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Article

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ORIGINAL ARTICLE

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The effects of youth training on risk behavior: the role of non-cognitive skills

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Abstract

This paper uses unique experimental data from a youth training program in the *Favelas*, Brazil, to examine whether youth training programs can prevent treatment recipients from engaging in risk behavior—i.e., cigarettes, alcohol, and hard drug utilization, as well as witnessing or being a victim of violent crime. Although the program was successful in increasing income, we find that it only improved risk behavior of the treated individuals with higher levels of socio-emotional skills.

JEL Classification: O11, O22, O17

Keywords: Risk behavior, Youth training programs, Socio-emotional skills

1 Introduction

The young are the segment of the population that has the highest use of illegal drugs, marijuana, cigarettes, and alcohol. They also have the highest crime rates and make up the greatest proportion of crime victims.¹ Consequently, in recent years, interest has grown in the field of economics for identifying the means to prevent at-risk young adults from engaging in risk behavior. For economists, a natural question is whether labor market incentives can prevent risk behavior (see a recent review by Blattman et al. 2015). However, little evidence currently exists on the causal effects of labor market incentives on risk behavior because of the difficulty in finding exogenous sources of variation on factors such as employment and income.

Youth training programs have been widely implemented in developing countries to help disadvantaged young individuals find employment or improve their earnings (Kenneth and Palmer 2010). In that sense, it might be expected that, if youth training programs help young individuals in improving their economic conditions—as has been extensively documented by Card et al. (2011), Attanasio et al. (2011), Ibarrarán et al. (2012), Hirshleifer et al. (2015), Ibarrarán et al. (2015), and Kugler et al. (2015)—then they could possibly improve the risk behavior of this population. Because youth training programs primarily aim at improving participants' employability, there is little evidence on their unintended effects on other outcomes such as risk behavior.

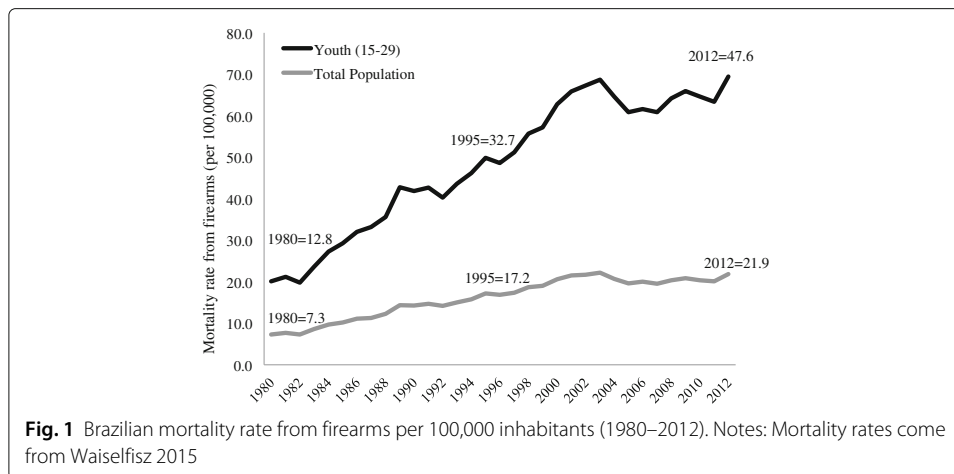
This paper contributes to the literature in three main ways. First and foremost, it takes advantage of unique data from a randomized trial, to study the effects of youth training programs on risk behavior. Second, by relying on individual data, our paper overcomes the confounding biases of studies that employ regional aggregate data to study risk behavior.

As suggested by Blattman et al. (2015), studies that employ aggregate regional data make it impossible to distinguish whether changes in individual decisions or on other market forces drive changes in risk behavior. For example, if a municipality experiences lower risk behaviors, it is not possible to determine if the individuals themselves are behaving differently or if the opportunities for risky activities are dropping. Since our analysis is based on surveys collected at the individual level, we are able to examine the direct effect of youth training programs on an individual's decision to engage in risk behavior.

Third, we study whether youth training programs may be more successful in deterring risk behavior for individuals with better socio-emotional skills. Our interest in these types of skills is motivated by recent findings on the strong correlation between socio-emotional skills and youth risk behavior (Blattman et al. 2015; Cook et al. 2014; Heller et al. 2015; Ludwig and Shah 2014). This correlation arises from two bases. First, recent findings suggest that youth discount the future more than adults (myopia), which prompts intrapersonal conflict between “selves.” This conflict is apparent in decisions made at separate times—a decision made by today's self for tomorrow might differ from one made by tomorrow's self. These limitations could lead to poor decision-making, particularly with regard to risk behaviors (JPAL 2013). Young individuals with higher socio-emotional skills have also lower myopia, which could allow them to make better decisions and vice versa. The importance of socio-emotional skills is also supported by findings in neuroscience that demonstrate the malleability of the prefrontal cortex—the region of the brain in charge of emotions and self-regulation—until the early twenties and the strong association between the development of the prefrontal cortex with preventing risk behavior (Almlund et al. 2011; Cunha et al. 2006; Heckman 2008). Hence, it is likely that higher levels of employment and income (induced by the participation in youth training programs) could have differential effects on youth risk behavior based on their heterogeneous socio-emotional skills.

We use experimental data from the youth training program *Galpão*. The program was designed to improve the employment and earnings of at-risk youth living in the *Favelas* in Rio de Janeiro, Brazil. The program's sole main objective was to improve the employability of young marginalized adults. *Galpão* was not intended to reduce the risk behavior of the treatment recipients directly. Calero et al. (2015) evaluated the impact of the program on earnings and employment. In contrast to other interventions that show modest effects from these types of programs (see Kenneth and Palmer 2010), *Galpão* was effective in increasing employment and earnings. We use the exogenous source of variation induced by the experiment to examine the effects of youth training programs on risk behavior.

Brazil presents an interesting context for studying youth risk behavior because it ranks 11th among 90 countries in the rate of firearm-related deaths, with 21.9 deaths per 100,000 inhabitants (Waiselfisz 2015). Victims of this violence are more likely to be among the young, and youth violence has shown a sharp increase in the last three decades. According to Waiselfisz (2015), the homicide rate by firearms rose from 12.8 to 47.6 per 100,00 inhabitants between 1980 and 2012—an increase of 271.8% (see Fig. 1). Higher rates of violence have also exposed youth to other types of risks. For instance, the use of illegal drugs (e.g., marijuana or cocaine) has also increased in recent years among the young,² and criminal organizations continually recruit young individuals, particularly those with low income, little education, and no religious attachment (Carvalho and Soares 2013).



We find no evidence that the program was successful in directly reducing risk behaviors such as smoking, casual alcohol consumption, hard drug consumption, or crime victimization, despite increasing employment for treatment recipients. We were not able, however, to rule out significant effects of the program on high alcohol consumption and fight participation. We also check if the program had a significant effect on socio-emotional skills, but we find no evidence of such an effect. We then proceed to examine if the program had differential effects on treatment recipients who had heterogeneous levels of socio-emotional skills. We find that individuals with higher socio-emotional skills who participated in the program, reduced their alcohol consumption and had lower crime victimization.

When analyzing which type of personality traits (socio-emotional skills) is more important in predicting risk behavior, we find that consistency of interests and empathy show the highest correlation with all measurements of risk behavior. Consistency of interest is defined as the capacity of maintaining constant interest in goals and projects and keeping stability in their actions and thoughts concerning goal achievement (Duckworth and Quinn 2009). Empathy measures the capacity to understand and accept other individuals, to consider their point of view, as well as showing respect for opinions which differ to your own (Brea 2010). These findings suggest that consistency of interest and empathy should receive higher emphasis when trying to modify the risk behavior of young individuals.

From a policy perspective, our results suggest that reducing risk behavior for youth may go beyond offering youth training programs, helping them find a job, and subsequently increasing their income. In particular, socio-emotional skills have a crucial role in guiding an individual's decision to engage in a risk behavior. Hence, further efforts should be directed at understanding how socio-emotional skills can be improved more efficiently.³

We contribute to two groups of literature. First, we contribute to the literature on the link between income and risk behavior. Most of the relevant work in this area focuses on the associations between poverty, violent crime, and conflict (see Bazzi and Blattman 2014; Berman and Couttenier 2015; Dube and Vargas 2013; Iyer and Topalova 2014; Miguel et al. 2004). Most of these studies show that unexpected negative changes in income or unemployment increase violent crime and conflict. We instead analyze the effects of a positive income shock (caused by higher employment due to the youth training program) on risk behavior of young adult men.

Second, we contribute to the group of studies that examine the unintended effects of youth training programs. The most closely related papers in this area are Ibararán et al. (2012) and Novella and Ripani (2014), who study the training program *Juventud y Empleo*. The former is a preliminary exploration on the effects of the program on teenage pregnancy rates; it finds small but significant effects. The latter examines the effect of the program on teenage pregnancy in more detail. The authors report that the program effectively reduces teenage pregnancy rates, particularly for teenagers with higher self-esteem scores.⁴

The rest of the paper is structured in six additional sections. Section 2 describes the program, Section 3 describes the data, and Section 4 presents the research methodology. Section 5 studies the effects of the program on risk behavior. Section 6 studies the heterogeneous effects of the program by socio-emotional skills. It also studies which personality traits (non-cognitive behavior) are better predictors of risk behavior. Finally, the last section presents the conclusions.

2 Background and context of the intervention

The *Instituto Stimulu Brazil*, a small-scale Brazilian non-governmental organization and the Inter-American Development Bank launched the *Galpão* program in 2009. It was designed with the sole primary objective of improving the employment and labor earnings of at-risk youth living in the *Favelas* (squatters' slum) in Rio de Janeiro, Brazil.⁵

In comparison with other youth training programs in Latin America (LAC), *Galpão* offers treatment over a long time frame.⁶ Participants remain in the program 6 months, 5 h a day, 5 days a week. The training includes 300 h of vocational or technical skills, 180 h of training on academic or basic skills, and 120 h on socio-emotional skills. The vocational or technical training prepares youth for jobs mainly in the areas of construction and soldering. The academic or basic skills training includes remedial courses in mathematics and Portuguese. Some of the concepts that the participants learn in these courses are used in the vocational training. For example, to build a metal bench, they use basic concepts from geometry such as an understanding of angles. The socio-emotional skills classes emphasize certain values and basic principles like respect, tolerance, confidence, prudence, courage, ethics, and civic responsibility.

The novel dimension of the project is the pedagogical approach, which makes extensive use of arts and theater. Almost all sessions start with group activities to facilitate the understanding of skills and concepts. The activities include exercises that make extensive use of artistic and theatrical techniques and are directed by program instructors with an artistic background.⁷

Unlike other youth training programs, the project did not have an explicit job placement service or a formal internship program. Rather, it relied on informal contacts with private-sector partners and partnerships with local firms.

The program's facilities were located in the port area, away from the *Favelas*. Because of the high incidence of violence in the *Favelas* and the youth being unable to move among communities owing to the existence of gangs, the location was chosen in a neutral downtown space. Recognizing that this might be a constraint to participation, the program covered the transportation costs of the participants.⁸

2.1 Selection process

Galpão's participants are selected in a two-stage process. In the first stage, all individuals interested in the program fill a "pre-inscription" questionnaire that includes information related to the personal and household situation, current employment, and education status, among other factors. This information is used to identify individuals with a monthly household income under two minimum salaries and between 17 and 29 years old. Those who meet these criteria are considered for the next phase.

In the second stage, individuals are invited to take mathematics and Portuguese tests on basic concepts. They also go through an interview process. The interview attempts to identify youth who are involved in criminal activities. If the interview reveals that the person is involved in such activities, he is not invited to participate in the program—regardless of his performance on the tests. The youth who perform best on the tests are invited to enroll in the program. Given that the number of eligible individuals is greater than the number of slots available in the program, youth are randomly assigned to the program.

3 Data

This paper uses experimental data collected through the randomized trial of *Galpão*. Given that the number of eligible individuals was greater than the number of slots available in the program, youth were randomly assigned to either the treatment group or the comparison group. In total, 451 youth were eligible. Approximately half of them were randomly assigned to the treatment group and the other half to the control group. There are data for the three cohorts implemented in 2012: the first cohort began in April, the second in June, and the third in July. Around 90 % of the treatment group attended the training, and none of the individuals of the control group participated in the program. The data include the socio-demographic characteristics of the individuals as well as information on their cognitive skill (a cognitive test), socio-emotional skills (Grit Scale and a Social and Personal Competencies Scale), risk behavior, earnings, and employment status.

A baseline survey and two follow-up surveys were conducted by a Brazilian firm (*Overview Pesquisa*). The baseline data were collected between June and October 2012 on a rolling basis.⁹ *Overview Pesquisa* was able to interview 84 % of the initial group. The first follow-up survey took place between 2 and 5 months after the end of training, and the second was between 11 and 13 months. A total of 348 youth responded to the first follow-up survey and 299 individuals to the second. The attrition rates, relative to the baseline sample, at the first follow-up (8 %) and the second follow-up (21 %), are comparable to other impact evaluations of youth training programs.¹⁰

3.1 Measuring risk behavior

We use self-reported measures of risk behavior collected in the baseline survey and all the follow-up surveys. Eight variables are available, including indicator variables for (i) ever smoking; (ii) casual alcohol consumption in the last week; (iii) high alcohol consumption in the last week; (iv) smoking marijuana during the last week; (v) ever consuming any type of hard drug, including cocaine, heroin, ecstasy, or sniffing glue; (vi) participating in a physical fight in the last month; (vii) witnessing a crime in the last year (including carrying weapons, sexual violence, physical aggression, robberies, homicides,

corruption, or police misbehavior); and (viii) being the victim of a crime in the last year (including verbal or physical abuse, threat, being chased, or being injured by any weapon).

In addition to these measures, we constructed a summary index of risk behavior defined to be the equally weighted average of the *z*-scores of its components (i.e., the eight measures of risk behavior), with the sign of each measure oriented so that higher risk behaviors have higher scores (following Kling et al. 2007). The *z*-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation. Thus, the index has a mean zero and standard deviation of one for the control group. As pointed out by Kling et al. (2007), the aggregation improves statistical power to detect effects that go in the same direction within a domain.

Despite the fact that these are the good proxies of risk behavior, it is worth pointing out that they are self-reported, and as such, some of them may be biased towards zero. This is a particular concern for the questions that measure behaviors which are socially regarded as inadequate or are illegal, such as marijuana consumption, hard drug consumption, or participation in physical fights, for which the individuals may refrain to report the truth. It is less of a concern for the variables that measure witnessing a crime or violence victimization or for such behaviors that are legal and commonly observed in young individuals (such as smoking or having a casual drink).

3.2 Measuring socio-emotional skills

We base our analysis on two measures of socio-emotional skills:¹¹ the Social and Personal Competencies Scale and the Grit Scale. The Social and Personal Competencies Scale (CPS for its acronym in Spanish, *Escala de Competencias Personales y Sociales*) was developed in 2010 (Brea 2010; Ibararán et al. 2012). It was designed to measure the effectiveness of the life skills module of the youth training program *Juventud y Empleo* in the Dominican Republic in modifying personality traits. For *Galpão's* evaluation, the test was translated from Spanish to Portuguese and adapted to the local context, a process involving a group of experts in psychology and language.

The CPS scale measures six basic competencies: (i) leadership, (ii) behavior in situations of conflict, (iii) self-esteem, (iv) abilities to relate with others, (v) orderliness, and (vi) empathy and communication skills. It contains 44 questions to which respondents are asked to answer using a four-point (i.e., forced) Likert scale, expressing whether they strongly agree, agree, disagree, or strongly disagree with the specific statement. The responses are used to generate a general score as well as specific scores for each of the six dimensions. A higher score reflects a higher level of development in the social and personal competencies.

The Grit Scale was developed by Duckworth et al. (2007) and Duckworth and Quinn (2009). "Grit" is defined by the authors as "...perseverance and passion for long-term goals. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity and plateaus in progress." The scale, designed for adolescents and adults, measures persistency of effort, enthusiasm about long-term goals,

consistency of interests, and ambition. It is a self-reported test. As Duckworth et al. (2007) point out "...grit is expected to be associated with Big Five Conscientiousness and with self-control but, in its emphasis on focused effort and interest over time, to have incremental predictive validity for high accomplishment over and beyond these other constructs." In general, the authors find that the Grit Scale accounts for more variance in socio-emotional behavior than the Big Five Conscientiousness. The respondent provides a self-rating on a series of items using a five-point Likert scale where "1" refers to disagree strongly and "5" to agree strongly; "3" is the neutral option. In the literature, several versions of the test exist, and the number of questions ranges from 10 to 17. In this study we use a 13-item scale. Higher scores on the scale are associated with higher levels of motivation and determination over years despite failure or adversity.

3.3 Measuring cognitive skills

Cognitive skills are measured by a multiple choice test. The cognitive test was developed by the MIDE UC at the Department of Psychology of the *Pontificia Universidad Católica de Chile* and applied in Busso et al. (2012). The test has previously been used in individuals between 25 and 30 years of age in Argentina and Chile, and it was chosen among 48 possible questions that were tested in those countries. It measures general intellectual ability through questions designed to assess analytic and abstract reasoning. Most of the questions correspond to analogies and figures. Each question presents one pair of related terms, followed by a second term that should be related to one of the four alternatives presented. There is only one correct answer per question. For this study, we used 12 questions (four verbal and eight figures). The total cognitive score was constructed as the sum of the correct answers for each individual—the mean score was 3.98 (s.e. 2.00). The cognitive test was conducted only in the second follow-up survey, which should not be a source of concern because Duflo et al. (2007) suggest that successful randomization makes baseline surveys unnecessary.

Table 1 shows descriptive statistics for the baseline survey for the treatment and control groups. Individuals targeted by the program were single men of approximately 24 years with low levels of education and income. Additionally, approximately 20 % of the individuals in the sample have smoked, 30 % consumed alcohol in the last week, 50 % had more than five drinks in the last week, and at least 3 % reported smoking marijuana in the last week, had consumed hard drugs, or had been part of a fight in the last month. The variables of hard drug consumption or fight participation should be analyzed with caution since the information is self-reported and individuals may refrain from reporting a negative behavior for fear of being excluded from the program. As expected, the variables of witnessing or being a victim of a crime, for which individuals may not have issues with reporting the truth, show substantially higher risk exposure. More particularly, approximately 50 % of the individuals witnessed a crime and 30 % were victims of a crime in the last year.

4 Research methodology

The motivation for relying on randomized variation to identify the effects of youth training programs on risk behavior follows standard concerns of selection biases. Individuals who voluntarily enroll in youth training programs may be different, or may be trending different, than those who choose not to engage in these programs. Since at least some

Table 1 Testing for balanced covariates—mean difference test

	Control group	Treatment group	Difference	SE
Sociodemographics				
Female	0.1	0.1	0.0	(0.0)
Age	23.2	23.1	0.1	(0.4)
Single	0.7	0.8	−0.1	(0.0)
White	0.2	0.2	−0.0	(0.0)
Unemployed	0.2	0.2	−0.0	(0.0)
Ever worked	1.0	0.9	0.0	(0.0)
N. of jobs	4.8	5.1	−0.4	(0.4)
Employed (last week)	0.6	0.5	0.1	(0.1)
Income (unconditional)	498.6	416.1	82.5	(49.4)
Years of education	11.71	11.65	0.06	(0.18)
Household size	3.5	3.9	−0.3	(0.2)
Household income	1554.2	1729.5	−175.3	(127.2)
N. children	0.5	0.6	−0.1	(0.1)
Household's members literate	1.0	1.0	−0.0	(0.0)
N. rooms	4.7	4.8	−0.2	(0.1)
Rent	348.3	338.1	10.2	(32.5)
Has TV	1.0	1.0	−0.0	(0.0)
Has DVD	0.9	0.9	−0.0	(0.0)
Has fridge	1.0	1.0	−0.0	(0.0)
Has freezer	0.2	0.3	−0.1	(0.0)
Has computer	0.5	0.5	−0.0	(0.1)
Has car	0.2	0.2	−0.0	(0.0)
Has motorcycle	0.1	0.1	−0.0	(0.0)
<i>Bolsa Carioca</i> beneficiary	0.0	0.0	−0.0	(0.0)
<i>Bolsa Familia</i> beneficiary	0.1	0.1	−0.0	(0.0)
Socio-emotional skills				
CPS: total	−0.00	−0.21	0.21	(0.11)
Grit: total	−0.00	−0.04	0.04	(0.10)
Risk behavior				
Smoked ever?	0.26	0.21	0.05	(0.05)
Casual alcohol last week?	0.31	0.38	−0.07	(0.05)
High alcohol last week (>5 drinks)?	0.57	0.53	0.03	(0.09)
Consumed marijuana last week?	0.05	0.03	0.02	(0.02)
Ever consumed any substance? ^a	0.03	0.02	0.01	(0.02)
Fight last month?	0.03	0.02	0.00	(0.02)
Witness any crime (last year)	0.53	0.54	−0.01	(0.05)
Victim any crime (last year)	0.31	0.26	0.04	(0.05)
Summary index	0.08	0.05	0.03	(0.04)
Observations	178	150		

The CPS and Grit Scales are presented in z-scores to ease interpretation

^aThe question asks whether the individual has ever consumed any substance such as cocaine, heroin, ecstasy, or sniffed glue; it excludes marijuana consumption. The summary index of risk behavior is an equally weighted average of the z-scores of its components (i.e., the eight measures of risk behavior). The z-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation

of these characteristics may be unobserved for the researcher, the estimates of the causal effects of youth training programs on risk behavior will be biased if these differences are ignored.

Biases are expected to overestimate the effects of the program. In general, individuals who self-select in youth training programs may make better choices and, hence, should show lower levels of risk behavior. Hence, a simple comparison on the risk behavior of individuals who are treated by the youth training program and those who are not is likely to overestimate the effects of the program. Differences on the risk behavior between treatment and control groups may also be exacerbated in time. As individuals receive more training, for example, they could also become more informed on smart choices subsequently reducing their risk behavior and, hence, may decide to receive further training reducing their risk behavior even more, and so on.

We exploit the random variation induced by the *Galpão* program to analyze the effects of youth training programs on risk behavior. For this purpose, we use the following two specifications:

$$Y_{it} = \alpha_0 + \beta T_i \times \text{Post}_t + \gamma_t + \gamma_i + \epsilon_{it} \quad (1)$$

$$Y_{it} = \beta_0 + \beta_1 T_i \times \text{First Follow-up}_t + \beta_2 T_i \times \text{Second Follow-up}_t + \gamma_t + \gamma_i + \mu_{it} \quad (2)$$

where i stands for individual, t stands for the survey wave (baseline, first, and second follow-ups), Y_{it} is the outcome of interest, T_i is a dummy variable for treatment recipients, Post_t is a dummy variable that takes the value of one after the treatment was implemented (first and second follow-ups), and First Follow-up_t and $\text{Second Follow-up}_t$ are dummy variables for the post-treatment periods. The specification in Eq. (1) tests for the total effects of the program, whereas the specification in Eq. (2) tests for the dynamic effects of the program for the first and second survey waves. Standard errors are clustered at the individual level.

In this context, β , β_1 , and β_2 will be unbiased estimates of the effects of the program if the treatment randomization was effective.

4.1 Evidence on the randomization effectiveness

We first use the baseline sample to show the effectiveness of the randomization in the *Galpão* program by estimating the mean difference test for the observable variables. The observable covariates in the baseline can be grouped in sociodemographic characteristics, non-cognitive skills, and risk behavior. Table 1 shows evidence of a successful randomization.

5 Effects of the program

5.1 Employment, cognitive, and socio-emotional skills

We first estimate the effects of the program on labor outcomes, socio-emotional skills, and cognitive skills. The results are presented in Table 2. The table suggests that the *Galpão* program had a positive impact on the probability of having a job in the last week and, hence, on unconditional income (conditional income only includes the observations of the employed individuals). More particularly, we find that the individuals treated by the program saw an additional 10 percentage point likelihood of being employed. In analyzing the dynamic effects of the program, it is clear that the changes in employment are mainly observed in the second follow-up (11 to 13 months after the treatment implementation). This is not surprising since the effects of the program may not be directly

Table 2 Effects of the *Galpão* program

	Labor outcomes			Socio-emotional skills		Cognitive skills		
	Employed (1)	Uncond. income (2)	Cond. income (3)	CPS scale (4)	Grit Scale (5)	Analogies (6)	Figures (7)	Total (8)
Panel A. Total effects								
T × Post	0.11* (0.06)	142.92** (59.94)	73.31 (60.76)	0.16 (0.11)	0.03 (0.10)	0.04 (0.08)	−0.16 (0.22)	−0.11 (0.24)
Obs.	949	944	675	968	968	276	276	277
R-Square	.073	.16	.15	.0068	.0003	.0007	.0019	.00078
Panel B. Dynamic effects								
T × 1st follow-up	0.07 (0.06)	92.73 (62.36)	61.41 (58.02)	0.11 (0.13)	−0.04 (0.12)			
T × 2nd follow-up	0.15** (0.07)	191.47** (77.24)	75.20 (81.30)	0.21 (0.13)	0.10 (0.12)			
Obs.	949	944	675	968	968			
R-Square	.1	.23	.23	.0098	.003			
<i>Controls for all panels</i>								
Individual FE	Y	Y	Y	Y	Y	N	N	N
Period FE	Y	Y	Y	Y	Y	N	N	N

The cognitive test was not tested for dynamic effects because it was only collected in the last follow-up survey. The CPS and Grit Scales are presented in z-scores to ease interpretation. Clustered standard errors at the individual level are presented in parentheses

*Significant at the 10 % level; **significant at the 5 %; ***significant at the 1 %

observable immediately after the program was implemented (3 to 5 months in the first follow-up survey), but they may instead require some months to occur.¹²

We also find no evidence of significant effects of the program on socio-emotional skills or cognitive skills. We hypothesize that the absence of consistent effects of the program on cognitive and non-cognitive skills suggest that, although these variables are evolving through the life cycle as shown by Almlund et al. (2011), they may be difficult to shape in the short to medium term.

5.2 Risk behavior

We present our estimates of the effects of the program on risk behavior in Table 3, finding no direct effects of the program on risk behavior improvements. More particularly, we observe that smoking consumption, witnessing a crime, or being a victim of a crime actually increases for the individuals treated by the program.¹³ We hypothesize that the increments observed on smoking consumption and crime victimization may be explained via the positive income effect of the program. Since the program increased employment probability and, thus, unconditional income, the individuals treated by the program may have higher purchasing power (to buy goods such as cigarettes) and may also become targets of crime.

Since the *Galpão* program was a pilot project, our sample has a small size. This might create concerns of low power in our estimates given the large size of the standard errors. Our results in Table 3, however, allow us to reject the possibility that the program induced a reduction in the risk behavior for most of the observable measures given that the coefficients for the effects of the program are mostly positive (with the exception of high alcohol consumption and fight participation). Specifically, for the case of high alcohol consumption, we cannot rule out zero effects of the program but neither can we reject large effects as the coefficient takes a value of 8 % (see column 3). For the case of fight participation, we cannot rule out a significant effect of the program (although if significant, these effects are small).

6 Effects of *Galpão* by type of socio-emotional skills

We now proceed to check whether the program was able to modify risk behaviors when complemented with high socio-emotional skills. The answer to this question is of relevant policy value as targeting individuals with heterogeneous levels of socio-emotional skills may be an effective way of reducing risk behavior. In addition, recent literature has found a strong and large predictive power of socio-emotional skills on risk behavior and crime (Blattman et al. 2015).

Before we move on to present the main analysis, it is worth pointing out that when the RCT (Randomized Control Trial) was originally designed the analysis of the effects of the program on the subgroup of individuals with heterogeneous levels of socio-emotional skills was not conceived. This was only a question in which we became increasingly interested in after the RCT was implemented. Hence, the evidence presented in this section should be considered a first exploratory attempt to tackle this question. Future research, however, should attempt to solve this caveat by designing RCT interventions that are stratified by socio-emotional skills. We only test for the heterogeneous effects of the program by socio-emotional skills to alleviate concerns of data mining (as pointed by Deaton 2010).

Table 3 Effects of the program on risk behavior

	Smoke (1)	Alcohol ^a (2)	High alcohol (3)	Marijuana (4)	Other drugs (5)	Fights (6)	Witness (7)	Victim (8)	Summary index (9)
Panel A. Total effects									
T × Post	0.06 (0.04)	0.01 (0.05)	−0.08 (0.13)	0.03 (0.02)	0.01 (0.02)	−0.01 (0.02)	0.02 (0.05)	0.06 (0.05)	0.01 (0.11)
Obs.	968	968	338	965	1074	967	1074	1074	337
R-Square	.0051	.000094	.016	.0072	.0062	.0005	.058	.043	.0015
Panel B. Dynamic effects									
T × 1st follow-up	0.03 (0.04)	0.01 (0.05)	−0.08 (0.15)	0.02 (0.02)	0.00 (0.02)	0.01 (0.02)	0.11* (0.06)	0.11* (0.06)	0.08 (0.11)
T × 2nd follow-up	0.09* (0.05)	0.00 (0.06)	−0.07 (0.14)	0.03 (0.02)	0.01 (0.02)	−0.04 (0.03)	−0.06 (0.06)	0.01 (0.05)	−0.06 (0.14)
Obs.	968	968	338	965	1074	967	1074	1074	337
R-Square	.01	.0038	.032	.0073	.0078	.0099	.082	.063	.019
Controls for all panels									
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Period FE	Y	Y	Y	Y	Y	Y	Y	Y	Y

The summary index of risk behavior is an equally weighted average of the z-scores of its components (i.e., the eight measures of risk behavior). The z-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation. Clustered standard errors at the individual level are presented in parentheses

^aCasual alcohol

*Significant at the 10 % level; **significant at the 5 %; ***significant at the 1 %. None of the coefficients are significant when we adjust the significance level using the Bonferroni's correction for multiple testing

To test whether the program was more effective in reducing risky behaviors for individuals with higher socio-emotional skills, we run a reduced form regression of the risk indicators on the triple interaction of a treatment dummy, a post-treatment time dummy, and the CPS or Grit Scales. The results of the exercise are only informative on the effects of the *Galpão* program on individuals that have heterogeneous levels of socio-emotional skills.

The results of the exercise are presented in Table 4. They suggest that individuals with higher levels of socio-emotional skills who were treated by the program had a lower probability of consuming alcohol, had a lower probability of participating in fights, and faced a lower probability of being victims of crime.

To understand what types of personality traits are more related with risk behavior, we test for the correlation between the different types of socio-emotional skill and our multiple measures of risk behavior. Table 5 presents a panel regression of each risk behavior indicator on the z-scores for the socio-emotional tests (including fixed effects by individual and period of data collection—i.e., baseline, first, or second follow-up). In general, the estimates show a strong and negative correlation of the non-cognitive tests and risk behavior. The correlation is particularly strong for the CPS subscale measurements of empathy and the Grit subscale measurements of consistency of interest. Empathy measures the capacity to understand and accept other individuals, to consider their point of view, and to show respect for opinions that differ from one's own. Consistency of interest measures the capacity for maintaining constant interest in goals and projects and keeping stability in actions and thoughts concerning goal achievement.

Hence, targeting changes in empathy and consistency of effort may be an effective way of reducing the risk behavior of young individuals. Our results are in line with evidence by (Dodge et al. 2014), who carried out a randomized controlled trial to test the efficacy of an early intervention to prevent adult psychopathology and to improve well-being in children with early-onset conduct problems. The authors find that early interventions to improve soft skills such as self-control and empathy are crucial for preventing future risk behavior.

We also study the predictability of socio-emotional skills on the risk behavior of individuals that belong to different age, gender, or income groups in the Appendix. The results suggest that higher socio-emotional z-scores on empathy and consistency of effort are strongly associated with lower risk behavior for males in their upper twenties (25 to 29 years) with low levels of income.

7 Conclusions

We use experimental data for the youth training program *Galpão*, implemented in the *Favelas* in Brazil, to explore the causal relationship between youth training programs and risk behavior. Our results suggest that the youth training program was not successful in reducing risk behaviors such as smoking, casual alcohol consumption, drug consumption, or crime victimization. However, we were not able to rule out significant effects of the program on high alcohol consumption and fight participation. We also find that those individuals that had higher levels of non-cognitive skills show relevant reductions in their risk behavior.

Table 4 Effects of the program on risk behavior (by type of socio-emotional skills)

	Smoke		Casual alcohol		High alcohol		Marijuana		Drug consumption	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Total effects										
T × Post × CPS	−0.013 (0.030)		−0.001 (0.041)		−0.072 (0.094)		−0.011 (0.015)		0.000 (0.011)	
T × Post × Grit		−0.024 (0.033)		−0.071* (0.041)		−0.110 (0.090)		−0.009 (0.015)		0.010 (0.010)
Obs.	968	968	968	968	338	338	965	965	968	968
R-square	.0085	.012	.0022	.01	.042	.049	.0082	.012	.0036	.005
Panel B. Dynamic effects										
T × 1st follow-up × CPS	−0.002 (0.031)		−0.033 (0.046)		−0.034 (0.106)		−0.012 (0.025)		−0.014 (0.012)	
T × 2nd follow-up × CPS	−0.034 (0.052)		0.039 (0.064)		−0.147 (0.115)		−0.009 (0.019)		0.016 (0.014)	
T × 1st follow-up × Grit		−0.025 (0.035)		−0.130*** (0.045)		−0.008 (0.116)		−0.002 (0.025)		−0.006 (0.017)
T × 2nd follow-up × Grit		−0.021 (0.048)		−0.005 (0.054)		−0.230** (0.106)		−0.018 (0.019)		0.026 (0.017)
Obs.	968	968	968	968	338	338	965	965	968	968
R-square	.019	.017	.0079	.02	.067	.082	.0082	.013	.013	.014

Table 4 Effects of the program on risk behavior (by type of socio-emotional skills) (*Continued*)

	Fights		Witness of crime		Victim of crime		Summary index			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Panel C. Total effects										
T × Post × CPS	−0.021 (0.015)		0.037 (0.044)		−0.076** (0.037)		−0.089 (0.067)			
T × Post × Grit		−0.022 (0.016)		0.062 (0.047)		−0.017 (0.035)		−0.073 (0.075)		
Obs.	967	967	968	968	968	968	337	337		
R-square	.0032	.0088	.033	.036	.036	.04	.013	.0087		
Panel D. Dynamic effects										
T × 1st follow-up × CPS	−0.031** (0.015)		0.017 (0.055)		−0.068 (0.049)		−0.084 (0.086)			
T × 2nd follow-up × CPS	−0.009 (0.026)		0.064 (0.065)		−0.084 (0.053)		−0.099 (0.099)			
T × 1st follow-up × Grit		−0.034* (0.018)		0.081 (0.057)		−0.012 (0.046)		−0.009 (0.104)		
T × 2nd follow-up × Grit		−0.010 (0.025)		0.051 (0.067)		−0.011 (0.054)		−0.151 (0.102)		
Obs.	967	967	968	968	968	968	337	337		
R-square	.0069	.013	.05	.047	.049	.051	.04	.031		
Controls for all panels										
Ind. FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

The controls include all the double interactions between variables. The summary index of risk behavior is an equally weighted average of the z-scores of its components (i.e., the eight measures of risk behavior). The z-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation. Clustered standard errors at the individual level are presented in parentheses

*Significant at the 10 %; **significant at the 5 %; ***significant at the 1 %

Table 5 Correlation between risk behavior and non-cognitive skills

	Smoke (1)	C. alcohol (2)	H. alcohol (3)	Marijuana (4)	Drugs (5)	Fight (6)	Witness (7)	Victim (8)	Summary index (9)
CPS: leadership	−0.007 (0.011)	−0.006 (0.013)	0.036 (0.025)	−0.003 (0.006)	0.001 (0.003)	0.001 (0.003)	−0.010 (0.015)	−0.002 (0.013)	0.008 (0.022)
CPS: conflict beh.	−0.002 (0.010)	−0.014 (0.014)	0.011 (0.023)	−0.007 (0.007)	−0.005 (0.003)	−0.008* (0.004)	−0.014 (0.015)	−0.014 (0.013)	−0.032 (0.023)
CPS: self-esteem	0.002 (0.013)	0.005 (0.014)	−0.001 (0.024)	−0.003 (0.005)	−0.000 (0.004)	−0.006 (0.004)	−0.020 (0.016)	−0.012 (0.013)	−0.055** (0.022)
CPS: relations	0.006 (0.013)	0.010 (0.015)	0.071*** (0.024)	−0.001 (0.008)	0.002 (0.005)	0.005 (0.005)	−0.008 (0.015)	0.005 (0.014)	0.032 (0.026)
CPS: order	0.007 (0.011)	−0.002 (0.013)	0.020 (0.023)	−0.003 (0.006)	0.003 (0.004)	−0.004 (0.004)	−0.031** (0.015)	−0.009 (0.013)	−0.037* (0.022)
CPS: empathy	−0.020 (0.012)	−0.011 (0.014)	−0.019 (0.026)	−0.008* (0.005)	−0.002 (0.003)	−0.013*** (0.005)	−0.041*** (0.016)	−0.036*** (0.014)	−0.068*** (0.023)
CPS: total	−0.006 (0.012)	−0.008 (0.015)	0.022 (0.024)	−0.008 (0.007)	−0.001 (0.004)	−0.008** (0.004)	−0.032** (0.015)	−0.020 (0.014)	−0.041* (0.022)
Grit: consistency	−0.028** (0.012)	−0.038*** (0.014)	−0.047** (0.024)	−0.009* (0.005)	−0.003 (0.004)	−0.009** (0.004)	−0.036** (0.016)	−0.038*** (0.012)	−0.052** (0.021)
Grit: perseverance	0.016 (0.013)	−0.007 (0.015)	−0.024 (0.026)	−0.008 (0.006)	0.001 (0.003)	0.002 (0.004)	−0.006 (0.016)	−0.018 (0.014)	−0.022 (0.025)
Grit: ambition	0.009 (0.012)	−0.011 (0.015)	−0.034 (0.024)	−0.011* (0.006)	0.000 (0.004)	0.000 (0.004)	−0.009 (0.015)	−0.030** (0.014)	−0.039** (0.023)
Grit: total	−0.009 (0.013)	−0.027* (0.016)	−0.034 (0.027)	−0.014** (0.007)	−0.002 (0.005)	−0.000 (0.005)	−0.018 (0.016)	−0.042*** (0.014)	−0.042 (0.027)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. CPS and Grit Scores are presented in standard deviations to ease interpretation. Clustered standard errors at the individual level are presented in parentheses

*Significant at the 10 %; **significant at the 5 %; ***significant at the 1 %

It is of crucial importance to note here some caveats of our analysis which could be improved in future research. First, despite using a credible source of identification, the *Galpão* program was a pilot intervention, and as such, it only treated a small sample of individuals. Future research examining similar questions should attempt to increase the sample size to alleviate small sample bias concerns. Second, our measures of risk behaviors are self-reported which can be biased approximations of the true risk behavior of the individuals that were surveyed. This is a special concern for the self-reported variables of risk behavior that are illegal such as hard drug consumption or participation in physical fights. It is less of a concern for variables that are socially accepted and legal (such as smoking or alcohol consumption) as well as for those that measure witnessing a crime or victimization. Future research should attempt to measure risk behavior directly.

Endnotes

¹As suggested by UNODC (2014) considering the homicide rates of 219 countries, involvement in crime tends to peak in adolescence and decline thereafter.

²For a comprehensive review of crime and violence trends in Brazil, see Murray et al. (2013).

³Heckman and Masterov (2007) and Heckman and Carneiro (2003) study when in life socio-emotional skills develop and stress the importance of early investments in both cognitive and socio-emotional skills.

⁴More particularly, they find that females aged 16–19 years in the treatment group are six percentage points less likely to be pregnant at the time of the follow-up survey on average. This corresponds to a 48 % drop compared to the average pregnancy rate in the same age group in the control group.

⁵According to the last census, in 2010, approximately 11.4 million people live in *Favelas*, which represents 6 % of Brazil's population.

⁶For example, *Juventud y Empleo* in the Dominican Republic includes 225 h of a wide range of job training courses divided into 75 h of life skills training and 150 h of technical or vocational training (Card et al. 2011; Ibararán et al. 2012). In Argentina, *entra21* comprises 100 h of technical training, 64 h of life skills training, and 16 extra hours depending on the type of course (Alzua et al. 2015).

⁷For instance, during the socio-emotional training, the class is divided into small groups. The instructor has the participants act out short plays in which they demonstrate a value (e.g., courage) in their daily lives. The next session starts with the same exercise focused on a different value (e.g., prudence). Then the participants discuss the stories. For example, in a particular session, one group dramatized a youth witnessing an assault and intervening to stop it, showing courage. They reflected upon it. Was it appropriate to be courageous in such a situation? Did he put his own life in danger? They then concluded that he risked his life in the situation, and he should have acted with prudence. This type of exercise teaches participants to reflect, analyze, and identify the appropriate values for different situations. The academic training relies on different activities. For example, to introduce the equation concept, the instructor uses a weight scale and explains to the participants that equilibrium requires both sides of the scale bear equal loads. Thus, an abstract concept is taught in an experimental way.

⁸Based on administrative data, the cost per participant is R\$ 810 (USD 385) a month or R\$ 4680 (USD 2225) for the entire training. Transportation costs represent around 27 % of the monthly cost.

⁹In the case of the first cohort, the survey was done after the training began. Although randomization makes baseline surveys unnecessary in principle (Duflo et al. 2007), the questionnaire included retrospective time frames to capture information before the program started. Furthermore, a balance check between the treatment and control groups from the first cohort versus the other two cohorts reveals no differences, particularly in time-variant variables.

¹⁰These attrition rates are comparable to other impact evaluations of youth training programs in Latin America (38 % in Card et al. (2011); 18.5 % in Attanasio et al. (2011); 18.5 % in Alzua et al. (2015); and 20 % in Ibarrarán et al. (2012)).

¹¹Non-cognitive skills are difficult to define and generally are associated to work and study habits (i.e., motivation discipline) and behavioral attributes like self-esteem, locus of control, socio-emotional regulation, and self-control (Heckman 2008; Holmlund and Silva 2014).

¹²This results are in line with the results presented in the impact evaluation of the *Galpão* program by (Calero et al. 2015).

¹³We also adjust the significance level to correct for multiple testing using Bonferroni's correction. When this adjustment is included, none of the coefficients presented in Table 3 are statistically significant.

Appendix: non-cognitive skills and risky behavior

Table 6 Correlation between risky behavior and non-cognitive skill (ages < 20)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any Substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	0.000 (0.014)	0.000 (0.014)	−0.004 (0.025)	0.009 (0.007)	−0.001 (0.025)	0.000 (0.008)	−0.021 (0.029)
CPS: conflict beh.	0.002 (0.017)	0.002 (0.017)	−0.053** (0.026)	0.009 (0.007)	−0.043 (0.029)	−0.010 (0.013)	−0.005 (0.031)
CPS: self-esteem	−0.004 (0.021)	−0.004 (0.021)	0.013 (0.028)	0.004 (0.004)	0.017 (0.029)	−0.005 (0.011)	−0.008 (0.033)
CPS: relations	0.006 (0.019)	0.006 (0.019)	0.028 (0.028)	0.014 (0.009)	0.027 (0.029)	0.005 (0.014)	−0.022 (0.029)
CPS: order	−0.005 (0.020)	−0.005 (0.020)	−0.007 (0.023)	0.001 (0.007)	−0.014 (0.026)	0.000 (0.010)	−0.021 (0.028)
CPS: empathy	−0.002 (0.013)	−0.002 (0.013)	−0.020 (0.024)	−0.007 (0.005)	−0.034 (0.024)	−0.032** (0.013)	−0.044* (0.026)
CPS: total	−0.001 (0.018)	−0.001 (0.018)	−0.018 (0.026)	0.006 (0.006)	−0.022 (0.031)	−0.016 (0.010)	−0.034 (0.030)
Grit: consistency	−0.010 (0.019)	−0.010 (0.019)	−0.038 (0.026)	−0.001 (0.003)	−0.045* (0.024)	−0.020** (0.009)	−0.045 (0.029)
Grit: perseverance	0.031 (0.020)	0.031 (0.020)	0.005 (0.030)	0.002 (0.005)	0.018 (0.031)	0.008 (0.010)	−0.021 (0.030)
Grit: ambition	0.014 (0.021)	0.014 (0.021)	0.021 (0.032)	0.003 (0.003)	0.018 (0.034)	0.008 (0.011)	−0.015 (0.028)
Grit: total	0.027 (0.020)	0.027 (0.020)	−0.009 (0.032)	0.000 (0.003)	−0.005 (0.030)	−0.007 (0.010)	−0.037 (0.030)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. Robust standard errors are presented in parenthesis. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarra et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %.

Table 7 Correlation between risky behavior and socio-emotional skills (age 20 to 24)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	−0.008 (0.017)	−0.008 (0.017)	−0.010 (0.022)	−0.003 (0.009)	−0.008 (0.021)	0.002 (0.005)	−0.018 (0.023)
CPS: conflict beh.	−0.014 (0.014)	−0.014 (0.014)	0.012 (0.022)	−0.009 (0.010)	0.004 (0.020)	−0.004 (0.005)	−0.027 (0.021)
CPS: self-esteem	0.018 (0.021)	0.018 (0.021)	0.012 (0.022)	−0.008 (0.009)	0.016 (0.023)	−0.005 (0.005)	−0.017 (0.025)
CPS: relations	0.020 (0.019)	0.020 (0.019)	0.013 (0.023)	0.001 (0.013)	0.010 (0.023)	0.006 (0.005)	−0.016 (0.023)
CPS: order	0.008 (0.016)	0.008 (0.016)	0.022 (0.022)	−0.006 (0.009)	0.016 (0.020)	−0.002 (0.005)	−0.030 (0.023)
CPS: empathy	−0.023 (0.023)	−0.023 (0.023)	0.001 (0.027)	−0.014 (0.010)	−0.010 (0.026)	−0.000 (0.004)	−0.025 (0.027)
CPS: total	−0.006 (0.019)	−0.006 (0.019)	0.011 (0.025)	−0.011 (0.011)	0.004 (0.025)	−0.001 (0.004)	−0.034 (0.024)
Grit: consistency	−0.020 (0.018)	−0.020 (0.018)	−0.045** (0.022)	−0.015 (0.010)	−0.023 (0.019)	−0.003 (0.005)	−0.031 (0.025)
Grit: perseverance	−0.014 (0.020)	−0.014 (0.020)	−0.022 (0.025)	−0.019 (0.012)	−0.014 (0.022)	0.007 (0.006)	0.012 (0.026)
Grit: ambition	−0.001 (0.019)	−0.001 (0.019)	−0.041* (0.024)	−0.018* (0.011)	−0.010 (0.022)	0.001 (0.007)	0.004 (0.024)
Grit: total	−0.019 (0.021)	−0.019 (0.021)	−0.062** (0.027)	−0.030** (0.015)	−0.039* (0.024)	0.006 (0.008)	0.001 (0.029)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. Robust standard errors are presented in parenthesis. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarraran et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation

Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %

Table 8 Correlation between risky behavior and socio-emotional skills (age 25 to 29)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	−0.010 (0.027)	−0.010 (0.027)	−0.011 (0.022)	−0.018 (0.013)	−0.013 (0.026)	0.003 (0.004)	0.015 (0.027)
CPS: conflict beh.	0.010 (0.025)	0.010 (0.025)	−0.036 (0.024)	−0.024* (0.013)	−0.018 (0.025)	−0.009 (0.007)	0.003 (0.028)
CPS: self-esteem	−0.009 (0.027)	−0.009 (0.027)	−0.018 (0.026)	−0.008 (0.011)	−0.029 (0.025)	−0.007 (0.008)	−0.034 (0.027)
CPS: relations	−0.013 (0.028)	−0.013 (0.028)	−0.016 (0.027)	−0.022 (0.014)	−0.043* (0.025)	0.004 (0.006)	0.013 (0.026)
CPS: order	0.012 (0.023)	0.012 (0.023)	−0.042* (0.023)	−0.004 (0.013)	−0.002 (0.023)	−0.009 (0.009)	−0.030 (0.028)
CPS: empathy	−0.052** (0.026)	−0.052** (0.026)	−0.021 (0.021)	−0.008 (0.008)	−0.055** (0.023)	−0.007 (0.007)	−0.055** (0.029)
CPS: total	−0.017 (0.027)	−0.017 (0.027)	−0.039* (0.023)	−0.022 (0.014)	−0.042* (0.025)	−0.006 (0.007)	−0.022 (0.028)
Grit: consistency	−0.063** (0.027)	−0.063** (0.027)	−0.036 (0.025)	−0.013 (0.010)	−0.052** (0.025)	−0.001 (0.007)	−0.023 (0.028)
Grit: perseverance	0.035 (0.026)	0.035 (0.026)	−0.013 (0.025)	−0.012 (0.010)	0.017 (0.026)	−0.005 (0.007)	−0.008 (0.026)
Grit: ambition	0.024 (0.027)	0.024 (0.027)	−0.004 (0.025)	−0.021* (0.013)	0.015 (0.029)	−0.007 (0.007)	−0.016 (0.027)
Grit: total	−0.031 (0.027)	−0.031 (0.027)	−0.021 (0.026)	−0.018 (0.012)	−0.025 (0.026)	0.004 (0.007)	−0.015 (0.027)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. Robust standard errors are presented in parenthesis. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarra et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %.

Table 9 Correlation between risky behavior and socio-emotional skills (men)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	−0.014 (0.012)	−0.014 (0.012)	−0.007 (0.015)	−0.007 (0.006)	−0.014 (0.014)	0.001 (0.004)	−0.008 (0.016)
CPS: conflict beh.	−0.012 (0.011)	−0.012 (0.011)	−0.020 (0.015)	−0.012* (0.007)	−0.025* (0.014)	−0.007* (0.004)	−0.017 (0.016)
CPS: self-esteem	−0.000 (0.014)	−0.000 (0.014)	0.008 (0.016)	−0.006 (0.005)	0.003 (0.016)	−0.005 (0.005)	−0.016 (0.017)
CPS: relations	−0.000 (0.014)	−0.000 (0.014)	0.015 (0.016)	−0.006 (0.008)	−0.006 (0.016)	0.006 (0.006)	−0.008 (0.017)
CPS: order	−0.001 (0.012)	−0.001 (0.012)	−0.005 (0.014)	−0.008 (0.006)	−0.007 (0.014)	−0.004 (0.005)	−0.037** (0.016)
CPS: empathy	−0.031** (0.014)	−0.031** (0.014)	−0.011 (0.016)	−0.010* (0.006)	−0.033** (0.016)	−0.015*** (0.006)	−0.040** (0.017)
CPS: total	−0.018 (0.014)	−0.018 (0.014)	−0.010 (0.016)	−0.013* (0.007)	−0.026 (0.017)	−0.008* (0.004)	−0.033* (0.017)
Grit: consistency	−0.028** (0.013)	−0.028** (0.013)	−0.039** (0.015)	−0.012** (0.006)	−0.036*** (0.014)	−0.010** (0.005)	−0.036** (0.017)
Grit: perseverance	0.007 (0.014)	0.007 (0.014)	−0.007 (0.017)	−0.012** (0.006)	−0.000 (0.016)	0.003 (0.005)	−0.001 (0.017)
Grit: ambition	0.001 (0.014)	0.001 (0.014)	−0.013 (0.017)	−0.016** (0.007)	−0.003 (0.017)	0.001 (0.005)	−0.007 (0.016)
Grit: total	−0.016 (0.015)	−0.016 (0.015)	−0.030* (0.018)	−0.019** (0.007)	−0.030* (0.016)	−0.000 (0.005)	−0.015 (0.017)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarraran et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Each regression includes fixed effects by individual and year. Robust standard errors are presented in parenthesis

Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %

Table 10 Correlation between risky behavior and socio-emotional skills (women)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	0.043* (0.023)	0.043* (0.023)	0.027 (0.028)	0.022 (0.014)	0.068** (0.034)	−0.004 (0.010)	−0.010 (0.037)
CPS: conflict beh.	0.066** (0.027)	0.066** (0.027)	0.035 (0.044)	0.023 (0.015)	0.090** (0.046)	−0.011 (0.013)	0.008 (0.037)
CPS: self-esteem	0.031 (0.037)	0.031 (0.037)	0.010 (0.031)	0.016 (0.013)	0.036 (0.031)	−0.012 (0.009)	−0.026 (0.042)
CPS: relations	0.054** (0.023)	0.054** (0.023)	0.023 (0.028)	0.025 (0.017)	0.063* (0.033)	0.002 (0.006)	0.021 (0.035)
CPS: order	0.061** (0.029)	0.061** (0.029)	0.037 (0.026)	0.028 (0.019)	0.096*** (0.033)	−0.004 (0.004)	0.033 (0.038)
CPS: empathy	0.032** (0.016)	0.032** (0.016)	0.008 (0.034)	−0.000 (0.010)	0.011 (0.033)	−0.005 (0.011)	−0.040 (0.042)
CPS: total	0.073*** (0.028)	0.073*** (0.028)	0.033 (0.040)	0.024 (0.016)	0.087** (0.044)	−0.007 (0.011)	−0.009 (0.041)
Grit: consistency	−0.027 (0.033)	−0.027 (0.033)	0.001 (0.039)	0.010 (0.008)	−0.025 (0.042)	−0.001 (0.012)	−0.032 (0.043)
Grit: perseverance	0.071** (0.030)	0.071** (0.030)	0.022 (0.034)	0.016 (0.011)	0.075* (0.041)	−0.000 (0.009)	−0.040 (0.037)
Grit: ambition	0.065** (0.028)	0.065** (0.028)	0.025 (0.029)	0.011 (0.008)	0.079** (0.036)	−0.007 (0.013)	−0.010 (0.034)
Grit: total	0.049 (0.037)	0.049 (0.037)	0.026 (0.037)	0.013 (0.011)	0.061 (0.044)	−0.000 (0.017)	−0.029 (0.040)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarra et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Robust standard errors are presented in parenthesis. Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %

Table 11 Correlation between risky behavior and socio-emotional skills (income quintile 1)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	0.016 (0.028)	0.016 (0.028)	−0.034 (0.040)	−0.004 (0.023)	−0.003 (0.049)	0.016* (0.009)	−0.074* (0.040)
CPS: conflict beh.	0.006 (0.027)	0.006 (0.027)	−0.046 (0.040)	−0.006 (0.019)	−0.050 (0.041)	−0.002 (0.013)	−0.024 (0.033)
CPS: self-esteem	0.020 (0.039)	0.020 (0.039)	−0.069 (0.045)	−0.018 (0.020)	−0.033 (0.046)	−0.005 (0.008)	−0.041 (0.042)
CPS: relations	0.001 (0.028)	0.001 (0.028)	0.001 (0.032)	−0.018 (0.028)	−0.030 (0.037)	0.021* (0.013)	−0.050 (0.035)
CPS: order	0.018 (0.025)	0.018 (0.025)	−0.033 (0.032)	−0.018 (0.015)	−0.012 (0.036)	−0.016 (0.011)	−0.090*** (0.029)
CPS: empathy	−0.014 (0.030)	−0.014 (0.030)	−0.024 (0.039)	−0.031** (0.013)	−0.039 (0.041)	−0.030* (0.018)	−0.096*** (0.035)
CPS: total	0.003 (0.028)	0.003 (0.028)	−0.046 (0.037)	−0.023 (0.019)	−0.048 (0.048)	−0.010 (0.009)	−0.093*** (0.031)
Grit: consistency	−0.059 (0.038)	−0.059 (0.038)	−0.068 (0.044)	−0.021 (0.014)	−0.084** (0.038)	−0.015 (0.012)	−0.092** (0.044)
Grit: perseverance	0.019 (0.044)	0.019 (0.044)	−0.013 (0.043)	−0.023 (0.019)	0.024 (0.048)	0.019 (0.014)	−0.039 (0.037)
Grit: ambition	0.008 (0.046)	0.008 (0.046)	−0.018 (0.041)	−0.029 (0.020)	0.001 (0.049)	0.018 (0.013)	−0.024 (0.034)
Grit: total	−0.012 (0.046)	−0.012 (0.046)	−0.065 (0.047)	−0.034* (0.019)	−0.047 (0.046)	0.009 (0.011)	−0.064* (0.037)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarra et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions, and each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Robust standard errors are presented in parenthesis

Estimates with *** are significant at the 1 %, those with ** are significant at the 5 %, and those with * are significant at the 10 %

Table 12 Correlation between risky behavior and socio-emotional skills (income quintile 5)

	Smoke (1)	Alcohol (2)	Marijuana (3)	Any substance (4)	Fight (5)	Witness crime (6)	Victim (7)
CPS: leadership	−0.003 (0.028)	−0.003 (0.028)	0.014 (0.048)	−0.008 (0.026)	−0.000 (0.041)	0.009 (0.009)	0.067 (0.042)
CPS: conflict beh.	0.010 (0.022)	0.010 (0.022)	0.004 (0.043)	−0.005 (0.024)	−0.013 (0.041)	−0.012 (0.010)	0.040 (0.041)
CPS: self-esteem	−0.022 (0.043)	−0.022 (0.043)	0.055 (0.060)	−0.031 (0.033)	−0.006 (0.063)	0.004 (0.004)	0.009 (0.048)
CPS: relations	0.032 (0.042)	0.032 (0.042)	0.043 (0.064)	−0.015 (0.040)	0.015 (0.061)	0.013 (0.017)	0.070 (0.044)
CPS: order	−0.003 (0.028)	−0.003 (0.028)	0.013 (0.047)	−0.026 (0.022)	0.026 (0.042)	0.016 (0.012)	0.007 (0.051)
CPS: empathy	−0.038 (0.028)	−0.038 (0.028)	−0.049 (0.050)	−0.005 (0.022)	−0.049 (0.040)	0.003 (0.004)	−0.013 (0.038)
CPS: total	−0.006 (0.031)	−0.006 (0.031)	0.009 (0.056)	−0.019 (0.039)	−0.011 (0.049)	0.004 (0.006)	0.047 (0.045)
Grit: consistency	0.010 (0.022)	0.010 (0.022)	0.004 (0.049)	−0.001 (0.016)	0.001 (0.035)	0.004 (0.006)	−0.055 (0.046)
Grit: perseverance	0.054 (0.037)	0.054 (0.037)	0.072 (0.048)	−0.029 (0.024)	0.052 (0.047)	0.024 (0.016)	0.063 (0.050)
Grit: ambition	0.026 (0.025)	0.026 (0.025)	0.052 (0.044)	−0.039 (0.028)	0.025 (0.040)	0.020 (0.015)	0.003 (0.040)
Grit: total	0.025 (0.034)	0.025 (0.034)	0.062 (0.053)	−0.026 (0.023)	0.017 (0.043)	0.022 (0.015)	0.022 (0.052)

Each coefficient of the table presents the estimates of a panel regression of a given risk behavior variable on each of the socio-emotional skill scores. Each regression includes fixed effects by individual and year. The Social and Competence Personal Scale (CPS) is a non-cognitive test designed and tested by Brea (2010) and Ibarraran et al. (2012). It measures an individual's socio-emotional skill in six basic competencies: leadership, behavior in situations of conflict, self-esteem, abilities to relate with others, order, and empathy and communication skills. It is composed of 44 questions. Each question has a scale of 0 to 3 describing personal competencies of the individual. It produces a general score and a specific score for each of the six dimensions. A higher CPS score is associated with a higher level of development in the social and personal competencies. The Grit Scale is a non-cognitive test designed by Duckworth et al. (2007). It measures determination and strength of mind through the dimensions of consistency of interests, persistency of effort, and ambition. It is composed of 13 questions. Higher scores on the Grit Scale are associated with higher levels of determination and motivation during long periods of time despite failure or adversity. Non-cognitive scores are presented in standard deviations to ease interpretation, i.e., the mean was subtracted to each observation and the result was divided by the standard deviation. Robust standard errors are presented in parenthesis

*Significant at 10 %; ** significant at 5 %; ***significant at 1 %

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