

Prediction of Behavioral Problems in Chilean Schoolchildren

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ABSTRACT: Five hundred and thirty five Chilean schoolchildren were evaluated with a test–retest procedure using teacher and parent questionnaires in first and sixth grade, respectively, and a measure of self-esteem in sixth grade. According to teachers' ratings, disobedience/aggression, shyness and hyperactivity persisted. Crosspredictions were found: disobedience/aggression increased the risk of cognitive/concentration problems, which predicted emotional immaturity, while hyperactivity predicted disobedience/aggression. Teacher's global opinion of poor achievement predicted cognitive/concentration problems, and poor conduct predicted hyperactivity. Behavioral problems rated by parents in first grade predicted their persistence. Detection of problems in first grade predicts sixth grade outcomes, providing information for implementing preventive interventions.

KEY WORDS: developmental psychopathology; child psychiatric epidemiology; early predictors; longitudinal studies.

Introduction

One of the issues addressed in developmental psychopathology research is the persistence of behavioral problems throughout the lifespan. Early predictors for later problems can be determined.^{1–4} One of the vulnerable transition periods in the child's life is the beginning of primary school at 6 years of age.^{5–9} This experience can be stressful and exacerbate or trigger emotional and behavioral

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disorders, which can remit spontaneously or persist and affect the child's psychosocial development. For example, Garber reports that both early symptoms and stressors predict persistence or exacerbation of depressive symptoms in adolescents.¹⁰

Longitudinal studies, conducted with both general and clinical populations in different countries, have shown stability of early behavioral and emotional problems, which serve as predictors of later disturbances.^{3,4,7,11-22} For example, children's disruptive and aggressive behaviors predict increased rates of antisocial behavior and substance abuse in adolescence and adulthood.^{13,23-29} Approximately 70% of children with attention deficit hyperactive disorder (ADHD) continue showing symptoms later in life.^{30,31} Behavioral inhibition, early onset anxiety and major depressive disorders have been associated with adolescent and adult depressive disorders.^{5,32-35}

In Latin America there are no published longitudinal follow-up studies of prevalence and persistence of emotional and behavioral problems in school-aged children. Such information is required for planning preventive interventions and improving services.

This developmental epidemiologic study was carried out to evaluate the prevalence, persistence and predictors of behavioral problems from first to sixth grade³⁶⁻³⁸ in a sample of Chilean schoolchildren.

Method

All first graders from seven schools in three districts of West Santiago were included in the study in 1992 and 1993. These schools were selected because they were served by the primary health care center where this study originated. In Chile, schools are classified by a socioeconomic vulnerability index, which is used by the Ministry of Education to qualify students for free meals (JUNAEB 1992-1998). By this measure, the schools in this study showed varied vulnerability indexes, but as a group they are representative of the state supported schools in Metropolitan Santiago (90% in all).

Children were evaluated for emotional and behavioral problems by means of teacher and parent questionnaires. They were reevaluated in sixth grade, on a blind procedure basis, using the same instruments. A self-report questionnaire was added in order to assess self-esteem.

Cognitive and language levels were not assessed in this study, and no mental health treatment questions were included.

Subjects

At intake, 1279 first graders from two cohorts (mean age 6.6; SD=0.60; 48.6% female) were evaluated in their respective schools. Consent from

parents and teachers was obtained in previous coordination meetings, where the aims of the study were explained. No teachers refused to be interviewed in order to complete the questionnaires on either evaluation occasions. Only classes were included where the teachers had spent at least 5 months with the children, in order to insure a good knowledge of their students. Interviewers (a teacher and psychology graduates) were trained by a senior psychologist. In 2 h, a teacher and an interviewer were able to complete the evaluation process for all children in one class. Children with any incomplete instrument were excluded.

In 1997 and 1998 all sixth graders ($n = 1062$) were evaluated with both questionnaires, 535 of them corresponded to the first grade intake sample. In addition, children completed the self-esteem questionnaire with the interviewer, none refused to participate.

Children of the two cohorts who remained in the same schools from first to sixth grade and had fully complete teachers' questionnaires constitute the follow-up sample ($n = 535$; 41.8% of the initial sample) which is reported in the present study.

Attrition rates are explained mainly by the children not being available at the same schools for follow up. Most of the first graders not included in the sixth grade evaluation had moved to different school districts. At that time, funds and information were insufficient to track them.

The 535 children that were followed up to sixth grade, were comparable to the total first grade sample (1279 children) in age, sex, teachers' ratings of shyness and immaturity, parents' overall score of behavioral problems and the percentage of fathers living at home. However, the children that did not continue to sixth grade and were therefore excluded from the final sample, had initially presented higher teachers' ratings on overall behavioral problems, disobedience/aggression, cognitive deficit and hyperactivity (all $p < 0.001$) (see Table 1).

Instruments

The teacher and parent tests were validated for Chilean children during the first and second years of the study in both cohorts. This validation process involved: translation and expert judges' feedback in a pilot sample; internal consistency (Cronbach alpha) and factorial analysis of principal components with varimax rotation for both cohorts.³⁹ The self-esteem questionnaire had been previously standardized and used in another study.⁴¹

Teachers' Observation of Classroom Behavior (TOCA-R)

The instrument was administered individually to the teachers and responses compiled by trained interviewers. The measure was created and used by Kellam et al. in two longitudinal studies in Chicago and Baltimore.^{5,6,26,44-47,50,51} A cutoff point for overall behavioral problem scores was defined by the research team as ≥ 1 SD above the mean.

The original instrument has six factors, but in the Chilean version the TOCA includes only five which explain 61% of the total variance:

Table 1
Comparison of Intake and Follow up Samples in First Grade

<i>Characteristics in first grade</i>	<i>Samples</i>		<i>Statistics</i>	<i>p-Values</i>
	<i>Intake</i>	<i>Follow up</i>		
Sample size	1279	535		
Mean age	6.6 SD 0.60	6.5 SD 0.54	$T = 0.01$	$p > 0.05$, ns
Female	48%	49.2%	$Z = 0.47$	$z > 0.05$, ns
Father not living with child	21.7%	20.1%	$Z = 1.8$	$p > 0.05$, ns
Overall behavioral problems by teachers (1 SD above mean)	45.2%	33.3%	$Z = 4.68$	$p = 0.00001$
F1 – Dissobedience/ aggression (over p. 75)	32.4%	25.6%	$Z = 2.87$	$p = 0.00205$
F2 – Shy behavior (over p 75)	29.6%	29.3%	$Z = 0.12$	$p > 0.05$
F3 – Cognitive deficit / concentration (over p 75)	38.1%	25.8%	$Z = 5.03$	$p = 0.00001$
F4 – Emotional Immaturity (over p 75)	35.9%	35.7%	$Z = 0.08$	$p > 0.05$
F5 – Hyperactivity (over p 75)	32.8%	27.7%	$Z = 2.14$	$p = 0.01617$
Overall behavioral problems by parents (1 SD above mean)	12.6%	11.6%	$Z = 0.51$	$p > 0.05$, ns

*F1, Authority Acceptance; F2, Social Contact; F3, Cognitive Achievement/ Concentration; F4, Emotional Maturity and F5, Activity level.*³⁹ Cognitive achievement and concentration were merged into one factor (See Appendix for final TOCA configuration). Cronbach's alpha was 0.91 for social contact, 0.946 for authority acceptance, 0.812 for cognitive achievement, 0.741 for emotional maturity and 0.903 for concentration. Activity level was not calculated because only three items remained after statistical analyses. Scores in the upper quartile for each factor were considered as indicative of significant problems. This cutoff point proved to be the most consistent and predictive in our populations, according to our statistical analyses. The TOCA-R also allows for a teachers' global opinion evaluating the child's academic achievement, conduct and special needs (e.g: remedial or tutorial class, child requires evaluation, behavior and/or hyperactivity/concentration problems and social aids for the family). This constitutes a separate section, not included in factor's scores and provides qualitative information.

Pediatric Symptom Checklist (PSC)

This questionnaire was designed by Jellinek⁴⁰ to be completed by parents of 6–12-year-old children and yields one summary score. It had not been used in longitudinal studies. The PSC assesses emotional and behavioral problems at home (*e.g. physical symptoms, isolation, low energy, hyperactivity, conflict with teachers or friends, distractibility, fears, sadness, irritability, low self-esteem, sleep problems, disobedience, taking others' property*) and was validated in Chile.³⁹ Cronbach's alpha was 0.853. Factor analysis yielded a single factor responsible for 47% of the total variance. Behavioral problems were considered present when the score equaled or exceeded 1SD above the mean. In order to assess family risk or protective factors we added a section with the following items: *father not living with the child, child's chronic illness, mental illness in the family and family social engagement and participation (in religious, sports, community organizations)*.

Piers–Harris Self Concept Scale

This self-administered questionnaire, created by Piers in 1984, measures self-concept in 8–12-year-old children. It is divided into subscales that assess behavior, intellectual and scholastic status, anxiety, popularity and happiness/satisfaction. The measure was standardized for the use in Chile with 9–11-year-old children.⁴¹ In order to simplify results, we established three discrete scoring categories (low, medium and high self-esteem). Low self-esteem was defined by the presence of scores in the lower tertile, combining the scores of all subscales. This was the most predictive cutoff point for our population. Since this instrument is valid for older children, it was administered only to the sixth graders. The children received general information about the evaluation procedure, and all consented to participate.

Statistical Analyses

Data were analyzed using the EPIINFO and STATA programs. Chi-square, Kruskal Wallis and ANOVA tests were used to evaluate differences between groups of children. TOCA-R factors scores were divided into dichotomous variables: above or below the 75th percentile. Correlations between variables were analyzed using odds ratios and confidence intervals. Mantel–Hanzel and Fischer's tests were used to assess significance. Prevalence rates are reported as means and standard deviations; p values are based on two-tailed tests, accepting a $p < 0.05$.

To evaluate the predictors of problem persistence, a bivariate analysis was performed first, followed by eight logistic regression models to evaluate sixth grade TOCA factors, PSC and Pier–Harris results. All teachers' and parents' reports obtained while the children were in first grade were entered as dichotomous variables in a stepwise procedure. The best fitting models were selected at the end of this process.⁴² Only variables with $p < 0.05$ significance were included in the models.

Table 2
Prevalence and Continuity of Overall Behavioral Problems Rated by Teachers (TOCA-R). Bivariate Analyses

<i>First grade</i>		<i>Sixth grade</i>			
		<i>Children over cutoff point</i>		<i>Children under cutoff point</i>	
<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Children over cutoff point (1 SD above mean)					
178	33.3	80	44.9*	98	55.1
Children under cutoff point					
357	66.7	110	30.8*	257	69.2
Total	535	190	35.5	355	64.5

*OR: 1.83, CI: 1.24; 2.71, $p < 0.001$.

Results

Teachers' Ratings

Prevalence of Overall Behavior Problems. 33.3% of the children were rated above the cutoff point (≥ 1 SD above the mean) in first grade and 35.5% in sixth grade. (Table 2)

Persistence of Overall Behavior Problems. 44.9% of the children rated by the teachers with overall behavioral problems in first grade persisted with maladaptive behaviors in sixth grade (Table 2).

Prevalence of Specific Behavior Problems. Similar rates of cognitive/concentration problems (25.8% versus 21.7%) and activity level (27.7 and 23.7%) between first and sixth graders were found. In contrast, there were significant decreases in the ratings of Authority acceptance (25.6% versus 19.8%; $p < 0.03$), Social contact (29.3% versus 22.4%; $p < 0.01$) and Emotional Maturity problems (35.7% versus 27.5%; $p < 0.01$) across the rating periods (Figure 1).

Prediction of Persistence of Specific Behavior Problems. A logistic regression model (Table 3) showed stability across the two ratings for F1, Authority Acceptance ($p < 0.001$) F2, Social contact ($p < 0.018$) and F5, Activity levels ($p < 0.001$).

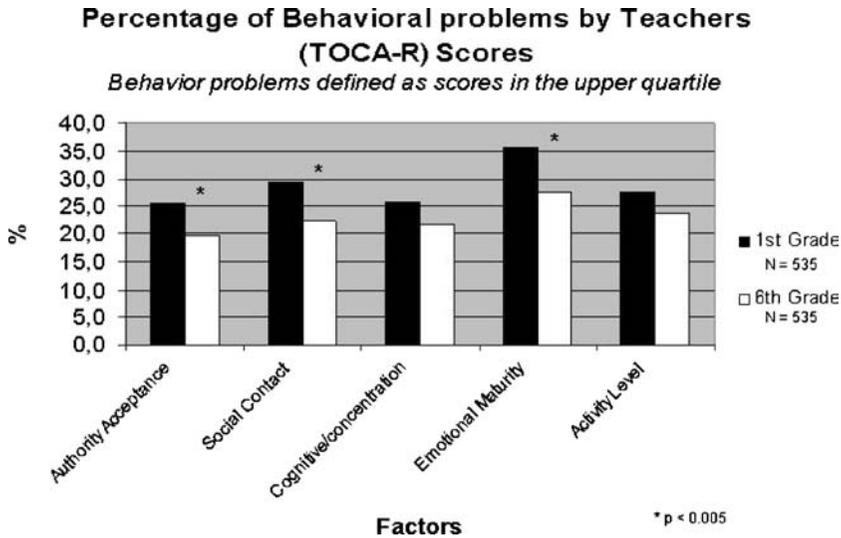


Figure 1. Percentage of Behavioral Problems by Teacher (TOCA-R) Scores.

Crossprediction of Specific Behavior Problems. Deficits in first grade Cognitive/concentration factor (F3) doubled the probability of being rated as emotionally immature in sixth grade (F4) ($p < 0.001$). Activity level (F5) had the same effect on sixth grade authority acceptance (F1) ($p < 0.007$). In contrast, early authority acceptance problems (F1) predicted later cognitive/ concentration deficit (F3) ($p < 0.004$). (Table 3).

Predictivity of Teachers' Global Opinions. Teachers' global opinion regarding poor conduct in first grade doubled the risk for overall behavioral problems and hyperactivity (F5) ($p < 0.04$) in sixth grade. A global opinion of poor achievement predicted cognitive/concentration deficit (F3) ($p < 0.0001$) (Table 3).

Protective Associations. First grade social contact problems (F2) decreased the risk of being rated as immature (F4) in sixth grade ($p < 0.0001$). Teachers opinion of poor achievement was protective for sixth grade hyperactivity (Table 3).

Parents' Ratings

Parents' ratings of overall behavior problems were less prevalent than teachers ratings on both assessment occasions. Moreover, the

Table 3
 Prediction of Teacher Reported Behavioral Problems (TOCA FACTORS).
 Logistic Regression Models

<i>First grade predictors</i>	<i>Sixth grade outcomes</i>					
	Toca overall score	F1 – Authority acceptance	F2 – Social contact	F3 – Cognitive/ concentr.	F4 – Emotional maturity	F5 – Activity level
F1 – Authority acceptance		OR 2.91 CI 1.63; 5.19 $p < 0.0001$		OR 2.25 CI 1.29; 3.93 $p < 0.004$		
F2 – Social contact			OR 2.00 CI 1.24; 3.22 $p < 0.004$		OR 0.29 CI 0.17; 0.50 $p < 0.000$	
F3 – Cognitive/ concentration					OR 1.99 CI 1.26; 3.16 $p < 0.003$	
F4 – Emotional maturity						
F5 – Activity level		OR 2.21 CI 1.24; 3.94 $p < 0.007$				OR 1.95 CI 1.18; 3.24 $p < 0.009$
Global opinion of Poor achievement				O.R 1.85 C.I. 1.34; 2.53 $p < 0.0001$		OR 0.70 CI 0.52; 0.95 $p < 0.026$
Global opinion of Poor conduct	OR 1.78 CI 1.37; 2.30 $p < 0.0001$					OR 2.24 CI 1.606; 3.148 $p < 0.0001$

*Only significant findings are included ($p < 0.05$).

former significantly decreased by sixth grade (11.5% versus 5.9%; $p < 0.03$). Bivariate analysis showed that 22.2% of the children rated with problems in first grade had continuity of such problems in the sixth grade (Table 4).

The logistic regression analyses showed that problems rated by parents was the only first grade variable with more than a six-fold risk of later persistence (OR = 7.23, CI = 2.95; 17.69; $p < 0.0001$).

Table 4
 Prevalence and Continuity of Overall Behavioral Problems Rated by Parents
 (PSC 1 SD Above Mean). Bivariate Analyses

<i>First grade</i>		<i>Sixth grade</i>			
		<i>Children over cutoff point</i>		<i>Children under cutoff point</i>	
<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Over cutoff point (.1 SD above mean)					
.45	11.6	10	22.2*	35	77.8
Under					
342	88.4	13	3.8	329	96.2
Total					
387	100	23	5.9	364	94.1

OR: 7.23, CI: 2.68; 19.42, * $p < 0.000$.

Parents' first grade ratings did not predict problems according to teachers or self-esteem reported by the children.

Self-esteem Ratings

Significantly low self-esteem was found in 16.6% of the sixth graders.

The logistic regression model revealed that teachers global perception that the child needed evaluation for hyperactivity in first grade doubled the risk of later low self-esteem (OR = 2.99, CI = 1.69; 5.27 $p < 0.021$).

Discussion

This is the first longitudinal epidemiologic study attempting to understand and predict the persistence of behavioral problems in schoolchildren in Chile and Latin America. We used data from several sources in a sample of non-selected children and a methodology similar to that of other studies.^{5,6,26,44-47,50,51}

In this study teachers reported higher prevalence and greater persistence of behavioral, emotional and cognitive problems than parents. Lack of agreement between different evaluators is commonly

found in similar research studies, showing higher scores obtained from parents, children or teachers.^{12,21,36} A possible explanation for lower parents rates might be that they see their children in a less demanding environment in which behavior problems are less likely to be triggered. It is also possible that low and middle low socioeconomic level parents are more tolerant to disruptive behaviors than teachers, or are afraid to report them.

As in other studies, teachers' ratings of specific behavioral problems in first grade (TOCA factors) showed long-standing predictive power for multiple behavioral and cognitive problems. Thus, considerable consistency was found between children with behavior problems in first and sixth grades despite different teachers completing the instruments.^{11,12,14,17,18,22,23,26,29,46,48,49}

Kellam et al., using the TOCA-R and other instruments,^{26,45} found that behavioral problems during first grade predicted risk of specific disorders in later life. For example, learning problems predicted psychiatric symptoms and depression in adolescents, especially in males. Aggressive behaviors, in particular when combined with shyness in first grade boys, predicted adolescent delinquent behavior and drug abuse. Furthermore, they were able to prevent adverse outcomes by means of early intervention programs.^{46,50,51}

Studies by Achenbach and others, using the Child Behavior Checklist (CBCL), also reported persistence of behavioral and emotional problems from childhood into adolescence and adulthood.^{21-23,28,53}

Risk Prediction by Teachers Ratings in this Study

Specific behavioral clusters (TOCA factors) predicted later outcomes in this study, while teachers overall scores did not. Future research might thus disregard overall teacher's ratings in favor of addressing more specific issues.

Continuity of aggressive/disobedient behavior and crosspredictions between different disruptive behavioral dimensions are findings supported by other research.^{13,20,24,25,27-29,33,46-48,51,52} The persistence of shy behavior from first to sixth grade is consistent with findings of other reports.^{5,15,32-34}

The fact that cognitive/concentration deficit was predicted by disobedience/aggression and teacher's global opinion of poor achievement is in line with reports showing an association between learning and behavioral problems.⁸

Emotional immaturity was not stable over time and did not predict any outcomes. In fact, Kellam's studies discontinued the use of this factor in their later research.⁶ Except for social contact/shyness, the TOCA-R does not contain other items that assess internalizing behaviors.

Protective Factors and Teachers Ratings

The finding that children with reduced academic progress in first grade were in lower risk of later hyperactivity was unexpected. It might result from the teacher giving them extra help and starting a protective chain of events leading to improved behavior in sixth grade.

On the other hand, the finding that early shyness reduced the likelihood of sixth grade immaturity might be explained by teachers' mislabeling some quiet and autonomous children as shy in first grade. These results have not been informed by other researchers and might be explained by cultural differences in the educational milieu.

Prediction by Parents

The persistence of parent's perception of behavioral problems from first to sixth grade was the strongest association found in the study, although there was no cross-prediction with the teachers' ratings. The later finding agrees with the evaluators' discrepancy regarding prevalence. It is supported by other research which suggests that evaluators detect different problems in different settings.^{12,21,36}

Prediction of Low Self-esteem

The questionnaire was not administered in first grade, as it is standardized for older children. Thus, it is not known whether low self-esteem might have been stable from first to sixth grade. The finding that teachers' perceived need of child evaluation for hyperactivity in first grade, predicted low self-esteem in sixth grade, is striking. In fact, teachers' expectations about children have been found to influence their behavior and self-concept.^{7,8} Behavior problems also affect self-esteem in a negative way and may create vulnerability for psychiatric disorders.³

Other variables were tested in each of the predictive models, but did not show any significant relationships: sex, presence of father at home, family mental illness, family social participation, teachers opinion about the child's need of being evaluated for learning and behavioral problems.

Limitations of this Study

The attrition rate of our follow-up sample is similar to that found in other studies.^{43–47} Children that remained in the study had many characteristics similar to the total intake sample, but presented less disruptive behaviors. Most of the children that were not available for follow-up had changed school; other authors have found that such changes are associated with maladaptive scores.^{44–47} It is possible that the inclusion of children with more severe behavior problems would have made our persistence and prediction outcomes more significant.

The number of parents ratings was reduced on both occasions of the study. During the first grade, there were no resources for home visits, which we achieved in the sixth grade from a second grant, greatly improving the response rate.

Since agreement between teachers and parents was low (4.1% in first grade and 2.3% in sixth grade),^{12,21,36} we could not analyze the additive effects of problems reported by both respondents.

Finally, and noted previously, the population studied includes only children educated in state supported schools. Thus, the upper socioeconomic levels of the population are not represented in our sample.

Strengths of the Study

It was possible to assess early maladaptive behaviors and other contextual variables that predicted persistence and discontinuity of problems along a 6-year follow-up period. Moreover, our study showed the applicability of TOCA-R and the methodologies used in the two USA studies in a different cultural milieu. Validation of the instruments needed few modifications for rating Chilean children's behavior.

This study addresses a serious public health concern and indicates the need for early detection of behavioral and emotional problems in first graders. Evaluating these early predictors can increase the

probability of preventing later problems and provides opportunities for implementing targeted interventions.^{46,47,50}

Further research is required to evaluate more specifically the persistence and predictors of behavioral problems in children, which implies more resources for educational research projects. It is now possible to trace children in other schools by current computational registers, but it is also necessary to make home visits to parents who do not complete the study questionnaires.

This study's methodology and instruments are currently being used by the Ministries of Health and Education in Chile for implementing preventive intervention programs. Follow-up studies should be carried out to compare the efficacy of different intervention procedures.

Summary

This epidemiological longitudinal test–retest follow-up study aimed to determine the course of behavioral problems rated in first grade in terms of the prediction of sixth grade disturbances. A Chilean sample of 535 schoolchildren were evaluated in first and sixth grade, respectively, by instruments which considered the ratings of teachers and parents. A self-esteem measure was added in sixth grade.

Results showed persistence of teacher reported disobedience/aggression, shyness, hyperactivity and parent reported behavioral problems. However, many later problems were predicted by different early maladaptive behaviors: cognitive/concentration problems were predicted by disobedience/aggression, emotional immaturity by cognitive/concentration problems and disobedience/aggression by hyperactivity rated in first grade. Teachers first grade global opinion of poor achievement predicted cognitive/concentration problems, and their opinion about poor conduct predicted hyperactivity in sixth grade. Poor child rated self-esteem in sixth grade was predicted by teachers opinion that the child needed to be evaluated for hyperactivity in first grade.

A protective effect of shyness in first grade was found for later emotional immaturity. The same effect was observed for hyperactivity in children rated as poor achievers in first grade.

Findings of this study should be analysed considering some weaknesses, such as the attrition rate. Nevertheless, it yields data in a different culture using methodology proven in other studies as well as information for preventive intervention programs.

Appendix

Configuration of Teachers' Test (TOCA-R)*

<i>Factors</i>	<i>Items</i>
F1—Authority acceptance	Stubborn-breaks rules-harms/hurts others-breaks things-yells at others- takes others property-fights-harms/damages property-lies-has trouble in respecting teacher's authority-teases classmates-starts fights with classmates- reacts negatively to criticism and failure- does not obey rules without protesting/negotiates endlessly-keeps distant from teacher-is accepted by classmates
F2—Social contact	Friendly- socializes & interacts with classmates-plays with classmates-avoids classmates/isolated - socializes with teacher- has lots of friends- shares with classmates/is solidary-is willing to participate in recreational and extraprogramatic activities
F3—Cognitive achievement/concentration	Completes assignments- learns up to ability -shows enthusiasm and pleasure in learning - works hard-concentrates- pays attention- easily distracted-stays on task- works well alone- acts younger than age/cries easily-self reliant- needs affection to be motivated in work
F4—Emotional maturity	Seeks too much attention from teacher- clings to and goes after classmates- seeks too much attention from classmates- clings to teacher
F5—Activity Level	Can't sit still- runs around a lot and climbs on things- gets up from seat and walks around the classroom

*Chilean version.

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