (discipline story), the child accidentally breaks a vase while playing at home; in the second (jealous story) while the child plays in his room with a friend, the attachment figure enters and offers a snack that, when received, is followed by the attachment figure playing with his friend. In the third story (abandon story), the child has to go to hospital because he feels sick. Hospital rules mean no parent can stay with their children overnight. The fourth story (reunion story) refers to the arrival of the child's attachment figure in the morning. In the fifth story (pain story), the boy goes with his family to spend a day in the field and suddenly experiences a strong stomach ache. The sixth situation (delayed reunion) takes place after school ("Every day their attachment figure picks up the child but today all children have been picked up by their parents except him"). The seventh story (competitiveness story) takes place in the classroom and the teacher asks children to make a dictation. The children haven´t passed and the teacher put a note in the agenda. He must show the dictation results to his attachment figure. In the eighth story (frightening story), the child is playing in his room while his attachment figure is making dinner and suddenly the lights go out.

Evaluators ask a set of questions and the children must provide an answer. All stories are followed by the same questions about expectations and attributions of themselves and their attachment figure. Specifically, the questions are: What do you think happens then? What do you think/behave/feel when you… (action included the script of the story)? What do you think your attachment figure thinks/does/feels when you… (action included the script of the story)? Finally, What do you think the end of the story is about? At the end of the interview, the interviewer rewards and thanks the child for his or her participation. After that, they spend a while playing in order to decrease any potential tension and to promote a relaxing atmosphere. The time to conduct the interview is about 25-35 minutes.

Two groups of categories are extracted from the children´s answers to the different stories: (a) children´s reactions (e.g., positive or negative emotions, coping, attributions, expectations, disruptive behaviors); and (b) child-attachment figure interactions (e.g., warmth, hostility, friendliness, punishment, abandon, sensitive reactions, induction strategies). All of these categories are operationalized including a description according to real examples.

The Children´s Behavior Check-list (CBCL/4-18; Achenbach & Edelbrock, 1993).

We focus on the checklist of the inventory that assesses children´s behavioral and emotional problems. For this study we only consider the broader dimensions: internalizing problems (e.g., emotionally reactive, anxious/depressed, somatic complaints, withdrawn) and externalizing problems (e.g., behavioral problems, aggressive behavior). The scales have shown good psychometric properties in different populations. In this study Cronbach´s alpha was .89 for internalizing problems (anxious/depressed, withdrawn and somatic complaints), and .91 for externalizing problems (rule breaking behavior and aggressive behavior). Internalizing and externalizing scales were correlated .68. Cronbach´s Alpha ranges from .51 to .83 for general sample and risk/maltreated sample.

Parental Acceptance-Rejection Questionnaire, Short Form (PARQ: Mother and Father; Rohner, 2005).

This questionnaire was given to children (about mothers and fathers, separately) and also to parents (mothers and fathers separately). Scores on the PARQ (short form) spread from a low of 24 (maximum perceived parental acceptance) to a high of 96 (maximum perceived parental rejection). Scores at or above 60 reveal the perception of qualitatively more rejection than acceptance. The PARQ has been used in over 500 studies worldwide, and is known to have outstanding reliability and validity for use in cross-cultural research (Rohner, 2005). Coefficient alphas in this study were .79 for mothers and .86 for fathers when children report the questionnaires, and .82 for mothers and .83 for fathers when parents filled them in.

Procedure

To recruit participants for this study, a random selection was requested from a primary public school. We received authorization from the parents of all children and the Departments of Social Services and HPS gave consent for an examination of records. Participation of each child in the study was voluntary and contingent on the informed consent of his or her parents. The parents of the general sample were asked to complete the CBCL and the PARQ (mother version and father version) and children reported information about attachment (EAN) and perceived parental acceptance-rejection (PARQ-C for mothers and PARQ-C for fathers). In the risk-social/maltreatment sample and clinical sample the main caregiver of the child was asked to complete the CBCL and children were interviewed according to the EAN. The completed questionnaire for parents and caregivers were returned to the researchers for correction and analysis. At the end of the study, parents and caregivers received feedback regarding the main outcomes of their children.

Data analysis

The exploration of the instrument's internal structure was conducted through exploratory factor analysis (EFA) using principal component analysis and Varimax (i.e., orthogonal rotation) with Kaiser´s normalization. No a priori factor structure was hypothesized and all of the item scores had equal or higher loads of .30. Both the eigenvalue one criterion (Kaiser, 1961) and the Scree test (Cattell, 1966) were used for factor extraction.

The data were analyzed to obtain descriptive characteristics of the general sample, and the resulting factors and the psychometric properties of the instrument. Furthermore, these factors were studied in two other different samples (clinical sample and risk-social sample) in order to obtain some validity evidences. Both univariate and multivariate analyses were used by SPSS 19.0.

Results

Exploratory Factor Analysis

Four EFAs were performed, two per each kind of instrument record: children´s reactions (part 1), and child-attachment figure interactions (part 2). The four exploratory factor analyses had identical statistic characteristics (see data analysis section).

Regarding part 1 (the reported children´s reactions) one factor analysis was conducted for the positive reactions and another one for the negative reactions (Table 1). For the positive reactions two factors were extracted: Positive Reaction (Factor 1a, loaded items related to competitiveness, discipline, pain and frightening situations) and Trustful Reaction (Factor 2a, loaded items from abandon, jealous and reunion after being abandoned). The Kaiser-Meyer-Olkin measure of sampling adequacy was .59, and the Barlett test of sphericity was $\chi 2\ (120) = 4999$, $p < .0000$.

Also, two factors were extracted as far as children´s negative reactions are concerned: Negative Reaction (Factor 1b, loaded items related to abandon, jealous, discipline and competitiveness situations) and Mistrustful Reaction (Factor 2, loaded items from delayed reunion with attachment figure, frightening situations, and reunion after being abandoned). The Kaiser-Meyer-Olkin measure of sampling adequacy was .51, and the Barlett test of sphericity was $\chi 2\ (120) = 1197$, $p < .0000$.

In relation to the child-attachment figure interactions (part 2) and following the same statistical plan, two different factor analyses were performed: one for positive interactions and one for negative interaction (Table 2). From the positive child-attachment figure interactions emerged three factors: Factor 1c, Empathic Interaction that includes predominantly empathic answers from the attachment figure and friendly reconciliation between child and attachment figure when they cope/manage/handle different threatening situations; Factor 2c, Trustful Interaction, including predominantly answers of trust and confidence from abandon/reunion and discipline situations; and Factor 3c, Positive Interaction in which loaded the items that

Table 1

Structure matrix of children´s reactions (Principal component analysis with varimax rotation of Children´s reactions)

	Child´s positive reactions			Child´s negative reactions	
	Factor 1a	Factor 2a		Factor 1b	Factor 2b
PRS7	**.67**	-.03	DRS3	**.67**	-.05
TRS7	**.65**	.04	DRS7	**.65**	.08
PRS1	**.59**	.37	ARS3	**.62**	-.10
TRS1	**.56**	.48	DRS2	**.58**	.21
TRS8	**.50**	-.06	CRS7	**.58**	.02
PRS5	**.43**	.01	CRS2	**.53**	.40
PRS8	**.32**	-.08	DRS1	**.50**	.09
PRS2	.01	**.70**	CRS1	**.42**	.10
TRS2	.05	**.67**	CRS8	-.23	**.70**
TRS3	-.14	**.67**	DRS8	-.27	**.67**
PRS3	.02	**.60**	DRS6	.10	**.66**
TRS4	.03	**.37**	CRS6	.15	**.63**
TRS6	.17	.17	DRS4	.23	**.54**
--	--	**--**	CRS4	.12	**.52**
Eigenvalue	2.82	1.87		3.23	20.23
%Variance	17.63	11.71		2.34	14.65
Factor 1	1	.18		1	.15
Factor 2	--	1		--	1

Note. PRS = Positive Reaction to Story; TRS = Trustful Reaction to Story; DRS = Disruptive Reaction to Story; ARS/CRS = Contradictory Reaction to Story. Item loads lower than .30 over all factors have been excluded.

refer to positive interactions in rivalry and jealous situations. In this factor there was no specific type of predominant interactions. The Kaiser-Meyer-Olkin measure of sampling adequacy was .51, and the Barlett test of sphericity was $\chi 2$ (496) = 1414.87, $p < .0000$.

Finally, two factors were extracted from the negative child-attachment figure interactions. Factor 1d, Rivalry Interaction, including negative interactions to rivalry and abandonment situations, that groups disruptive and contradictory or ambivalent interactions over rivalry and abandon situations; and Factor 2d, Pro-arousal Interaction, that groups negative interactions to threatening situations including disruptive and contradictory child-adult interactions from delayed reunion, fear and pain situations. For this analysis, the Kaiser-Meyer-Olkin measure of sampling adequacy was .52, and the Barlett test of sphericity was $\chi 2$ (120) = 1368, $p < .0000$.

The eigenvalues of factors and the percentage of its explained variance are included in the tables. No significant inter-correlations were found for one factorial structure except for the positive interaction´s structure. This suggests the relative independence of factors for the negative reactions´ structure, for the positive reactions´ structure, and the negative interactions´ structure. However, the Empathic Interaction factor showed a moderate correlation with the other positive interaction factors (Trustful Interaction, Positive Interaction). This might indicate a higher second order structure for the three positive interaction´s factors.´

Table 2

Structure matrix or child-figure attachment interactions (Principal component analysis with varimax rotation of Child-figure interactions)

	Positive interactions				Negative interactions	
	Factor 1c	Factor 2c	Factor 3c		Factor 1d	Factor 2d
FIS8	**.72**	-.25	.14	DIS2	**.74**	.02
FIS5	**.62**	.31	-.19	CIS2	**.71**	-.08
PIS8	**.56**	-.16	.19	DIS1	**.61**	-.06
PIS5	**.54**	.28	-.20	DIS7	**.60**	-.12
TIS8	**.50**	-.03	-.02	CIS1	**.58**	.03
EIS3	**.49**	.00	.10	CIS7	**.50**	-.05
EIS1	**.48**	.43	.19	DIS3	**.44**	.20
EIS8	**.44**	-.13	.01	DIS4	**.43**	.19
EIS4	**.42**	.00	.07	CIS3	**.42**	.22
FIS4	**.39**	-.02	.18	CIS4	**.42**	.23
TIS5	**.37**	.13	-.01	CIS6	.10	**.69**
EIS5	**.36**	.20	.10	DIS6	.13	**.68**
FIS3	**.36**	.30	.16	CIS8	-.05	**.64**
FIS6	.06	**.62**	-.16	CIS5	.09	**.63**
FIS1	.42	**.61**	.15	DIS8	-.06	**.62**
PIS6	-.15	**.60**	-.21	DIS5	.08	**.61**
TIS1	.05	**.57**	.22	--	--	--
TIS6	.14	**.53**	.03	--	--	--
PIS1	.28	**.53**	.08	--	--	--
TIS4	-.08	**.44**	.14	--	--	--
TIS3	.04	**.43**	.03	--	--	--
PIS3	-.12	**.37**	.02	--	--	--
FIS7	.14	.01	**.81**	--	--	--
PIS7	.12	-.00	**.74**	--	--	--
TIS7	.12	-.00	**.72**	--	--	--
PIS2	.00	.26	**.55**	--	--	--
FIS2	-.03	.27	**.54**	--	--	--
TIS2	.15	.21	**.35**	--	--	--
EIS7	.14	-.05	**.30**	--	--	--
EIS2	-.13	-.16	**.30**	--	--	--
Eigenvalue	4.85	2.83	2.52		3.47	2.46
% variance	15.17	8.86	24.04		21.74	15.41
Factor 1	1	.23*	.25*	Factor 1	1	.14
Factor 2	--	1	.18	Factor 2	--	1
Factor 3	--	--	1	--	--	--

Note. Item loads lower than .30 over all factors have been excluded; EIS = Empathic Interaction to Story; FIS = Friendly Interaction to Story; PIS = Positive Interaction to Story; TIS = Trustful Interaction to Story; DIS = Disruptive Interaction to Story; CIS = Contradictory Interaction to Story.
*p <.05.

Table 3

Basic psychometric properties of factors

	Mean	SD	Cronbach's α	Mean Discrepancy
A. Positive Reactions				
F1a-Positive Reaction	11.57	3.96	.64	.36
F2a-Trustful Reaction	8.92	3.45	.57	.38
B. Negative Reactions				
F1b-Negative Reaction	10.58	4.37	.73	.43
F2b-Mistrustful Reaction	3.72	2.43	.71	.36
C. Positive Interactions				
F1c-Empathic Int.	12.80	4.27	.73	.37
F2c-Trustful Int.	11.81	4.02	.69	.40
F3c-Positive Int.	4.45	2.99	.69	.44
D. Negative Interactions				
F1d-Rivalry Int.	18.34	6.67	.75	.41
F2d-Pro arousal Int.	5.89	3.06	.74	.48

Note. F = factor; int. = interaction.

Basic psychometric characteristics

Table 3 shows the basic psychometric properties of the factors for the different factorial structures.

The internal consistency coefficients, as measured by Cronbach's alpha, varied between .57 (Trustful Reaction) and .75 (Rivalry Interaction). Most of these alphas rounded to .70. The average discrepancy (item-factor correlation) varied between the .36 and .48.

Inter-rater reliability

To determine inter-rater reliability the percentage of agreement between testers was calculated for each item of the factor on 19 subjects of the general sample and 15 subjects of the social risk sample. Percentages of agreement on the items range from 62.83 % to 97.14 %. The global percentage of agreement was on the clinical sample 87.74 %, and on the risk sample 70%.

Evidences of external validity

In order to obtain evidences of validity we analyze correlations between attachment factors and different dimensions of children´s psychological adjustment. Particularly, relations between children´s behavioral problems and attachment factors were explored (Table 4).

Correlation analysis showed that positive reactions and positive interactions were negatively related to children´s behavioral problems. On the other hand, negative reactions and negative interactions were positively related to children´s problems. It was true for the general sample, the risk sample and the clinical sample.

It is interesting to notice that the attachment problems were more (mainly) related to internalized problems (i.e., withdrawn/depression, somatic complaints, thought problems) in the general and clinical samples. However in the risk sample, the attachment problems were more associated to externalized problems (i.e., rule breaking behavior, aggressive behavior, externalizing behavior). The factors associated with a higher number of children´s behavioral problems were: The Mistrustful Reaction in the general sample; the Rilvary Interaction in the risk sample; and the Pro-arousal Interaction in the clinical sample. In addition, the factor Empathic Interaction was not significantly related to any kind of children´s behavioral problems.

We also analyzed relations between the children´s perceived parental acceptance-rejection (as a measure of the quality of parent-child relationship) and attachment factors in the general sample. These relations were explored

Table 4

Pearson´s correlations between children´s behavioral problems and attachment factors

		Positive reactions		Negative reactions		Positive interactions			Negative interactions	
CBCL		F1a	F2a	F1b	F2b	F1c	F2c	F3c	F1d	F2d
	a	-.01	.00	.11	-.16	.03	08	.18	.13	-.01
Anxious/Depressed	b	.00	-.36	45	-.00	-.04	-.52	-.17	.58*	.03
	c	-.31	-.14	.30	.33	-.05	-.12	-.25	.28	65**
	a	.02	.02	.03	-.24*	.12	.05	.20*	-.01	-.09
Withdrawn/Depressed	b	.53	.53	-.07	-.25	-.41	-.38	.14	-.04	-.48
	c	-.26	-.31	.27	.45	-.06	-.25	-.03	.33	.70**
	a	-.12	-.11	-.00	-.20*	-.02	.03	.11	-.03	-.16
Somatic Complaints	b	-.56*	-.28	.25	-.00	-.22	.02	-.15	.29	.03
	c	-.16	-.06	.19	.38	.01	.02	-.01	.08	.48*
	a	-.01	-.10	.21*	-.13	.02	-.03	.12	.18	-.02
Social Problems	b	.07	-.11	.39	-.23	-.40	-.35	.05	.54	-.08
	c	-.44	-.10	.29	.33	-.05	-.14	-.36	.11	.63**
	a	-.13	-.09	.17	-.20*	-.06	.02	.14	.11	-.13
Thought Problems	b	-.06	-.53	.50	-.08	-.43	-.44	-.15	.55*	-.11
	c	-.12	-.12	.21	.06	-.46	-.15	.04	.22	.38
	a	-.04	-.11	.17	-.06	.02	.00	.03	.23*	.04
Attention Problems	b	-.17	-.18	.41	.69**	-.41	-.34	-.10	.51	.54
	c	-.32	-.44	.09	.53*	-.27	-.40	-.25	.21	.62**
	a	-.04	-.21*	.07	-.05	-.05	-.07	.13	.04	-.06
Rule-Breaking Behavior	b	-.35	-.14	.63*	.24	-.54	-.22	-.29	.60*	.31
	c	-.33	-.34	-.37	-.02	-.06	-.15	-.02	-.03	.34
	a	-.17	-.15	.06	-.07	-.11	-.21	.03	.10	-.01
Aggressive Behavior	b	-.04	-.44	.38	.12	.04	-.61*	-.25	.47	.25
	c	-.21	-.30	.11	.42	.04	-.18	-.29	.32	.51*
	a	-.04	-.03	.07	-.23*	.05	.07	.21*	.05	-.09
Internalizing Scale	b	-.11	-.41	.32	-.09	-.46	-.36	-.11	.41	-.12
	c	-.24	-.18	.22	.33	-.14	-.11	-.10	.20	.69**
	a	-.14	-.18	.07	-.07	-.10	-.18	.07	.09	-.03
Externalizing Scale	b	-.18	-.44	.59*	.21	-.18	-.61*	-.34	.66*	.35
	c	-.38	-.37	-.05	.27	-.00	-.31	-.40	.27	.45
	a	-.09	-.16	.15	-.17	-.02	-.02	.12	.16	.05
Total	b	-.09	-.43	.55*	.06	-.42	-.52	-.18	.65*	.10
	c	-.38	-.31	.21	.37	-.16	-.25	-.28	.33	.71**

Note. a = general sample; b = risk/maltreated sample; c = clinical sample; F1a = Positive Reaction; F2a = Trustful Reaction; F1b = Negative Reaction; F2b = Mistrustful Reaction; F1c = Empathic Interaction; F2c = Trustful Interaction; F3c = Positive Interaction; F1d = Rivalry Interaction; F2d=Pro arousal Interaction.
*$p < .05$
** $p < .01$

separately for the children´s report and for the parent´s report about the parent-child relationships. According to the children´s report, Positive Reaction significantly ($p < .05$) and negatively correlated with maternal hostility (*rxy* = -.25), maternal indifference/neglect (*rxy* = -.24), undifference rejection (*rxy* = -.22) and the total rejection score (*rxy* = -.28). Regarding the father´s questions, Positive Reaction was significantly related with paternal warmth (*rxy* = .24), Trustful Interaction was associated with paternal hostility/aggression (*rxy* = -.34), and negative interactions; Rivalry Interaction and Pro-arousal Interaction were

respectively correlated with overcontrol (*rxy* = -.28; *rxy* = -.23).

Similar results were found considering the parent´s reports. According to the mothers´ answers, Positive Reaction was significantly ($p < .05$) correlated to maternal undifferentiated rejection (*rxy* = -.26) and Trustful Reaction was significantly associated with maternal hostility (*rxy* = -.24); Negative Reaction was related to both maternal hostility (*rxy* = .21) and maternal undifferentiated rejection (*rxy* = .29); Positive Interaction was associated to maternal hostility (*rxy* = -.21) and maternal indifference/neglect (*rxy* = .29); finally, Rivalry Interaction was correlated to maternal hostility (*rxy* = .30) and maternal total rejection (*rxy* = .21). According to the fathers´ answers, only two correlations were significant ($p < .05$): Trustful Reaction with paternal indifference/neglect (*rxy* = .35), and Rivalry Interaction with paternal warmth (*rxy* = -.23).

More evidence of construct validity was provided by tests that use the independent samples t-test as well as the effect size by Cohen´s d. The mean differences between groups, general versus clinical, and general versus risk-maltreated (see Table 5), were also analyzed for each factor of attachment. A t-Student with a bootstrap confidence interval (95%) based on 5,000 bootstrap samples were conducted to test the group differences. As you can see in the Table 5, the clinical group showed significantly lower levels of positive reactions (Positive Reaction, Trustful Reaction) and interactions (Empathic Interaction, Trustful Interaction, Positive Interaction), as well as higher levels of negative reactions (Negative Reaction, Mistrustful Reaction) and negative interactions (Rivalry Interaction) than the general group. Likewise, we found significantly lower levels of positive reaction (Positive Reaction, Trustful Reaction) and positive interactions (Trustful Interaction, Positive Interaction) in the risk-maltreated group compared to the general group. On the other hand, risk-maltreated group showed higher levels of Negative Reaction and Rivalry Interaction.

Table 5

Mean differences between groups in the attachment factors

		M	(*SD*)	*t*	*d*		*M*	(*SD*)	*t*	*d*
Positive React.	Clinical-G	5.58	(3.50)	-5.80**	-1.88	Risk-G	2.31	(1.60)	-2.38*	-0.93
	General-G	12.79	(4.13)			General-G	4.00	(2.00)		
Trusful React.	Clinical-G	4.84	(2.29)	-5.14**	-1.67	Risk-G	4.92	(2.98)	-0.13	-0.05
	General-G	9.89	(3.61)			General-G	5.08	(2.62)		
Negative React.	Clinical-G	14.21	(4.10)	2.93**	0.95	Risk-G	6.85	(4.45)	2.31*	0.91
	General-G	10.11	(4.52)			General-G	3.46	(2.81)		
Mistrusful React.	Clinical-G	4.32	(2.49)	1.75	0.57	Risk-G	3.85	(1.81)	1.67	0.66
	General-G	3.05	(1.90)			General-G	2.46	(2.36)		
Empathic Int.	Clinical-G	9.63	(3.71)	-3.12**	-1.01	Risk-G	5.38	(3.04)	1.52	0.59
	General-G	13.95	(4.73)			General-G	3.77	(2.31)		
Trustful Int.	Clinical-G	8.37	(3.33)	-3.95**	-1.28	Risk-G	4.31	(2.35)	0.12	0.05
	General-G	13.95	(5.15)			General-G	4.15	(3.65)		
Positive Int.	Clinical-G	2.26	(2.05)	-3.91**	-1.26	Risk-G	1.46	(1.33)	-0.55	-0.22
	General-G	5.68	(3.21)			General-G	1.77	(1.48)		
Rivalry Int.	Clinical-G	21.89	(7.43)	2.46*	0.79	Risk-G	15.23	(8.48)	3.22**	1.26
	General-G	16.42	(6.22)			General-G	6.62	(4.53)		
Pro-arousal Int.	Clinical-G	6.95	(4.87)	1.18	0.38	Risk-G	7.77	(2.92)	4.62**	1.81
	General-G	5.37	(3.18)			General-G	2.77	(2.58)		

Note. React. = reaction; int. = interaction; G = group; M = mean; SD = standard deviation; *t*-Student has been conducted with a bootstrap confidence interval (95%) based on 5.000 samples.

*p <.05

**p <.01

Discussion

The structure of the EAN based on a sample of Spanish children demonstrates a factor structure that is psychometrically valid and conceptually compatible with previous studies on attachment measures (e.g., Target et al., 2003). The present findings reveal a multi-internal structure organized in two parts: children´s reactions and child-attachment figure interactions. Four factors were identified in the first part from children´s reactions, two positive (Positive Reaction and Trustful Reaction) and two negative reactions (Negative Reaction and Mistrustful Reaction); and five factors in the second part, three factors from the positive interactions (Empathetic Interaction, Trustful Interaction, Positive Interaction) and three factors from the negative interactions (Rivalry Interaction and Pro-arousal Interaction). Each group of factors was obtained from a different factor analysis.

Positive reactions (Trustful Reaction and Positive Reaction factors) reveal the trust and confidence of a child´s response to threatening situations including positive attributions and positive expectations. By the contrary, negative reactions (Mistrustful Reaction and Negative Reaction factors) show the child´s tendency to behave in a mistrustful and negative way (i.e., showing disruptive behaviors, negative emotions) to the stressful situations. Regarding interaction factors, the positive interactions (Empathetic Interaction, Trustful Interaction and Positive Interaction) were related to the friendly, sensitive, empathetic child-attachment figure relationship in the threatening situations; and the negative interactions (Mistrustful Interaction and Negative Interaction) were associated with disruptive, aggressive, hostile, and frightening child-attachment figure relationships.

This new structure is consistent with two basic and broad structures of attachment, secure and insecure (e.g., Ainsworth et al., 1978; Van Ijzendoorn & Kroonenberg, 1998). High positive signs and low negative signs of attachment dimensions (children´s reactions and child-attachment figure interactions) are compatible with a secure attachment structure; on the other hand, low positive signs and high negative signs of attachment dimensions indicate a possible insecure attachment.

Evidences of Validity and reliability

Correlations between children´s behavioral problems (externalizing and internalizing) and attachment dimensions, as well as the differences between children from the general population and risk/maltreated children or clinical children (criterial groups) provided strong evidence of construct validity. Regarding children´s behavioral problems, the more negative reactions and interactions children showed to the threatening stories, the more externalizing and internalizing behavioral problems children had. Similarly, the more positive reactions and interactions children reported to the stories, the less behavioral problems children had. These significant relations were found for all samples (general, risk/maltreated and clinical). However, attachment problems were mainly associated with internalized problems in the general and clinical samples, and the externalized problems were mainly associated with the attachment problems in the risk (e.g., Finzi, Cohen, Sapir, & Weizman 2000). A possible explanation for these results is that children who have been abandoned or whose parents are negligent tend to show more disruptive behaviors and conduct problems because of socializations deficits (i.e., lack of parental supervision or monitoring, poor control).

Furthermore, interaction problems in jealous, competitiveness or abandonment situations (Rivalry interaction factor) were associated with a higher number of behavioral problems among risk/maltreated children. Among clinical children, frightening situations (i.e., pain, fear) were associated with more behavioral problems. Finally, among children from the general population, mistrustful reaction in the delayed or abandon-reunion situations was the dimension associated with more behavioral problems. This suggests how sensitive children may be to specific kinds of threatening situations depending on their affective antecedents and biography.

Consistently with Gracia, Lila, and Musitu (2005), relations between the children´s perceived maternal and paternal acceptance-rejection (children and parents´ reports) and attachment factors in the general sample showed children´s perceived parental love and warmth was related to the children´s secure attachment and positives personal and social attitudes.

Concerning the differences between groups in the attachment dimensions, children from the clinical (i.e., all factors except for pro-arousal) and risk-maltreated samples (i.e., positive and negative reactions, rivalry and pro-arousal interactions) tended to show lower levels of secure- attachment signs and higher levels of insecure-attachment sings. It is consistent with previous studies that find a higher proportion of insecure-attachment in risky populations (e.g., Dienner & Kim, 2004; Moore & Pepler, 2006) and more signs of insecure mental representations (e.g., Nowacki & Schoelmerich, 2010).

In terms of reliability, although the reliability of tests with a situational base tends to show a lower reliability (Picard, Allsopp, & Campbell, 2012), all the scales of EAN demonstrated adequate internal consistency, with the majority of values being close to or greater than .70. The inter-judge reliability was also acceptable.

This study has some limitations that should be considered. First, we acknowledge the absence of test-retest measures to estimate the stability of the results and the evolution of the dimensions over time. In addition, our analyses were based solely on information provided by self-reports (children and parents or caregivers) without comparisons with naturalistic observation measures. However, the evaluation by story-telling interview has demonstrated good reliability and tends to be highly correlated with other measures of security (e.g., Granot & Mayseless, 2001; Kerns et al., 2000). Future research with children should attempt to address these aspects.

In conclusion, this analysis of the structure of the Spanish EAN reveals a comprehensive structure of the children´s attachment representations based on the children´s reactions and child-figure attachment interactions through different everyday stories. This instrument provides a measure of the internal working model that allows us to explore the quality of child-attachment figure relationships in different threatening situations. The results from these inputs could help us to prevent future psychological problems. The strong reliability, fundamental consistency and the net of significant relations with different criterial groups of children, children´s psychological problems, and perceived parental acceptance-rejection indicate good construct validity.

Referencias

Achenbach, T. M. & Edelbrock, C. (1993). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. Burlington, VT.: Department of Psychiatry, University of Vermont.

Ainsworth, M., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of Attachment: A Psychological Study of the Strange Situation*. Oxford: Lawrence Erlbaum.

Bowlby, J. (1973). *Attachment and Loss: Vol. 2: Separation*. New York: Basic Books.

Cattell, R. B. (1966). *Handbook of Multivariate experimental psychology*. Chicago, IL: Rand McNally.

Diener, M. & Kim, D. Y. (2004). Maternal and child Predictors of Children's social competence. *Journal of Applied Developmental Psychology, 25*, 3-24. https://doi.org/10.1016/j.appdev.2003.11.006

Finzi, R. Cohen, O., Sapir, Y., & Weizman, A. (2000). Attachment Styles in maltreated children: a comparative study. *Child Psychiatry and Human Development, 31,* 113-128. https://doi.org/10.1023/a:1001944509409

Fraley, R. C. & Spieker, S. J. (2003). Are Infant Attachment Patterns Continuously or Categorically Distributed? A Taxometric Analysis of Strange Situation Behavior. *Developmental Psychology, 39,* 387-404. https://doi.org/10.1037/0012-1649.39.3.387

Gracia, E., Lila, M., & Musitu, G. (2005). Rechazo parental y ajuste psicológico y social de los hijos [Parental Rejection and Children's Psychological and Social Adjustment]. *Salud Mental, 28*, 73-81.

Granot, D. & Mayseless, O. (2001). Attachment Security and Adjustment to School in Middle Childhood. *International Journal of Behavioral Development,*

25, 530-541. https://doi.org/10.1080/01650250042000366

IBM Corp. (2011). *IBM SPSS Statistics for Windows, Version 19.0.* Armonk, NY: IBM Corp.

Kaiser, H. F. (1961). A note on Guttman´s Lower Bound for the Number of Common Factors. *British Journal of Statistical Psychology, 14*, 1-2. https://doi.org/10.1111/j.2044-8317.1961.tb00061.x

Kerns, K., Tomich, P., Aspelmeier, K., & Contreras, J. (2000). Attachment-Based Assessment of Parent-child Relationxhips in Middle Childhood. *Developmental Psychology, 36,* 614-626. https://doi.org/10.1037/0012-1649.36.5.614

Moore, T. E. & Pepler, D. J. (2006). Wounding words: Maternal verbal aggression and children's adjustment. *Journal of Family Violence, 21,* 89-93. https://doi.org/10.1007/s10896-005-9007-x

Nowacki, K. & Schoelmerich, A. (2010). Growing up in Foster Families or Institutions: Attachment Representation and Psychological Adjustment of Young Adults. *Attachment & Human Development, 12,* 551-566. https://doi.org/10.1080/14616734.2010.504547

Picard, O., Allsopp, G., & Campbell, L. (2012). *Foundation Programme. 250 SJTs (Situational Judgement Test Questions) for foundation year entry*. London, UK: ISC Medical.

Rohner, R. P. (2005). Parental acceptance-rejection questionnaire (PARQ): Test Manual. In R. P. Rohner & A. Khaleque (Eds.), *Handbook for the study of parental acceptance and rejection* (4th ed., pp. 43-106). Storrs, CT: Rohner Research Publications.

Sierra, P., Carrasco, M. A., Moya, J. J., & Del Valle, C. (2009, October). *The children attachment interview by evocative stories supported with pictures. Exploratory study of a new method to assess attachment in children.* International Attachment Network. IAN Iberoamericana, Madrid, Spain.

Sierra, P., Carrasco, M. A., Moya, J. J., & Del Valle, C. (2011). Entrevista de Apego para Niños (EAN). Un estudio exploratorio de un nuevo instrumento de evaluación del apego en niños de 3 a 7 años [Child Attachment Interview (EAN): Exploratory study of a New Method to Assess Attachment in Children from 3 to 7 years]. *Acción Psicológica, 8*(2), 39-53. https://doi.org/10.5944/ap.8.2.189

Target, M., Fonagy, P., & Schmueli-Goetz, Y. (2003). Attachment Representations in School-Age Children: The Development of the Child Attachment Interview (CAI). *Journal of Child Psychotherapy 29*, 171-186. https://doi.org/10.1080/0075417031000138433

Van Ijzendoorn, M. H. & Kroonenberg, P. M. (1988). Cross-cultural Patterns of Attachment: A Meta-Analyses of Strange Situation. *Child Development, 59,* 147-156. https://doi.org/10.1111/j.1467-8624.1988.tb03202.x