

Which skills predict dropout from youth programs? Findings from an after-school social program in Venezuela ¹

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Abstract

Dropout from school and more generally from skills development programs reduces human capital accumulation and contributes to the inter-generational poverty cycle. Using data from the impact evaluation of Venezuela's National System of Youth Orchestras and Choruses (*El Sistema*), a national-wide after-school social program that provides musical training to children and youth, we provide the first analysis on the relative importance of socioemotional skills, cognitive skills and socioeconomic status as predictors of dropout in Latin America. We find that self-esteem and aggression propensity, measured at baseline, are important socioemotional skills predicting dropout. We also find that working memory is a cognitive skill correlated with dropout. These types of findings are important to program managers because they provide means to identify participants that most need encouragement and follow-up from program inception, with the ultimate objective of increasing retention.

Keywords: dropout, student attrition, self-esteem, aggression propensity, working memory, child and youth development, social protection, *El Sistema*, music, Venezuela.

JEL classification: I38, J13, N36

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1. Introduction

Program dropout or student attrition is generally defined as “the departure from or delay in successful completion of program requirements” (Ascend Learning LLC, 2012). In Latin America and the Caribbean (LAC), it has mostly been studied in the context of schooling, particularly in terms of secondary education, as the latter has become one of the most pressing social challenges in the region. Although secondary school graduation rates have risen there in approximately 20 percentage points during the last two decades, it is still way below in comparison with other parts of the world: in 2014 the average rate of people between 18 and 20 years of age who completed at least 12 years of schooling was approximately 40% in LAC, but this rate was more than double at the European Union at approximately 81% (Duryea and Robles, 2016). Consequently, understanding dropout’s causes and minimizing its magnitude should be a primary concern for policy makers, especially in the context of LAC.

Dropping out of high school limits the chance of future success for many children, deepens and perpetuates the cycle of poverty into future generations and diminishes the pool of qualified people from diverse backgrounds who enter the professional and political ranks that make important public policy decisions (APA, 1996, 2002).

It is well known that its incidence is higher among children and youth with lower socioeconomic status. Less is known on whether or which skills also determine dropout. Measuring these functions, e.g. at entry, can help program managers identify those children and youth that most need assistance, tutoring and follow-up, with the ultimate objective of increasing retention.

Dropout is a complex phenomenon with multiple causes and correlates that can be grouped in four categories.

The first category includes the socioeconomic conditions of the youth and her family (Spady, 1970; Spady, 1971; Weidman, 1989). It encompasses factors such as income, parents’ education and background, the area of residence, and employment opportunities. Students from very low-income families may enter the labor force and dropout of school in order to support family living expenses. This “income effect” is distinct from the substitution effect which represents the opportunity cost of attending school and rises with age. When aggregate economic conditions decline the income effect promotes dropout while the substitution effect entices students to invest in school (Duryea and Arends 2003; Ferreira and Schady 2009).

The second category is related to the institutions (Adelman, 1999; Giovagnoli, 2002; Pascarella, 1985). It includes high students to teacher ratios, lack of financial support for students in need, admission rules such as selection at entry, lack of information on career opportunities (links with tertiary education and with potential employers), lack of teacher’s preparation in the face of changing students’ preferences and employers’ needs.

The third category includes the academic causes of dropout (Adelman, 1999; Braxton et al., 1997; Ethington, 1990; Spady, 1970; Spady, 1971; Tinto, 1982). It encompasses deficiencies in previous learning (Zubieta and Susinos, 1986), excessive theoretical orientation of the curriculum, lack of support for learning disabilities and special needs, lack of career orientation, excessive duration of the courses, heterogeneity of classes.

Finally, the fourth group includes the personal causes (Bean, 1985; Fishbein and Ajzen, 1975; Weidman, 1989). It comprises self-esteem (Masjoan, 1989), aspirations, motivation,

expectations, lack of emotional maturity, personal difficulties, beliefs (Medrano et al., 2010), dedication, attitudes, peer's relation, abilities and interests.

Socioemotional skills and behaviors have been the focus of recent research in the field of children and youth development given an increasing evidence confirming the long-term economic returns of developing these kind of skills (Cunha and Heckman 2007, 2010; Daly et al., 2015). The study of the relationship between these skills and academic engagement, including school persistence and graduation, has not been the exception. For example, Jimerson et al. (2002) in a 12-year longitudinal study evaluated the differences between students who are retained and subsequently drop out and students who are retained and continue to graduate from high school. They conclude that even among students that are retained, early socio-emotional and behavioral characteristics such as lower self-esteem and problematic behavior (including aggression) are associated with an increased risk of dropping out. Coneus et al. (2009) analyze the determinants of dropout from secondary and vocational education in Germany, examining the effects of non-cognitive skills, measured by Rotter's Locus of Control which measures whether a person believes they have some determination over their future or whether it is determined by fate, family background and school achievements. These authors hypothesized that individuals with strong noncognitive skills can be expected to be motivated in doing homework and less likely to skip school. They find that better school grades and higher noncognitive skills reduce the risk to become an educational dropout, but that the influence of noncognitive skills tends to increase above the influence of school achievements with age.

Focusing on after-school activities, Weisman and Gottfredson (2001) compared students who remained in a sample of Maryland after-school programs to students who dropout prior to the end of the school year. They find that higher-risk students in terms of demographic characteristics, school attainment, social skills and risky behaviors (e.g.: drug use, delinquent behavior), who are indeed the kind of beneficiaries that these types of programs attend to serve, are more likely to dropout. More specifically, they find statistically significant differences among the two groups on measures of peer drug models, number of days that students were absent from school and social disorganization in their home neighborhoods.

In this paper, we use data from a sample of children and youth (6-14 years old) participating in a large scale social program to study how cognitive and socioemotional skills, in addition to the socioeconomic status, are correlated with dropout. Data is from the surveys conducted for the impact evaluation of Venezuela's National System of Youth Orchestras and Choruses, over the period 2012-2013.

Venezuela's National System of Youth Orchestras and Choruses, commonly known as *El Sistema*, is a massive program of social inclusion that focuses on children and youths' integral development. It was founded in 1975 by Maestro José Antonio Abreu and currently serves about half million individuals across the whole country. It has been internationally praised and replicated in over 30 countries (El Sistema USA, 2015).

El Sistema provides training in choral or instrumental music through individual and collective practice and group performances. It focuses mainly on classical music, but also encompasses traditional and popular genres. Although it has recently started to operate as part of the curriculum in some schools, it is normally an out-of-school program offered in music centers known as *núcleos*. These *núcleos* are scattered throughout the country and work in coordination as a network, guided by a national curriculum (or "sequence") that specifies compositions and

arrangements of increasing complexity.² The network is managed by the *Simón Bolívar* Musical Foundation (Fundamusical).

Admission in a *núcleo* depends on seats availability, and not on the music talent of the child or youth. The admission process, which includes a pre-registration by the child's parent or legal guardian, takes place during the summer before classes start in September. The academic year is comprised of two semesters, with a break during the month of December for the end of year's holidays.

Our analysis focuses on the activities conducted during academic year 2012-2013, in 16 *núcleos* that participated in an impact evaluation study of *El Sistema*. This year was characterized by important political events, including presidential elections on October 7, 2012 and the death of President Hugo Chavez on March 5, 2013. Answering a retrospective qualitative survey in October 2015, only one of the 16 directors reported that implementation in the 2012-2013 academic year was temporarily disrupted by school closures related to election activities. Seven directors reported that implementation in 2012-2013 was normal or better compared to other years, and 4 reported problems of crowding (Alemán et al., 2016).

Our analysis is novel because it provides quantitative evidence that socioemotional skills, more specifically self-esteem and aggression propensity, are important predictors of dropout. Cognitive skills are also correlated with dropout although to a lesser extent. Additionally, our analysis examines the role of children's basic demographic and socioeconomic characteristics in predicting dropout (we also capture institutional variation by including site variables in our model). This is the first evidence of the relative importance of socioemotional skills, cognitive skills and socioeconomic status as predictors of dropout in Latin America. Our analysis is also relevant on a worldwide scale, as the literature on the determinants of dropout focuses mainly on school dropout, and evidence on after-school programs is extremely limited.

The rest of the paper is organized as follows. Section 2 describes the data sources, provides key variable definitions and describes the methodology used for measuring dropout predictors. Sections 3 presents the quantitative analysis results. Finally, section 4 discusses final conclusions and policy implications.

2. Data, definitions and methodology

We use data on 2871 children aged 6-14 years old that belonged to the sample of the impact evaluation of *El Sistema* (see Aleman et al., 2016). This data is from three sources. First, we use socioeconomic and demographic characteristics (e.g. age and gender, level of education, assets ownership, parents' level of education, geographic location) from application forms filled between May and July of 2012. Second, we use the measurement of children's cognitive and socioemotional skills from the baseline survey of the impact evaluation, conducted between October 2012 and February 2013. Third, we use retrospective information on participation in

² Notwithstanding the guidance of a national curriculum for the whole network of *núcleos*, it is important to note that each site, operated by the orchestra's director and teaching staff, also owns some level of autonomy to command periodical activities according to their needs. Therefore, total compliance to standardization processes might be always impossible.

núcleos activities during the 2012-2013 academic year, from the follow-up survey of the impact evaluation, conducted between September and November 2013.

We aim to assess whether socioemotional skills and cognitive skills are predictors of program dropout, while controlling for socioeconomic status (SES). The analysis focuses on 938 children that participated in a *núcleo* during the first (Fall/Winter) semester of the academic year 2012-2013. We estimate the following equation:

$$D_{ij} = \alpha + \beta_1 SEM_i + \beta_2 Cog_i + \beta_3 SED_i + \beta_4 Nuc_j + \varepsilon_{ij} \quad (1)$$

where D_{ij} is a dummy variable which takes value 1 if child i , who applied to *núcleo* j , dropped out, i.e. did not participate in the activities of any *núcleo* of *El Sistema* during the second (Winter/Spring) semester of the academic year 2012-2013; SEM_i is a vector of variables measuring socioemotional skills; Cog_i is a vector of variables measuring cognitive skills; SED_i is a vector of variables measuring socioeconomic and demographic characteristics; Nuc_j are 16 *núcleos* dummy variables, and; ε_{ij} is a normally distributed error term. α , β_1 , β_2 , β_3 and β_4 are the parameters to be estimated, with each β_i measuring the correlation between dropout and each individual characteristic.

The dependent variable (D_{ij}) is based on guardians' reported information. Specifically, guardians indicated whether their children assisted at least once in academic activities of any *núcleo* in each of the two semesters of the academic year 2012-2013.

Socioemotional (SEM_i) and cognitive (Cog_i) measures are the main independent variables in our analysis. They are based on indicators constructed from the children's response to scale and task instruments typically used in the psychometric literature. Specifically, we use the following measures of socioemotional skills: Child Self-Control Rating Scale (Rohrbeck et al., 1991); prosocial behavior and difficulties (strength and difficulties questionnaire; Goodman et al., 1997); aggression propensity ("What would make you fight?" scale; Chan & Henry, 2009); empathy (empathy scale; Bryant, 1982), and; self-esteem (self-esteem scale; Rosenberg, 1965).

The cognitive measures include: a game/task that measures visuospatial intelligence (Raven's colored progressive matrixes; Raven, 1956); a task that measures processing speed skills (symbol search task, programed by the impact evaluation team following rules in Carlozzi et al., 2014), and; a task that measures working memory (digit span; programed by the impact evaluation team based on Luciana et al. (2009)).

Socioemotional and cognitive skills were measured at baseline, i.e. before dropout. All measures are expressed in z-scores: they were standardized by subtracting the mean value in the whole impact evaluation sample of 2871 children, and dividing by the standard deviation in the same sample.

Socioeconomic and demographic characteristics (SED_i) were extracted from questions answered by the legal guardians in the application forms. We control for these variables because they are commonly seen as predictors of academic success and dropout. The vector includes: applicant's age on September 1st, 2012 (estimated as a continuous variable using the birthdate provided in the application form); gender (dummy variable equal to 1 if child is a girl); asset ownership (one dummy for each of the following assets: a) computer, b) internet connection, c) television cable, d) washer, e) water filter, f) microwave and g) telephone landline; equal to 1 if legal guardian responded that the applicant's home has the corresponding asset); mother and father's education

(dummy variables; equal to 1 if the parent had attended, but not necessarily completed, some tertiary education); mother and father's presence in the household (dummy variables; equal to 1 if the mother/father lived in the same household as the applicant). As we did not want to drop observations because of non-responses or missing values in one or more of the mentioned socioeconomic and demographic variables, we flagged missing values with a dummy variable, and imputed the missing value with the variable's sample average.

In the vector of *núcleo* dummies (Nuc_j), "La Rinconada" is the omitted category. We include these variables because the characteristics of each *núcleo* are likely to affect dropout. Equation (1) is estimated as a linear regression model, with standard errors clustered at the guardian level; as in section 2 we mention that family's background can affect the probability to dropout, we assume unobservable characteristics correlated between applicants that were registered by the same legal representative.

Table 1 provides a statistical description of all the variables used in the analysis. Missing variables (out of the 938 observations in the total analysis sample) are due to scale non-response or task incompleteness. As it was explained, we avoid losing observations for the analysis by plugging the mean value for the socioeconomic variables. Appendix A summarizes the definition of all the variables used in the analysis.

Table 1. Descriptive statistics of variables used in the analysis

Variables	Total: Children who participated during 1 st semester (N=938)			Dropout: Participated 1 st semester, did not participate 2 nd semester (N= 202)			No dropout: Participated 1 st and 2 nd semester (N= 736)		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Dependent Variable									
Dropout	938	0.22	0.41	202	1	0	736	0	0
Socioemotional measures									
Self-control	888	0.03	1.00	183	-0.17	1.04	705	0.08	0.99
Prosocial behavior	887	0.05	0.98	183	-0.17	1.07	704	0.11	0.95
Aggression propensity	887	-0.07	0.97	183	0.14	1.01	704	-0.13	0.95
Difficulties	887	0.02	1.01	183	0.22	1.03	704	-0.04	1.00
Empathy	887	0.02	1.01	183	-0.13	1.03	704	0.07	1.00
Self-esteem	888	0.01	1.01	183	-0.24	1.10	705	0.07	0.98
Cognitive measures									
Digit Span (forward)	748	0.04	1.04	166	-0.11	1.01	618	0.01	1.04
Raven	784	-0.02	1.04	165	-0.09	1.04	621	0.05	0.91
Symbol search	775	-0.01	1.02	162	-0.26	0.95	613	0.05	1.03
Socioeconomic									
Child age on 1 September 2012	936	9.33	2.15	202	9.57	2.20	734	9.26	2.13
Female	938	0.55	0.50	202	0.53	0.50	736	0.56	0.50
Computer	935	0.86	0.34	202	0.78	0.42	733	0.89	0.32
Internet	929	0.71	0.46	202	0.61	0.49	727	0.74	0.44
Cable television	932	0.81	0.39	202	0.79	0.41	730	0.82	0.38
Washing machine	937	0.96	0.20	202	0.95	0.23	735	0.96	0.19
Water filter	935	0.56	0.50	202	0.52	0.50	733	0.57	0.50
Microwave	934	0.70	0.46	202	0.59	0.49	732	0.73	0.45
Telephone (landline)	921	0.87	0.34	202	0.76	0.43	719	0.90	0.30
Mother lives with child	909	0.96	0.19	191	0.96	0.20	718	0.97	0.18
Mother has ≥ 1 year of tertiary schooling	906	0.57	0.50	192	0.44	0.50	714	0.61	0.49
Father lives with child	845	0.78	0.41	171	0.79	0.41	674	0.78	0.41
Father has ≥ 1 year of tertiary schooling	836	0.47	0.50	170	0.41	0.49	666	0.49	0.50
Nucleos									
La Rinconada	938	0.06	0.23	202	0.06	0.24	736	0.06	0.23
San Agustín	938	0.09	0.29	202	0.08	0.27	736	0.10	0.30
La Hoyada	938	0.05	0.21	202	0.03	0.17	736	0.05	0.22
Guarenas	938	0.08	0.27	202	0.11	0.31	736	0.07	0.26
Santa Teresa	938	0.05	0.22	202	0.06	0.24	736	0.05	0.22
Los Teques	938	0.08	0.28	202	0.07	0.25	736	0.09	0.28
Cua	938	0.05	0.22	202	0.05	0.22	736	0.05	0.22
Maracay	938	0.12	0.33	202	0.10	0.30	736	0.13	0.34
Puerto Ordaz	938	0.11	0.31	202	0.04	0.20	736	0.13	0.33
Ciudad Bolívar	938	0.03	0.17	202	0.02	0.12	736	0.03	0.18
Upata	938	0.08	0.26	202	0.05	0.21	736	0.08	0.28
Barquisimeto	938	0.09	0.28	202	0.09	0.29	736	0.08	0.28
Duaca	938	0.03	0.17	202	0.07	0.25	736	0.02	0.14
Sarare	938	0.03	0.16	202	0.10	0.30	736	0.01	0.07
Divina Pastora	938	0.03	0.18	202	0.05	0.22	736	0.03	0.17
Cabudare	938	0.02	0.15	202	0.04	0.18	736	0.02	0.15

3. Results

Twenty two percent of the 938 children and youth that were participating in the activities of *El Sistema* during the first semester of the academic year 2012-2013 dropped out during the second semester of the same year. It is not possible to use this figure to estimate the average duration of program participation, as the rate of dropout cannot be considered to be constant over time; in other words, the first to dropout may have different characteristics from those that remain in the program, they may be the most socioeconomically, cognitively and socioemotionally vulnerable.

Table 2 presents the results of the estimation of model (1). It shows that dropout is correlated with a range of socioemotional, cognitive, socioeconomic, demographic and geographic variables. Table 3 presents the value of the adjusted-R² of linear regressions run using only a subset of variables. This is a rough indicator of the percentage of the variability in the dependent variable that is explained by a subset of its determinants.

Table 2 shows that children and youth with lower self-esteem and higher aggression propensity are more likely to dropout. This is consistent with what was discussed in our literature review. Lower levels of self-esteem hinder participants' vision of attaining goals (including musical skills). Aggressive behaviors can promote difficult relationships between teacher and peers jeopardizing program adjustment. Overall, socioemotional skills explain 3.3% of the variation in the dropout variable, which corresponds to about 15% of Model (1) overall predictive power.

Cognitive skills are also a significant correlate of dropout, although their relevance is relatively smaller. Specifically, children and youth that perform better in the digit span (forward) test are less likely to dropout. This result is consistent with studies that show that working memory contribute to academic competence and classroom engagement, which in turn facilitates student's persistence toward long-term goal achievement and the consequential reduction of dropout risk (Fitzpatrick et al., 2015). Cognitive skills explain 1.6% of the variation in the dropout variable, which corresponds to about 8% of Model (1) overall predictive power.

Socioeconomic and demographic characteristics are important explanatory variables. We find that the likelihood of dropout increases with age. As expected, dropout is less likely among children and youth whose mother has attended some college education. This confirms the importance of parents' rearing. Surprisingly, we find that dropout is more likely among children and youth that have cable television at home – an indicator of higher socioeconomic status. This suggests that some leisure opportunities at home compete with participation in *El Sistema*. Overall, socioeconomic and demographic characteristics explain 5.3% of the variation in the dropout variable, which corresponds to about one fourth of Model (1) overall predictive power.

Finally, the variables expressing the *núcleo* of enrolment explain over half of Model (1) overall predictive power. Relative to La Rinconada, which is used as reference, dropout was more likely in Sarare and Duaca, and less likely in Ciudad Bolivar. Qualitative information from the directors and a group interview with deserters (and their caretakers) was collected post-intervention in the Sarare *núcleo*. It was concluded that a few children from this *núcleo* dropped out for logistical problems (a local bus who served as a means of transportation for children who lived in the outskirts went out of service during the academic year, and could not be replaced). Unfortunately, qualitative information that could shed more light on the differential dropout rate for the *núcleos* of Duaca and Ciudad Bolivar was not collected or was incomplete.

Table 2. Program dropout's prediction models

Independent variables	Coefficient	p-value
Socioemotional		
Self-control	0.02526	0.237
Prosocial behavior	-0.01608	0.424
Aggression propensity	0.03424	0.050
Difficulties	-0.00740	0.692
Empathy	-0.01080	0.508
Self-esteem	-0.03608	0.055
Cognitive		
Raven	0.00099	0.947
Symbol search	-0.01736	0.383
Digit Span (forward)	-0.03489	0.020
Socioeconomic		
Child age on 1 September 2012	0.02212	0.016
Female	-0.03769	0.217
Computer	-0.07445	0.195
Internet	0.03258	0.429
Cable television	0.08967	0.034
Washing machine	0.02186	0.807
Water filter	0.03252	0.324
Microwave	-0.04352	0.257
Telephone (landline)	-0.08123	0.125
Mother lives with child	-0.04644	0.602
Mother has ≥ 1 year of tertiary schooling	-0.05519	0.106
Father lives with child	-0.01561	0.679
Father has ≥ 1 year of tertiary schooling	0.01994	0.541
Nucleos (omitted: La Rinconada)		
San Agustin	0.00695	0.932
La Hoyada	-0.05750	0.498
Guarenas	0.13667	0.203
Santa Teresa	0.04800	0.631
Los Teques	-0.07253	0.409
Cua	-0.07254	0.412
Maracay	-0.04131	0.606
Puerto Ordaz	-0.09717	0.174
Ciudad Bolivar	-0.13556	0.091
Upata	-0.05427	0.510
Barquisimeto	0.08158	0.366
Duaca	0.25071	0.040
Sarare	0.54167	0.000
Divina Pastora	0.15010	0.238
Cabudare	0.12295	0.349
Intercept - _cons	0.11414	0.520

Notes: Total Sample = Children who participated during 1st semester (N=938). A linear probability regression (OLS) was run to estimate the dropout prediction coefficients (Adjusted R² for the model = 0.145). Standard errors for this regression were clustered by guardians. Dependent variable dropout was collected during follow-up surveys to the participant's guardians and = 1 if children participated in semester 1 and did not participate in semester 2, = 0 if children participated in semester 1 and participated in semester 2. All socioemotional and cognitive measures were

responded by children at the baseline household survey. Socioemotional and cognitive measures are plugged in the regressions as z-scores. Socioeconomic and nucleos variables were collected during the registration period (guardians completed these applications). The omitted dummy variable for the nucleos is “La Rinconada”.

Table 3. Predictive Power of the Socioemotional, Cognitive, Socioeconomic and Demographic and Geographic Correlates of Program Dropout

Block of variables	Adjusted-R2	F-test	p-value
Socioemotional skills	0.033	3.915	0.001
Cognitive skills	0.016	5.039	0.002
Socioeconomic and demographic characteristics	0.053	2.647	0.000
Geographic location – <i>Núcleo</i>	0.111	5.710	0.000

4. Conclusion and policy implications

Regarding programs that have evidenced success in reducing dropout among high school-aged children and youth, Wilson et al (20011) carried out an extensive systematic review (meta-analysis) of 152 experimental and quasi-experimental studies that involved programs (implicitly or explicitly) presented as dropout prevention or intervention programs. The review indicated that most programs analyzed were effective in decreasing school dropout and that there was minimal variation in effects across different types of programs (overlapping confidence intervals for most types of programs).³ The authors conclude that dropout prevention and intervention will likely be successful if they are well implemented and appropriate for the local environment. Consequently, they recommend that policy makers choose between those types of programs that are more cost-effective and more suitable to the implementers abilities and resources.

We find that lower self-esteem and higher aggression propensity are associated with a higher probability to drop out of Venezuela’s *El Sistema*. This is important in the context of implementing social policy, particularly in a context of social and economic crisis. Local experts have paid special attention to factors that affect school disengagement, collecting qualitative information on the relevance of student’s psychological traits (Lugo, 2013). There is an increasing need to encourage and motivate Venezuelan children and youth to foster their vision and confidence that they can achieve better living conditions through education and training. Our results indicate that socioemotional skills measured at baseline are important predictors of dropout. They imply that early identification and special mentoring and support for children with low socioemotional skills can reduce the magnitude of dropout and foster human capital accumulation.

³ The types of programs analyzed include school or class restructuring (smaller classes, lower student-teacher ratios, blocked schedules, personalized learning settings, etc.), vocational training (coursework, internships, etc.), supplemental academic services (remedial education, tutoring, homework assistance, etc.), community service, mentoring/counseling, alternative schools, attendance monitoring, college-oriented programming, multi-service package (larger, comprehensive programs with multiple components), skills trainings (oriented toward improving self-esteem or attitudes about school, drug use, etc.), case management and others. Although attendance monitoring programs still produced significantly positive results, they were significantly less successful than the other types of programs.

Moreover, the fact that children with higher aggression propensity are prone to drop out is important in a context where violence is escalating. Rates of youth violence and homicide in Venezuela are already among the highest worldwide (Munyo 2013; World Health Organization 2014). Exposure to violence may increase aggression propensity and therefore dropout.

Finally, the result that socio-emotional variables are more important than cognitive skills as predictors of dropout can inform the design of dropout prevention interventions. As Heckman (2000) explains, IQ is fairly well set by age 8, but socioemotional traits like motivation and self-discipline are more malleable at later ages. Therefore, there might be more gains to focusing on socioemotional skills and behaviors when designing youth development programs.

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Appendix A: Dictionary of variables used in the analysis

Variables	Description	Source
Dependent Variable		
Dropout	Applicant dropped out, i.e. all children who their guardians reported participation (at least once) at a <i>núcleo</i> during Sep-2012 and Dec-2012, but who reported that the children did not participate during Jan-2013 and Jun-2013.	Questionnaire of time use and musical activities answered by guardians in the follow-up round of surveys. The total sample is comprised by children who participated during the first semester (from Sep-2012 to Dec-2012)
Scales		
Self-control ^a	Total score of Self-Control Scale (Rohrbeck et al., 1991) for children answered by applicants. Higher scores indicate higher levels of self-control.	Scales answered by children applicants during the baseline round of surveys. All scores are standardized.
Prosocial behavior ^a	Total score of the SDQ sub-scale (Goodman et al., 1998) answered by applicants. Higher scores indicate higher levels of prosocial behavior.	
Aggression propensity ^a	Total score of the "What Would Make You Fight?" Scale (Chan & Henry, 2009). Higher scores indicate less desired levels of conduct	
Difficulties ^a	Total score of the SDQ (Goodman et al., 1998) sub-scales that measure antisocial behaviors answered by applicants. Higher scores indicate less desired levels of conduct.	
Empathy ^a	Total score of the Empathy Scale (Bryant, 1982) for children answered by applicants. Higher scores indicate higher levels of empathy.	
Self-esteem ^a	Total score of the Self-esteem Scale (Rosenberg, 1965) for children answered by applicants. Higher scores indicate higher levels of self-esteem.	
Games		
Raven ^a	Total number of correct trials in the Raven task (Raven, 2000). Higher scores indicate higher levels of visuospatial intelligence	Games/tasks completed by children applicants during the baseline round of surveys. All scores are standardized.
Symbol search ^a	The amount of correctly identified symbols minus the number of incorrect symbols found within the time limit. A better score reveals an improved processing speed skill	
Digit Span ^a	Total of number series correctly repeated in the same order as they were read. Higher scores indicate higher levels of working memory.	
Socioeconomic		
Child age on 1 September 2012 ^a	Estimation of age on September 1 st , using birthdate provided in the form	Information completed by legal representatives in application forms
Female	Applicant is a girl.	
Computer	Applicant's house has a computer	
Internet	Applicant's house has internet	
Cable television	Applicant's house has tv cable	
Washing machine	Applicant's house has a washer machine	
Water filter	Applicant's house has water filter	
Microwave	Applicant's house has a microwave	
Telephone (landline)	Applicant's house has a telephone landline (estimated as a "yes" when legal representative provided a telephone landline)	
Mother lives with child	Applicant's mother lives in same house	
Mother has ≥1 year of tertiary schooling	Applicant's mother was enrolled in tertiary education	
Father lives with child	Applicant's father lives in same house	
Father has ≥1 year of tertiary schooling	Applicant's father was enrolled in tertiary education	
Núcleos	<i>Núcleos</i> where children applied. Only children who applied to the 16 <i>núcleos</i> that were part of the evaluation sample are taken into account. The 16 experimental <i>núcleos</i> are: La Rinconada, San Agustín, La Hoyada, Guarenas, Santa Teresa, Los Teques, Cua, Maracay, Puerto Ordaz, Ciudad Bolívar, Upata, Barquisimeto, Duaca, Sarare, Divina Pastora and Cabudare	Application form, submitted to the correspondent <i>núcleo</i>

Note: ^a Variable is not a dummy variable