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Interpersonal Problem-Solving Skills, Executive Function and Learning Potential in Preadolescents with High/Low Family Risk

Sara Mata, M. Mar Gómez-Pérez, Clara Molinero and M. Dolores Calero

Universidad de Granada (Spain)

Abstract. Situations generated by high family risk have a negative effect on personal development, especially during preadolescence. Growing up in the presence of risk factors can lead to negative consequences on mental health or on school performance. The objective of this study focuses on individual factors related to this phenomenon during preadolescence. Specifically, we seek to establish whether level of family risk (high vs. low risk) is related to interpersonal problem-solving skills, executive function and learning potential in a sample of preadolescents controlling age, sex, total IQ, verbal comprehension ability and the classroom influences. The participants were 40 children, 23 boys and 17 girls between the ages of 7 and 12, twenty of which had a record on file with the Social and Childhood Protection Services of Information deleted to maintain the integrity of the review process, and therefore, a high family risk situation. The other 20 participants had a low family risk situation. Results show that the preadolescents from high family risk performed worse on interpersonal solving-problem skills and executive function ($p < .05$, b from –119,201.81 to 132,199.43, confidence interval from –162,589.78/–75,813.8 to 84,403.05/179,995.8). Nevertheless, they showed the same ability to learn as the participants from low family risk. These results highlight the negative effects of high family risk situation in preadolescents and give value of taking into account protective factors such as learning potential when assessing preadolescents from high family risk.

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The period from childhood to adolescence entails large changes occurring in a relatively short period of time. These changes generate the development of different areas (cognitive, affective and social). Consequently, pre-adolescence is a critical period when individuals are more vulnerable to contextual risk factors to which they are exposed, since they lack the active resources to face issues associated with social situations. There are several risk factors, especially related with the family context, which may have a negative impact on the process of development of these abilities at this stage (Bäckman & Nilson, 2011; De Carlo, Wadsworth, & Stump, 2011).

On one hand, early childhood has generated interest in how different processes and skills are developed, and what factors affect this development. Adolescence has also been the focus of many studies, due to its key elements (search for identity, development of affective relationships outside the family, risk behaviors, influence from the environment, etc.). Nevertheless, the present study places its focus on pre-adolescence, due to the limited number of existing studies that address this stage, analyzing how interpersonal problem-solving skills, executive functions and learning potential relate to the level of family risk (high. vs. low family risk).

The family risk factors that are most emphasized in the literature are: single-parent family, social isolation, parents' personal history and characteristics (psychopathology), domestic violence, little or no schooling, inadequate nutrition, unemployment/low-income, sub-standard housing, poor health, lack of social services, alcohol/drug use, etc. (Bäckman & Nilson, 2011; Whittaker, Harden, See, Meisch, & Westbrook, 2011).

Correspondence concerning this article should be addressed to Sara Mata. Personality, Assessment and Treatment Department. Universidad de Granada. Campus Cartuja s/n. 18071. Granada (Spain). Phone: +34–680904650.

E-mail: saramata@ugr.es

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Growing up in the presence of risk factors can lead to negative consequences in mental health: emotional problems, hyperactivity, behavior problems, social incompetence or deficit in interpersonal problem-solving skills (Bornstein, Hahn, & Haynes, 2010; De Carlo et al., 2011; Yoshikawa, Aber, & Beardslee, 2012). Another dimension negatively affected by this situation is school performance: absenteeism, delayed executive function, learning problems, poor academic performance, little parental involvement in the educational process and school dropout (Bäckman, & Nilson, 2011; Mistry, Benner, Biesanz, Clark, & Howes, 2010; Whittaker et al., 2011).

Given the impossibility of analyzing in a single study all the variables affected by a high family risk context, this article focuses on interpersonal problem-solving skills, executive function and learning potential, because there are some previous studies that have shown a relationship between them (Arán-Filippetti & Richaud de Minzi, 2011; Ison & Morelato, 2002; Martin, Stack, Serbin, Schwartzman, & Ledingham, 2012; Sarsour et al., 2011; Young & Widom, 2014).

Interpersonal problem-solving skills refers to a set of basic processes that collect information about other people, comprehend it, interact with it and resolve problems, seeking out a valid solution for all the subjects involved (Chang, D´Zurilla, & Sanna, 2009; D´Zurilla & Nezu, 2010). Skills that have been identified as determining factors in interpersonal problem-solving are emotion recognition (the ability to perceive changes in others, which allows one to detect emotional information through verbal and non-verbal clues and to understand the emotions involved in the interpersonal problem Young & Widom, 2014), attribution of causes (which implies that the individual has to collect information carefully and systematically in order to define and formulate the problem), generating alternative solutions for a single problem and anticipating their consequences (being realistic about his/her goals in relation to his/her resources), assessing each alternative solution between them and determining how it will affect the rest of the people involved (Chang, D´Zurilla, & Sanna, 2009; Leshner, Tom, & Kern, 2013; Youngstrom et al., 2000). Although there is not much bibliography on this topic, some authors have shown a possible relationship between growing up in a high family risk environment and the presence of deficits in interpersonal problem-solving skills when compared to others not in that situation. For instance, in relation to emotion recognition Young and Widom (2014) showed a negative impact of child abuse and neglect on emotion processing. Thus, childhood abuse and neglect significantly predicted overall facial emotion recognition accuracy indicating that individuals with a history of childhood abuse/neglect were less accurate in recognizing positive and neutral pictures than those without a history of childhood abuse/neglect. Others authors such as Pollack, Cicchetti, Klorman, and Brumaghim (1997) found that mistreated children were superior to non-mistreated children (age from 7 to 11 years old) in recognizing a negative emotion (anger), as opposed to a positive emotion (happiness) using Ekman slides (Ekman & Friesen, 1976). Leist and Dadds (2009) found similar results with mistreated adolescents showing improved fear and sadness recognition as levels of mistreatment increased ($r = .39$, $p < .05$). For their part, Ison and Morelato (2002) showed that children (from 5 to 7 years old) living in families with high risk underperformed in the ability to define and identify the social problem, generating alternative solutions and anticipating their consequences in comparison with children from families without risk. In turn, Martin et al. (2012) showed that maternal childhood histories of aggression and withdrawal predicted poor solutions to social problems in their pre-adolescent children.

Executive functions, for their part, can be defined as neuropsychological processes that include the ability to plan, monitor performance, resistance to interference from irrelevant stimuli (or inhibitory control), cognitive and behavior flexibility, selective attention and working memory (Montgomery, Stoesz, & McCrimmon, 2013). The pre-frontal cortex constitutes the neural substrate of these functions, and one of their greatest developments occurs during the transition from childhood to adolescence, between 6 and 12 years of age (Andersen, 2003). At the same time, there seems to be a relationship between deficient executive functions and belonging to high risk families. To be precise, Sarsour et al. (2011) demonstrated that inequalities in family socio-economic status and home environments were associated with inequalities in pre-adolescents' executive functions. Specifically, those authors showed how single parent and low family socio-economic status were interactively associated with an underperformance of pre-adolescents' inhibitory control and cognitive flexibility. Arán-Filippetti and Richaud de Minzi (2011) found that children living in a context of poverty were more impulsive and obtained worse results in planning than a control group without risk.

In this study, we also analyze learning potential, which may act as a protective factor. Learning potential assessment is an evaluation methodology which has an interactive nature, since a brief training is inserted into the test situation itself. Through a pretest-training-posttest format, this methodology allows us to determine how the person under assessment profits from assistance offered by the assessor and how this assistance improves his or her execution, also taking into account non-intellectual variables that affect performance such

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as motivation, interactivity, etc. (Haywood, 2012; Tzuriel, 2013). One of the greatest advantages of this procedure, as compared to traditional assessment techniques, is that it does not focus on previously acquired knowledge but rather on the subject's ability to learn. This construct is seldom assessed or taken into account when addressing minority groups. Nonetheless, previous research has determined that subjects with low socio-economic status, ethnic minorities and immigrants show lower levels of performance on traditional assessment tests, as in the case of intelligence and aptitude tests, due to construct and content subjectivity in the test, a lack of familiarity with assessment instruments, differences in social interaction styles, and a lack of representation of these populations in test normative data (Haywood & Lidz, 2007; Schölmerich, Leyendecker, Citlak, Caspar, & Jäkel, 2008). By contrast, assessment of learning potential is more objective in its estimation of the real abilities of these groups (Calero, Fernández-Parra et al., 2013; Calero, Mata et al., 2013; Wiedl, Mata, Waldorf, & Calero, 2014).

For these reasons, the objective of this study is to establish whether level of family risk (high *vs.* low risk) is related to interpersonal problem-solving skills, executive function and learning potential in a sample of pre-adolescents. The specific hypotheses are:

High family risk will significantly predict performance level on tests related to interpersonal problem-solving skills. Pre-adolescents from the high family risk group will show poorer results than those in the low family risk group in the recognition of positive emotions but better in the case of negative emotions. Pre-adolescents from the high family risk group will also show poorer results than those in the low family risk group in skills in the solution of interpersonal problems.

High family risk will significantly predict performance level in tests related to executive function. Preadolescents from the high family risk group will show poorer results than those in the low family risk group.

High family risk will not predict learning potential. Both groups will show similar ability to learn.

Method

Participants

A total of 40 children between the ages of 7 and 12 (M_{age} = 9.47, *SD* = 1.52) participated in this study. Of these, 23 (57.5%) were male and 17 (42.5%) were female. All participants were enrolled in primary education at the la Salle school *Information deleted to maintain the integrity of the review process*.

The participants were differentiated by whether they were associated with high family risk, determined by having a record on file with the Social and Childhood Protection Services of *Information deleted to maintain the integrity of the review process*, where social workers had investigated the families using the Child Well-Being Scales (Magura & Moses, 1986). The school administration team selected the participants according to their knowledge of the existence of such a social record. Thus, children were selected because they experienced a situation of high family risk (the social record was active at the time of data collection). The social record determined high family risk by consideration of parental role performance, family capacities and child role performance. None of the children had a social record on account of school dropout. Once the participants for the group with a social record were identified (henceforth, high family risk group, HFR), another group of students without such a record and with low family risk (as identified by the school administration team) were selected to match the first group in age and gender (henceforth, low family risk group, LFR). The group was thus divided into 20 HFR and 20 LFR participants. Any indication of a disorder from the DSM-5 was set as an exclusion criterion.

At this elementary school there was only one class group at each grade level, and the subjects were distributed as follows: 15 pupils from third grade (7 from the HFR group and 8 from the LFR group), 11 fourth graders (6 from HFR and 5 from LFR), 4 fifth graders (2 from HFR group and 2 from LFR group) and 10 sixth graders (5 from HFR and 5 from LFR).

Instruments

Interpersonal problem-solving skills: Ekman 60 Faces test (Young, Perrett, Calder, Sprengelmeyr, & Ekman, 2002)

This is a computerized task to assess recognition of facial expressions. Photographic images are projected, showing faces that express the six basic emotions (anger, disgust, fear, happiness, sadness and surprise), intermingled with other photographs of faces with neutral expressions. The faces presented are from ten different people (6 women and 4 men): six images of each one. The images are presented at random for 5 seconds each, and the participant is required to indicate his/her impression of the emotion by pressing the corresponding key on the computer. This material for researching facial expression has been used and validated in several studies (Isaacowitz & Standley, 2011; Molinero, Bonete, Gómez-Pérez, & Calero, 2015; Prochnow, Brunheim, Steinhäuser, & Seitz, 2014; Young et al., 2002). Separate reliability values have been obtained for the emotion types (anger, disgust, fear, sadness and surprise) with adequate results ($\alpha < .001$) except for the happiness value, where scores produced a ceiling effect (Young et al., 2002). As for instrument validity, considering recognition rates for each of the

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60 photographs used as test items, there was a strong correlation between recognition rates from the study by Young et al. (2002) and recognition rates reported by Ekman and Friesen (1976) (quoted in Young et al., 2002) ($r = .81$, $t = 10.35$, $p < .001$) (see Young et al., 2002). In Spain, this test has been normalized and standardized for adolescents (11–18 year olds), with results similar to those of the original sample; Cronbach alpha for the entire sample was .97 (see Molinero et al., 2015). The Cronbach index is alpha = .80 for the test as a whole in the current sample of participants.

Evaluación de Solución de Conflictos Interpersonales (ESCI) [Assessment of Interpersonal Conflict Resolution] (Calero, García-Martín, Molinero, & Bonete, 2009)

This task consists of 17 sequences of sketches that represent an interpersonal conflict, shown on a computer monitor. The first four sketches show a single person, while the remaining sketches show two or more characters in a conflict situation. The participant is required to give written answers to the following questions: 1) How does the main character in the drawing feel? 2) Why does he/she feel this way? 3) What could he/she do to remedy this situation? The assessment provides a score for each construct: emotion, situational agreement and solutions. The instrument has been validated in a sample of adolescents (11–18 year olds) from Spain (Molinero, 2015). As for reliability, the Cronbach index is alpha = .90 for the test as a whole, and ranges from .69 to .91 for each area, while factor validity analysis revealed three main factors (emotion, situational agreement, solutions) and a single second-order factor. The test demonstrates adequate predictive validity for each factor (Molinero, 2015). The Cronbach index is alpha = .73 for the test as a whole in the current sample of participants.

Executive function and learning potential: Stroop: Color and Word test (Golden, 2006)

This test is applicable from ages 7 to 80, and consists of three tasks that assess resistance to interference, each with a duration of 45 seconds. The tasks are word reading (Stroop-W), where the subject must read the written names of colors; color naming (Stroop-C), where he or she must name the color of the typeface; and color-word (Stroop-CW), where they must name the color of the typeface, ignoring any conflict with the word meaning. An interference index is also obtained (Stroop-I) which assesses resistance to interference. Test-retest reliability is .89 for Stroop-W, .84 for Stroop-C, .73 for Stroop-CW and .70 for Stroop-I. The Cronbach index is alpha = .83 for the test as a whole in the current sample of participants.

Wisconsin Card Sorting Test-Learning Potential (WCST-LP) (Spanish adaptation by Calero, see, Wiedl, Schöttke, & Calero, 2001)

This is a learning potential test developed from the original version of the WCST. The original form is a neuropsychological task related to executive function components, such as planning, conceptual formation or behavior organization. This test was modified to include a brief training phase, and so be able to measure learning. Through a pretest-training-posttest format, this methodology allows us to determine how the person under assessment profits from assistance offered by the assessor and how this assistance improves his or her performance (Haywood, 2012). One of the greatest advantages of this procedure, as compared to traditional assessment techniques, is that it does not focus on previously acquired knowledge but rather on the subject's ability to learn.

The WCST-LP version uses a reduced format of 64 cards, the application includes three phases, each featuring the same 64 cards: pretest (following the standard instructions, where participants must infer the correct classification criterion: color, shape or number of objects), a brief training phase (during this phase the classification rules are explained; after each attempt, participants are informed as to whether their response was correct or not, and why; they are also informed as to the change in classification criterion and the cause) and posttest (based again on the original version, with no help). The complete assessment is carried out in one session. This test provides scores for the number of correct answers, the number of perseverations (persistence in an incorrect response to a criterion) and conceptual responses (comprehension of the classification principles in each test phase). The pretest-posttest difference provides gain scores that represent each participant's learning. Studies of dimensional indices of learning conclude that regression residuals offer certain clear advantages, favoring their application in learning potential assessment. Residual gain scores are calculated by regressing posttest performance on pretest performance; the residual gain scores on the WCST-LP have demonstrated high reliability and have proven to be predictive of functional outcome in clinical samples (Weingartz, Wiedl, & Watzke, 2008).

Control variable: Wechsler Intelligence Scale for Children-IV (WISC-IV) (Wechsler, 2005)

The scale consists of 15 subtests, 10 core tests and 5 supplemental, which assess the intellectual capacity of children between the ages of 6 and 16. Four indices are produced (Perceptual Reasoning, Verbal Comprehension, Working Memory and Processing Speed) and a whole-scale IQ score reflects the subject's general intelligence. Reliability in terms of internal consistency of the Spanish

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adaptation shows values between .72 and .95. Concurrent validity has been established through a correlation between the WISC-IV and the Raven Progressive Matrices, producing correlations between .31 and .61, depending on the indices, and .54 for the whole-scale IQ score (Wechsler, 2005). This study considers only the total IQ score and the Verbal Comprehension index as control variables. The Cronbach index is alpha = .71 for the test as a whole in the current sample of participants and alpha = .87 for the Verbal Comprehension index.

Procedure

First, we obtained permission from the Human Research Ethics Committee at the University of *Information deleted to maintain the integrity of the review process.* All the participants' parents gave their informed consent.

Each subject was assessed individually with the WISC-IV, the Stroop and the WCST-LP. One session lasting approximately 1¼ hour was used for the WISC-IV, and a second session of about 30–40 minutes to administer the Stroop and the WCST-LP. The Ekman and the ESCI were administered to the participants in a group session (approximately one hour), with no more than 6 children at a time. A counterbalancing method was used in the test presentation order. The assessors were not blind to the risk situation of the children.

Design and data analysis

We used a retrospective ex-post-facto design with two groups. The SPSS statistical package, version 18.0, was used for data analysis. In order to eliminate the influence of a shared classroom or other contextual variables, multilevel linear model analyses were applied with the group factor as independent variable (HFR *vs.* LFR), the class as a supra-level element, and age, sex, total IQ and score on the Verbal Comprehension Index as co-variables. Dependent variables were selected as a function of the hypotheses:

For the first hypothesis the dependent variables were scores from the Ekman and the ESCI.

For the second hypothesis the dependent variables were scores on the Stroop and pretest scores on the WCST-LP.

Regarding the final hypothesis the dependent variables were gain score on the WCST-LP (difference from pretest to posttest) and residual gains, both obtained from the number of correct answers.

There were no missing data for any participants.

Results

Interpersonal problem-solving skills

On the Ekman, results of the multilevel linear model show that high family risk significantly predicts recognition of sadness $F(1, 40) = 4.141$, $p = .049$, $b = –9{,}750.13$, $t(40) = –2.035$, $p = .049$; happiness $F(1, 16.27) = 6.984$, $p = .018$, $b = –18{,}709.82$, $t(16.27) = –2.643$, $p = .018$; surprise $F(1, 40.01) = 8.015$, $p = .007$, $b = –19{,}387.65$, $t(40.01) = –2.831$, $p = .007$; and disgust $F(1, 39.99) = 39.816$, $p = .0001$, $b = –25{,}364.42$, $t(39.99) = –6.310$, $p = .0001$. Mean scores show that the HFR group obtains lower scores than the LFR group in all cases, except for sadness, where the result is inverted. High family risk does not significantly predict results for fear or anger (see Table 1).

With regard to the ESCI, results from the multilevel linear model show that high family risk significantly predicts performance for emotions $F(1, 39.99) = 8.023$, $p = .007$, $b = 17{,}114.40$, $t(39.99) = –2.832$, $p = .007$; and causes $F(1, 29.33) = 4.407$, $p = .045$, $b = –27{,}897.11$, $t(29.33) = –2.009$, $p = .045$. Mean scores show that the HFR group obtains lower scores than LFR group in both cases. High family risk does not significantly predict results for solutions (see Table 1).

Executive function

On the Stroop, results from the multilevel linear model show that high family risk significantly predicts results on Stroop-W $F(1, 39.99) = 14.171$, $p = .001$, $b = 31{,}372.88$, $t(39.99) = 3.764$, $p = .001$; and Stroop-C $F(1, 39.92) = 11.439$, $p = .002$, $b = 29{,}697.80$, $t(39.92) = 3.382$, $p = .002$. Mean scores show that the HFR group obtains lower scores than LFR group in both cases. High family risk does not significantly predict results for Stroop-CW or for Stroop-I (see Table 1).

With regard to the data on executive function, assessed through the WCST-LP pretest, results from the multilevel linear model show that high family risk significantly predicts results for number of correct answers $F(1, 39.99) = 52.107$, $p = .0001$, $b = –114{,}191.78$, $t(39.99) = –7.218$, $p = .0001$; and number of conceptual responses $F(1, 29.09) = 31.564$, $p = .0001$, $b = –119{,}201.81$, $t(29.09) = –5.618$, $p = .0001$. Mean scores show that the HFR group obtains lower scores than LFR group in both cases. High family risk does not significantly predict results for the number of perseverations (see Table 1).

Learning potential

For learning potential, both gain scores (difference between pretest and posttest) and residual gain scores were taken into account in the multilevel linear model. Results show that high family risk significantly predicts gain score $F(1, 39.99) = 31.249$, $p = .0001$, $b = 132{,}199.43$, $t(39.99) = –5.590$, $p = .0001$, where the HFR group shows more benefit from the training phase than LFR group. However, high family risk does not significantly predict residual gain score (see Table 1).

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Table 1. *Multilevel Linear Model with Family Risk as a Factor, Classroom as a Supra-level and Age, Sex, Total IQ and Verbal Comprehension Index as Co-variables for Interpersonal Problem-solving Skills, Executive Function and Learning Potential*

		HFR group (n = 20)		LFR group (n = 20)						
		M	*SD*	*M*	*SD*	*F*	*P*	*b*	*SEb*	95%CI
					Interpersonal problem-solving skills					
Ekman	Anger	4.30	3.18	5.30	2.05	0.651	.43	–5,044.93	6,254.34	–17,796.23/7,706.37
	Disgust	3.95	3.35	5.95	2.42	39.816	.0001	–25,374.42	4,019.71	–33,488.60/–17,240.3
	Fear	2.90	2.73	2.10	1.77	0.204	.65	–1,361.54	3.015	–7,472.10/4,739.01
	Happiness	8.00	2.71	8.30	2.77	6.984	.018	–18,709.82	7,079.98	–33,698.03/–3,721.61
	Sadness	5.95	3.51	5.20	1.88	4.141	.049	–9,750.13	4,791.23	–19,433.53/–66.72
	Surprise	5.45	3.49	7.45	2.91	8.015	.007	–19,387.65	6.848	–33,227.87/–5,547.44
ESCI	Emotion	9.95	4.83	11.25	3.13	8.023	.007	17,114.40	6,042.18	4,902.67/29,326.13
	Situational agreement	28.50	8.36	33.60	4.69	4.407	.045	–27,897.11	13,289.26	–55,063.42/–730.81
	Solutions	5.25	3.51	8.45	2.72	2.249	.14	6,916.80	4,612.24	–2,404.90/16,238.51
					Executive function					
Stroop	Stroop-W	40.95	6.36	48.80	4.42	14.171	.001	31,372.88	8,334.14	14,528.93/48,216.85
	Stroop-C	42.70	6.67	48.50	4.75	11.439	.002	29,697.80	8,780.68	11,950.33/47,445.27
	Stroop-CW	40.50	7.10	47.10	4.55	1.006	.32	10,046.48	10,017.84	–10,200.37/30,293.35
	Stroop-I	45.80	5.77	47.55	4.50	3.187	.08	–15,671.95	8,778.77	–33,414.56/2,070.65
WCST-LP pretest	Correct answers	28.25	7.94	36.40	10.02	52.107	.0001	–114,191.78	15,819.32	–146,163.86/–82,219.7
	Number of Perseverations	18.85	13.81	15.60	12.52	0.884	.35	17,162.38	18,257.92	–19,738.43/54,063.21
	Conceptual responses	18.90	9.99	29.05	11.73	31.564	.0001	–119,201.81	21,217.08	–162,589.78/–75,813.8
					Learning potential					
WCST-LP	Gain score	24.90	8.86	14.25	12.24	31.249	.0001	132,199.43	23,648.94	84,403.05/179,995.8
	Residual gain score	1.17	4.73	–1.17	7.54	1.136	.29	15,899.81	14,918.42	–14,251.49/46,051.13

Note: HFR = High family risk; LFR = Low family risk.

Discussion

Considering the difficulties associated with growing up in high family risk contexts, as demonstrated in prior studies, our present objective was to establish whether the level of family risk (high vs. low risk) was related to interpersonal problem-solving skills, executive function and learning potential in a sample of pre-adolescents.

First, the results showed that HFR participants demonstrate less mastery of interpersonal problem-solving skills. Specifically, the ability to recognize and interpret emotions was observed to be negatively affected by this situation. Interestingly, the data reveal that despite the LFR preadolescents' better recognition of positive and neutral emotions, this tendency is inverted for sadness, where the HFR participants obtain better scores (although there is not a large difference between groups). These results are in line with Leist and Dadds (2009) who found a relationship between mistreatment and sadness and fear recognition but did not find the same pattern for anger recognition. Although we did not obtain a significant result for fear, the mean of HFR participants is bigger in the recognition of this negative emotion than for the LFR participants. In general, our results may reinforce the idea that growing up in a high family risk context hinders correct recognition of positive emotions, while it increases sensitivity to negative emotions, as in the case of sadness in this study (Leist & Dadds, 2009; Pollack et al., 1997; Young & Widom, 2014). In turn, preadolescents from the HFR group also had lower scores on other tasks related to interpersonal problem-solving skills, such as identifying the causes of the problems in comparison to LFR participants. These data concur in part with those found by Ison and Morelato (2002). However, our HFR participants did not show a poorer ability to generate alternative solutions in comparison with LFR participants, although again they obtain a lower mean in this ability when compared with LFR subjects. This fact might be determined by a methodological issue due to the limitations of the current study.

This study has also shown that a situation of high family risk may be related to the level of performance in executive function, specifically with the number of correct answers and conceptual responses in the pretest of the WCST-LP. These results can be considered of interest to the age group addressed here (ages 7–12), since this is one of the periods of greatest development for the neural structures that sustain executive functions (Andersen, 2013) and reinforce the idea that a high risk familial context may have a negative impact on the executive function development (Arán-Filippetti et al., 2011; Sarsour et al., 2011). Nonetheless, resistance to interference and perseveration do not seem to have been affected by the high family risk situation in this study. Future research studies should shed some light on this result.

However, a highlight of our investigation is a positive outlook that stems from our assessment of learning potential in the HFR participants. In spite of the poorer performance of preadolescents from the HFR group on tasks related to executive function, when a training phase is introduced into the test situation, their performance rises to match that of the LFR participants, showing that their capacity to learn remains intact. This fact is observable through the residual gains scores results. Thus, the differences found in the case of gain scores are an effect of the low performance of pre-adolescents from the HFR group on the pretest phase, allowing them an ample margin for gain, in comparison to preadolescents from the LFR group. Once this effect was corrected through residual scores, both groups were shown to profit equally from the training phase. These results concur with previous studies (Calero, Fernández-Parra et al., 2013; Calero, Mata et al., 2013; Wiedl et al., 2014) developed with ethnic minorities and immigrant children, populations that are also living in high risk contexts. These results have been consistent across the studies of learning potential methodology, positioning it as a complement to be taking into account in the assessment procedures of individuals at risk (see Haywood & Lidz, 2007).

All these results are especially interesting when we take into account the age range of the participants (not many studies address pre-adolescence and analyze these variables) and the fact that individual variables such as age, sex, total IQ and score on the Verbal Comprehension index were controlled as indicators of inter-individual differences. The distribution of participants in a real context (the class/grade) also creates a shared environment situation for both HFR and LFR participants (shared teachers, classmates, experiences), such that this control of a supra-level variable also allows us to attribute the differences between groups to family risk instead of shared classroom experiences.

Nevertheless, we would note several limitations of our study. Results of this study were obtained in a very local setting (students from a single school) and with a limited number of participants, affecting the statistical power and the ecological validity of the study. Furthermore, despite our knowledge of existing social records, we were unable to make direct contact with the children's families, who might have been able to provide specific information that would have helped consolidate the data presented here. Nor did we have access to all the family risk factors experienced by the participants, due to ethical assurances of data protection, which is one of our main losses of information and makes us take the results with caution. The fact

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that the assessors were not blind to the risk situation of the children also constitutes a limitation to this study. There is a need therefore to expand on the present study by increasing the number of participants and schools, as well as by seeking information from all the elements related to the risk situation: child-family-school.

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