Emotional Regulation and After-School Programs in highly violent communities.

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Abstract

This paper studies the impact of a program to prevent violence on emotional regulation and socio-emotional skills among at-risk children. By conducting lab-in-the-field experiments on a randomized controlled trial in a program in El Salvador, we were able to estimated the impact on emotional regulation that was measured using physiological recordings of the widely-studied arousal (a proxy of stress) and valence (a proxy for intrinsic attractiveness or aversiveness of an event) dimensions of emotions. In particular, children were allocated to either of the following three groups: control (no program), homogeneous and heterogeneous groups in terms of their predicted individual level of violence. We found that the program had a significant impact on emotional regulation and socio-emotional skills. In particular, we found a reduction in the reaction towards positive stimuli in 0.31 sd and in Locus of Control (a proxy of an increase in the belief that one's life can be controlled) in 0.26 sd. We found also heterogeneous effects by initial level of violence and gender: effects are driven by less violent children and by girls, when compared to their respective control group. In terms of group composition, there were greater effects in the homogeneous group compared to the control group on resting-state valence and Locus of Control. Moreover, we estimated that girls experienced a greater impact on emotional regulation when participating in heterogeneous group relative to homogeneous groups and with boys in heterogeneous groups.

Keywords: Emotional Regulation, After-School Clubs, Violence.

JEL Codes: I25, D87

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Introduction

Recent evidence indicates that the type of emotions a person faces is relevant in many of their cognitive and behavioral outcomes, such as attention, memory, and perception (Damasio, 1994, Lakoff, 2008, Salzman and Fusi, 2010, Fuster, 2013). According to DellaVigna (2009), even slight manipulations of the individual's mood have a substantial impact on their behavior, both in the short and medium term. These emotions are often determined largely by the environment in which individuals are involved, such as their communities, schools or homes. Therefore, people exposed to highly risky environments might face greater differences compared to their less exposed peers, in terms of learning and development of cognitive and socio-emotional skills, creating (or widening) a gap on educational or labor market outcomes, that could be explained by differentials in the level of exposure to those environments.

Additional evidence indicates that interventions aimed at improving socio-emotional skills among young people have a positive impact on behavior and academic outcomes (Blattman et al., 2017, Carrel and Sacerdote, 2013, Heckman and Kautz, 2012, Cunha et al., 2010). Egaña-DelSol (2017) concludes that these results are in line with evidence from neuroscience literature that indicates that it is possible to affect socio-emotional skills during adolescence. Since it is the age in which the brain, particularly the prefrontal cortex, is still in process of development (Fuster, 2002, 2013, Sigman et al., 2014). Therefore, it is relevant to identify policy interventions which help school-age children to foster their level of emotional regulation, which can be seen as proxy of resilience.

In this paper, we measure the impact of a program to prevent violence on emotional regulation and socio-emotional skills among at-risk children. By conducting lab-in-the-field experiments on a randomized controlled trial in El Salvador, we were able to estimate the impact on emotional regulation that was measured using physiological recordings of the widely-studied arousal (a proxy of stress) and valence (a proxy for intrinsic attractiveness or aversiveness of an event) dimensions of emotions. Additionally, we estimate whether the composition of the groups in which students participate, in terms of violence, is determinant in their emotional resilience level.

We use a random subsample from the experimental setting developed by Dinarte (2017)[1]. In this setting, selected students were allowed to participate in one club form April to mid-October during the full 2016 academic year, according to the random assignment between treatment and control groups, stratifying by school and academic level. Within the treated students, Dinarte (2017) defined two categories of treatments: the first treatment was the exposure of the student to a club of heterogeneous peers according to the predicted propensity to commit a violent act (IVV), and the second treatment was the assignment of the student to a Club of homogeneous peers. Within this second treatment, students were separated in two groups: students whose predicted propensity was higher than the median of the distribution, which were assigned to a club constituted by peers with high predicted propensity to violence. The others were assigned to a club of peers with low predicted propensity to violence. All randomly selected participants attended two sessions per week which last 1.5 hours each and take place just after school hours, and were implemented by volunteers. Each session includes the implementation of the club's curricula according to each type of club and, at the end of the session, a discussion about a specific topic oriented to reduce violent behaviors.

To measure the overall impact of participating in the program on emotional regulation, we compare the subsample of students randomly assigned to attend the program (with any kind of group composition) and the control subsample. We also estimated heterogeneous treatment effects by initial level of predicted violence and by gender. To measure the impact of group composition, we compare the two sub treatments, participate in the program in heterogeneous and homogeneous groups. Additionally, to analyze the effect of tracking, we follow Duflo, Dupas and Kremer (2012) and restrict the sample to treated students in the homogeneous group, and estimate a second order polynomial of the students' percentile in the IVV distribution function.

We present three main results. First, in the estimations of the overall (ITT) effects of participating in the program, we found an effect on emotional regulation in the clubs' participants compared to the control group and an impact on responsiveness to positive emotionally laden stimulus, using the neurophysiological recordings. In particular, the program reduces the reaction towards positive

[1]This study was registered in the AEA RCT Registry and the unique identifying number is: AEARCTR-"AEARCTR-0001602".

stimuli in 0.31 sd and increases in the belief that one's life can be self-controlled in 0.26 sd. We find no statistically significant effects on the rest of outcomes.

Second, in terms of heterogeneous effects by initial level of violence and gender, we found that the effects are driven by less violent children and by girls, when compared to their respective control group. Treated girls face a reduction in Valence in 0.55 sd and in Negative Valence Difference in 0.49 sd, compared to girls in the control group. Treated boys perceptions that their lives are determined by external factors is reduced in 0.26 sd compared to boys in the control group. Testing differences in the main outcomes between treated girls and boys, we find no statistically difference at the conventional levels.

We also find heterogeneous effects in terms of violence: Low violent-treated students have a reduction in Valence in 0.57 sd, 0.47 sd in Locus of Control and 0.49 sd in Negative Valence Difference compared to the control group. Only the effect in Arousal and Locus of Control are different between high- and low-violent students. Comparing the effects between quartiles of treated students, we find that the differences are mostly in the comparison between most violent and less violent students (Q4 and Q1 respectively). There are differences in effects between these two quartiles in Valence, Locus of Control, CRT and Positive Valence Differences. In the four outcomes, students in Q1 face a reduction but most violent students face an increase in these emotional regulation related measures.

Third, exploiting the random assignment of each student to homogeneous or heterogeneous groups of clubmates, we measure directly through the experiment how the group composition can generate differences in the effects of the ASP. We find that being assigned to a homogeneous set of peers in a ASP causes a reduction in Valence and Locus of Control compared to the control group, and there is no statistically differences between treated students in heterogeneous groups and the control group. Also, testing differences in the effects according to the group composition, we find differences in stress between students treated in homogeneous or heterogeneous groups: Those in homogeneous groups face an increase in stress and students in heterogeneous groups face a reduction on that outcome.

In terms of group composition, we find that students exposed to a group with a higher violence mean are more likely to face a reduction in their valence state, with no effects on stress. Third, using the tracking subsample, we find that the increase in the negative valence is driven by the homogeneous highly violent subgroup. We tested if the effects on the high violent group where different from the effects on the low violent participants and found that high violent participants face a greater and positive effect on stress than the low violent students. Also we find differences in Locus of Control: the reduction for low violent students was greater than the reduction faced by high violent students.

We also find heterogeneous effects of group composition by gender: there are differences in our proxy for stress and tendency to override an initial automatic response that is incorrect, and to engage in further reflection to find a correct answer (CRT) for treated girls: the reduction is greater when they are assigned to heterogeneous clubs. In the case of boys, there are differences by group composition only in Positive Valence and mental ability: there is a reduction in positive valence when they are treated in Heterogeneous groups and it is increase when are treated in homogeneous clubs. In comparative intelligence, boys in homogeneous groups face a greater reduction than those in heterogeneous groups.

Comparing the effect of group composition within each quartile, we find differences in our proxy for stress, positive Valence and mental ability. In stress and emotional resilience, students treated in Homogeneous groups have an increase in both outcomes, which is greater than the effects on students in heterogeneous groups. However, in mental ability, students in homogeneous clubs face a reduction and students in heterogeneous groups show an increase. Students of Q3 have differences in CRT and mental ability: Those treated in Homogeneous groups face a reduction in both outcomes which is greater than the effects of students in Heterogeneous groups. And students in Q2 have differences in cognitive load and CRT by group composition. Those treated in homogeneous groups face an increase in both neuro outcomes and those treated in heterogeneous groups face a reduction. The Q1 is insensible to group composition: there are no differences by type of treatment. Additionally, within treatment and between quartiles, there are no differences of the effects of group composition.

The rest of the paper is organized as follows: In section 2 describe our sample, the data collection procedure and results of balance tests between treatment and control groups. In section 3 we present the specifications to estimate the outcomes of interest and finally in Section 4 we present the results. All appendix tables are at the end of this paper.

Data and Methodology

This study aims to measure the impact of a ASP on emotional resilience in participant students in highly violent communities in a developing country. Additionally, this paper estimates how group composition of the ASP by initial level of predicted violence can generate differential impact of the program on emotional resilience. For both estimations, we rely in the experimental design from Dinarte (2017).

In that design, from the total enrolled students, 25% of the sample were randomly assigned to the control group, and the other 75% participated in the ASP. Within this treated group, 25% were randomly assigned to groups whose variability was heterogeneous in terms of a individual predicted propensity to violence IVV (i.e., these groups were constituted by children with all levels of violence according to the initial distribution of IVV). The rest 50% were assigned to two more homogeneous subgroups according to their baseline predicted level of violence: those students whose IVV were lower than the median were assigned to homogeneous groups of low violence (25%) and the remaining were assigned to groups formed by peers with high level of violence. Additional details of the intervention, balance of the sample, attrition, and descriptive statistics of the total sample can be find in Dinarte (2017).

Data Collection and main outcomes

We randomly selected a subsample of 308 enrolled participants in the ASP (from both control and treated groups). Then, following Egana-DelSol (2016) in an out-of-the-lab setting, we collected three streams of data for each student: pre-test resting emotional state, psychometric tests that intended to measure non-cognitive, creative and cognitive skills, and emotional responsiveness to both positive and negative stimuli.

To proxy emotional regulation we use the emotion-detection theory from the affective neuroscience literature that uses electroencephalogram (EEG) recordings to measure emotions. As mentioned before, we used low-cost portable EEG headsets to obtain a proxy measure of subjects' emotional states and responsiveness to stimuli in the arousal-valence locus (Ramirez and Vamvakousis, 2012).

As explained in Egana Del-Sol (2016), the pre-test emotional state allows us to estimate emotional arousal and valence indexes at a resting state. This pre-test was constructed using EEG recordings while students watched a black cross in the center of a gray screen for a period of 30 seconds before taking the battery of psychometric tests, and emotional arousal and valence indices at resting state are estimated using those recordings (our baseline measures).

Then, students responded the battery of psychometric tests that includes locus control scale, raven-like progressive matrixes, and torrance?s test of creative thinking (CRT). Finally, we obtained emotional responsiveness measures (including arousal and valence) right after the students finished the battery of tests. The experiment consisted of showing series of positive and negative images in order to generate positive and negative stimuli and elicit emotional responses. Therefore, there are three estimates of arousal and valence according to the type of stimuli, including: pre-test resting state, positive and negative.

In this study, we use arousal as a proxy of children's stress, measured directly from her brain activity. Valence could be interpreted as a positive or negative mood, as well as an attitude of either approach or withdrawal towards/from a stimulus (Harmon-Jones et al., 2010; Kassam et al., 2013).

Then, we applied the psychometric tests that includes Rotter Locus of Control Scale (Rotter, 1966), raven-like progressive matrixes, and cognitive reflection test (CRT). Our measure of locus of control indicates that children think that they are not able to control what happen in their lives. More specifically, a decrease in Locus of Control indicates that students consider that they can manage experiences occurring in their lives. Raven is a measure of abstract reasoning and non-verbal estimate of intelligence. It is implemented as a set of matrices in a progressive order.

And finally, CRT is a test designed to measure how a individual tends to choose automatically an initial incorrect response or to engage in a deeper reasoning to find a correct answer.

After the implementation of the psychometric tests, we obtained the emotional responsiveness measures exposing students to alternate series of images that elicit positive and negative emotional responses, in order to estimate arousal and valence indexes after stimuli. The final sample after filtering the EEG data and accounting for attrition is a total of 308 valid EEG recordings of students.

Descriptive statistics and balance tests of our sample are shown in Table 1. We have balance in all variables in the comparison between treatment and control groups and in most of the variables in the comparison between each treatment with the control group and in the comparison between treatments. As expected, testing for differences between high violent and low violent homogeneous groups, we find differences in individual student characteristics (age, gender, area of residence), in a category of mother's education and in some measures of exposition to risky environments (being without supervision at home and predicted propensity to violence).

[**Insert Table 1 here**]

Empirical Strategy

In this section, we present the main specifications estimated in order to generate evidence of the effect of the intervention and group composition on emotional resilience and skills. We also explain the specifications used to measure heterogeneous effects by gender and initial level of violence.

Average effects of ASP on Emotional Regulation

To measure the overall impact of the intervention on emotional regulation, we estimate the following regression:

$$E_{ij} = \theta_0 + \theta_1 T_{ij} + \theta_2 X_{ij} + S_j + \epsilon_{ij} \tag{1}$$

where E_{ij} are the emotional regulation and socio-emotional measures of the student i in school and education level j, expressed in standard deviations of the distribution of neuro outcomes of students in the control group. T_{ij} is a dummy that indicates whether the student has been assigned to the treatment group, S_j are school and education level fixed effects (stratification cells) and X_{ij} is a vector of controls, including a second order polynomial of student's predicted propensity to violence for all regressions. Due to measurement bias in the predicted propensity to violence, we estimate cluster bootstrapped standard errors at course-school level (Cameron and Miller, 2013; Dinarte, 2017). θ_1 is the ITT effect of being assigned to participate in an ASP Program compared to the control group.

Using the predicted level of violence, we estimated heterogeneous effects of clubs participation, separating our sample in students with high or low level of violence within each strata, treatment arm (homogeneous and heterogeneous) and control group. Then, we run the following specification:

$$E_{ij} = \theta_0 + \theta_1 T_{ij} + \theta_2 T_{ij} \times IVV\_high_{ij} + \theta_3 IVV\_high_{ij} + \theta_4 X_{ij} + S_j + \epsilon_{ij} \tag{2}$$

where IVV_high_{ij} is a dummy variable that indicates whether the student's IVV percentile is higher than the median within each group. The rest of variables are defined as in specification (1). The effect of the intervention on low violent students is measure through θ_1 and $\theta_1 + \theta_2$ is the ITT effect on highly violent children.

Then, to investigate more flexibly whether the effects of the intervention are different at different levels of the initial IVV distribution, we also separated our estimation of heterogeneous effects according to each quartile of the predicted index as follows

$$E_{ij} = \theta_0 + \theta_1 T_{ij} + \theta_2 \sum_{m=2}^{4} T_{ij} \times Qs_{ij} + \theta_3 X_{ij} + S_j + \epsilon_{ij} \tag{3}$$

where Qs_{ij} is a dummy variable that indicates whether the student's IVV is in quartile s of each group (Control, Homog. and Het.) of the IVV distribution within strata. Each quartile s is defined as 25% of students within each subgroup. The rest of variables are defined as in the first specification and the omitted category is the quartile of less violent children and its interaction with any treatment. In this case, θ_1 is the ITT effect on students in the first quartile compared to students in assigned to the control group whose level of violence is also in the first quartile of the initial distribution of violence.

As explained before, we also measure heterogeneous effects by gender. Dinarte (2017) finds that the effect of ASP Clubs on academic outcomes are greater for treated boys compared to boys in the control group, but the impact on violence-related outcomes are greater for girls using data from teachers' reports. Thus, we also measured if these effects on neuro outcomes are different between boys and girls, running the following specification:

$$E_{ij} = \theta_0 + \theta_1 T_{ij} + \theta_2 T_{ij} \times Male_{ij} + \theta_3 X_{ij} + S_j + \epsilon_{ij} \tag{4}$$

where $Male_{ij}$ is a dummy equal to 1 if student i is a boy. We also included $Male_{ij}$ in the vector of control variable. And θ_1 measures the effect of ASP on girls and $\theta_1 + \theta_2$ is the total effect of the intervention on boys in emotional regulation compared to the control group. Testing these two effects provides evidence of differences in the effects by gender.

Group composition effects of ASP Clubs on Emotional Regulation

Due to the random variation generated by the experimental design of the intervention, we can directly estimate the effect of group variability on emotional regulation running the following equation:

$$E_{ij} = \alpha_0 + \alpha_1 HT_{ij} + \alpha_2 HM_{ij} + \alpha_4 X_{ij} + S_j + \epsilon_{ij} \tag{5}$$

where HM_{ij} and HT_{ij} are dummies indicating whether the student i in school level j is assigned to a club composed by peers more similar (homogeneous) or diverse (heterogeneous) to her predicted level of violence, respectively. The rest of variables are defined as in the first specification. As before, we control in this specification by a second order polynomial of the predicted level of violence of each student and estimate the standard errors using clustered bootstrap at the course level.

α_1 (α_2) indicates the effect of being treated in a club with heterogeneous (or homogeneous) peers by predicted initial level of violence, compared to the control group. Testing the differences between α_1 and α_2 provides evidence of how the group composition might changes the effect of an ASP Club.

Specification (5) allow us to directly analyze the effects of group composition. However, we also were interested in measure differences in the effects of the intervention by initial level of predicted violence. Dinarte (2017) finds a statistical significant ITT effect on academic outcomes of students treated in homogeneous groups, but violence-related outcomes are statistically significant for students treated in heterogeneous groups. To estimate heterogeneous effects by initial level of predicted violence, as before we separate the estimations of the effect of treatment arms on each half and quartile of the distribution, running the following specifications:

$$Y_{ij} = \alpha_0 + \alpha_1 HT_{ij} + \alpha_2 HM_{ij} + \alpha_3 \sum_{m=1}^{4} HT_{ij} \times Qs_{ij} + \alpha_4 \sum_{m=1}^{4} HM_{ij} \times Qs_{ij} + \alpha_5 X_{ij} + S_j + \epsilon_{ij} \quad (6)$$

where the variables are defined as in specifications (2) and (3) and we include the dummies of top half of the distribution and quartiles in the vector of controls. Cluster bootstrapped standard errors at course-school level. Omitted categories in specification (7) are first quartile and interaction term between any treatment and first quartile.

Main Results

ASP Average Effects

After estimating specification (1) we find that treated participants face a reduction in valence in 0.35 sd compared to the control group, that can be thought of as a lower level of frustration of participants relative to the control group because adverse outcomes are expected. We also find a reduction in Locus of Control in 0.26 sd, i.e. a perception of control of their own lives; and a reduction in the reaction to positive stimuli (Positive valence difference) in 0.31 sd. This result is consistent with recent evidence of late stage investments showing a positive impact on behaviors instead of on underlying non-cognitive skills (Blattman et al., 2015).

In the rest of outcomes, we find no statistical difference between treated and control students at the conventional levels. Even though, with the exception of the stress level, all other outcomes have a negative sign, indicating that the intervention might reduce the effect on those neuro outcomes.

In terms of the main control variable, we find that this is only statistically different from zero in Positive Valence, indicating that a higher predicted propensity to violence increases Positive Valence in 0.1 sd, but the second order indicates that it is increasing at a decreasing rate.

[**Insert Table 2 here**]

ASP Heterogeneous Effects

Due to the heterogeneous effects by gender found in Dinarte (2017) on academic and violence-related outcomes, we also measure if there are heterogeneous effects on neuro outcomes by gender. As shown in Table 3, we only find heterogeneous effects on Valence, Negative Valence Difference and Locus of Control.

First, treated girls face a reduction in their level of frustration in 0.55 sd and in their response to negative stimuli in 0.49 sd, compared to girls in the control group. Then, treated boys face a reduction of 0.26 sd in locus of control compared to boys in the control group. Testing differences in neuro outcomes between treated girls and boys, we find no statistically difference at the conventional levels, providing evidence that the intervention is not generating differential impact by gender on emotional regulation related outcomes.

[**Insert Table 3 here**]

We exploit the prediction of the propensity to violence to analyze heterogeneous effects of the intervention according to students' initial level of violence. We separated students in subgroups of high or low violence level. Those students whose predicted propensity to violence is higher than the median of violence within each strata and treatment group where listed as high violent participants and the others as low violent participants. We also separated the subgroups in quartiles of violence, following the last procedure. Each quartile has approximately 25% of the total of participants in each strata and treatment or control groups.

In Table 4 we present the results of the estimation of specification (2). In Panel A we present the ASP effects on low and high violent subgroups. Compared to the low violent students in the control group, we find that treated students with a low predicted IVV have a reduction in their withdrawal behavior in 0.57 sd, 0.47 sd in locus of control and 0.49 sd in their reaction to negative stimuli. This evidence indicates that the intervention was successful affecting the behaviors.

In the subgroup of high violent students, we find no statistically difference between treated and control groups. Then, we tested if the effects on the high violent group where different from the effects on the low violent participants. We find that high violent participants face a greater and positive effect on Arousal than the low violent students. Also we find differences in Locus of Control: the reduction for low violent students was greater than the reduction faced by high violent students.

[**Insert Table 4 here**]

Using specification (3) we also test for differences at a more disaggregated level according to the predicted propensity to violence. We separated the sample in quartiles of violence with the same number of participants in each subgroups. Then, we estimated specification (4) and tested if the effects where different between quartiles. Dinarte (2017) finds greater effects of the ASP on academic outcomes for most violente students (Quartile 4) and some effects for students in Quartile 3, not only compared to the control group but also compared to less violent treated students.

In neuro outcomes, we find that reductions are higher for low violent students i.e. those in quartiles 1 and 2 compared to control group. For instance, as shown in Table 3 Panel B, we find a reduction in 1 sd in withdrawal behavior for students in Q1 compared to students in Q1 in the control group. Also in Locus of Control, we find a reduction in 0.63 sd and 0.33 sd for Q1 and Q2 respectively. Finally, a reduction in 0.92 sd in Positive Valence Difference in students in Q1, compared to other students in those quartiles in the control group. Treated students in Q3 have no differences of effects compared to their peers in Q3 in the control group. Treated students in Q4 have also no differences with students in Q4 in control group except in CRT, treated Q4 students face a increase in this measure compared to Q4 control group.

Comparing the effects between quartiles of treated students, we find that the differences are mostly in the comparison between most violent and less violent students (Q4 and Q1 respectively). There are differences in effects between these two quartiles in Valence, Locus of Control, CRT and Positive Valence Differences. In the four outcomes, students in Q1 face a reduction but most violent students face an increase in these neuro measures, no statistically different than zero at conventional levels.

Additional differences between quartiles are in Valence in the comparison between Q2 and Q1, with a greater effects for Q1. Also in Locus of Control when comparing Q2 and Q4, with a greater reduction for Q2. And finally, the effect of ASP on CRT is greater for Q4 compared to Q1. All these results are available upon request.

Group Composition Effects on Emotional Regulation

Exploiting the assignment of each student to homogeneous or heterogeneous groups of clubmates, we measure directly through the experiment how the group composition can generate differences in the effects of the ASP. We use specification (5) to measure if being assigned to more similar or more heterogeneous peers in terms of predicted violence generate differential effects.

In Table 5 we summarize these results. We find that being assigned to a homogeneous set of peers in a ASP causes a reduction in withdrawal behavior and Locus of Control compared to the control group, and there is no statistically differences between treated students in heterogeneous groups and the control group. Also, testing differences in the effects according to the group composition, we find differences in withdrawal behavior between students treated in homogeneous or heterogeneous groups: Those in homogeneous groups face an increase in withdrawal behavior and students in heterogeneous groups face a reduction in that outcome.

[**Insert Table 5 here**]

Heterogeneous effects of Group Composition on Emotional Regulation

Using specification (6) we can also measure whether the group composition has different effects according to gender and initial predicted level of violence. In Table 6 we summarize the results of heterogeneous effects of the group variability by gender. First, we find that compared to girls in the control group, there is a reduction in Arousal, Valence, Positive and Negative Valence Difference for girls treated in Heterogeneous Groups. If they are treated in homogeneous groups, there is only a reduction compared with the control group on Valence.

Boys are sensible to their group composition only when they are treated in homogeneous groups in terms of violence compared to boys in the control group. Specifically, we find differences in Locus of Control and Raven.

Then we measured differences within each gender by group composition. First, for girls there are differences in Arousal and CRT: the reduction is greater when they are assigned to heterogeneous clubs. In the case of boys, there are differences by group composition only in Positive Valence and Raven: there is a reduction in positive valence when they are treated in Heterogeneous groups and it is increase when are treated in homogeneous clubs. In Raven, boys in homogeneous groups face a reduction and those in heterogeneous groups face an increase in this neuro outcome.

[**Insert Table 6 here**]

We also wanted to analyze differences of each treatment by gender. Comparing the effects of treated girls and boys in homogeneous groups we find differences only on Raven: Boys face a reduction of 0.33 sd and girls an increase in 0.17 sd. Then, comparing heterogeneous effects conditional on gender, we find differences in four outcomes: Valence, Negative Valence and Positive and Negative Valence Difference. First, Girls face a reduction in 0.66 sd and boys an increase in 0.08 sd in Valence. Then, in Negative Valence, girls face an increase but boys a decrease in 0.43 sd. In differences of Valence, Girls face a reduction in 0.64-0.76 but boys a increase in 0.27 - 0.50 sd.

Finally, we test for differences in group composition by level of violence using the separation in quartiles of predicted violence at baseline. Compared to students in the control group, we find effects of the homogeneous treatment on Locus of control for Q1 and Q3 and in CRT for Q3. The heterogeneous treatment generates effects different from the control group on Arousal and Locus of Control for Q1 and Valence for Q3.

Comparing the effect of group composition within each quartile, we find that Q4 is the most sensible to group composition. We find differences in arousal, Positive Valence and Raven. In Arousal and Positive valence, students treated in Homogeneous groups have an increase in both outcomes greater than the effects on students in heterogeneous groups. But in Raven, students in homogeneous clubs face a reduction and students in heterogeneous groups show an increase.

Students of Q3 have differences in CRT and Raven: Those treated in Homogeneous groups face a reduction in both outcomes which is greater than the effects of students in Heterogeneous groups. And students in Q2 have differences in Arousal and CRT by group composition. Those treated in homogeneous groups face an increase in both neuro outcomes and those treated in heterogeneous groups face a reduction. The Q1 is insensible to group composition: there are no differences by type of treatment. Additionally, within treatment and between quartiles, there are no differences of the effects of group composition.

[**Insert Table 7 here**]

Summarizing these heterogeneous results by initial level of predicted propensity to violence, we find that Q4 is the most sensible subgroup to composition of clubs, the effects for the most violent students are lower when are treated in more diverse clubs. Then, least violent students are insensible to group composition. Finally, students in Q2 and Q3 face better results when treated in heterogeneous groups.

Conclusions

This study contributes to the understanding of channels that could be observed relative to social programs that foster socio-emotional skills among students enrolled in schools located in highly violent communities. Consistent with previous studies we show that social programs designed to foster non-cognitive skills are likely to affect emotional regulation. In other words, emotional regulation can be the mechanism explaining the educational and behavioral outcomes that was observed on Dinarte (2017) for the same intervention.

We found evidence that the program is likely affecting emotion and self-reported tests scores through changes in emotion. In fact, besides the positive qualitative evidence in favor of change of non-cognitive skills, it is not possible to correctly separates these effects. Particularly, we found that the program had a significant impact on emotional regulation and socio-emotional skills: treated participants face a reduction in the reaction towards positive stimuli in 0.31 sd and in Locus of Control (a proxy of an increase in the belief that one's life can be controlled) in 0.26 sd. This result is also interesting because the increase in a withdrawal behavior -i.e. a reduction in positive valence-biases downward self-reported measures of non-cognitive skills, generating evidence that estimated results in behavior might be lower bounds of the intervention impact. In fact, the program might affect the self-perception of subjects at the moment they are answering self-reported tests.

Also we found heterogeneous effects by initial level of violence and gender. Most of the effects might be driven by less violent children and by girls, when compared to their respective control group. In terms of stress, most violent students face an increase in stress compared to low violent students. Similarly, in locus of control, both subsamples face a reduction in locus of control, but it is greater for low violent students.

Additional interesting results are in terms of group composition: there were greater effects in the homogeneous group compared to the control group on resting-state valence and Locus of Control, but we do not find any effect of treated student in heterogeneous groups compared to the control group. Moreover, the only difference in terms of group composition is in stress: treated students in the homogeneous group have an increase in stress compared to the heterogeneous group. This results is evidence of a increase in stress when children are with similar peers in terms of violence, that might be caused by the preference for diversity from students.

We estimated that girls experienced a greater impact on emotional regulation when participating in heterogeneous group relative to homogeneous groups and with boys in heterogeneous groups. These behavioral findings are consistent with the asymmetric impact on emotional responsiveness (DellaVigna, 2009). We highlight the relevance of emotional disposition and modulation as a key mechanism to overcome "Psychological Poverty Traps" (Haushofer and Fehr, 2014). According to Haushofer and Fehr (2014) poverty causes stress and negative affective states, which may lead to short-sighted and risk-averse decision-making; possibly by, limiting attention and favoring habitual behaviors at the expense of goal-directed ones.

The methodology proposed in this paper has many benefits. First, it offers a way to incorporate emotion into the education and violence economics field. The importance of emotional regulation in life satisfaction has recently been highlighted for both developed and developing countries (Deming, 2015; OECD, 2015). This study shows that there are neurophysiological approaches to proxy emotional disposition and responsiveness with a high level of accuracy, and at a relatively low cost in violent communities. The results also may aid evaluation of similar programs oriented to improve non-cognitive skills.

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TABLE 1. SUMMARY STATISTICS: MEANS OF VARIABLES BY TREATMENT GROUP. PRIOR TO TREATMENT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Treatments		*Tracking groups*	
	Full Sample	**Control group (C)**	**Any Treatment (T)**	**Heterogen. group (HT)**	**Homogen. group (HM)**	**Homog. High (HM-H)**	**Homog. Low (HM-L)**
Student is male	0.44	0.49	0.43	0.46	0.42	0.63	0.16 ***
Student's age	13.08	13.00	13.10	13.05	13.14	13.62	12.58**
Student lives in urban area	0.72	0.71	0.73	0.70	0.74 ¨	0.77	0.71 *
Student's household composition							
Student living with both parents	0.50	0.47	0.51	0.48	0.53	0.55	0.51
Student living only with one parent	0.33	0.34	0.33	0.39	0.29	0.29	0.29
Student living with one parent and stepparent	0.06	0.07	0.05	0.03	0.07 ¨	0.05	0.09
Student living with other relative /adults	0.10	0.12	0.11	0.10	0.11	0.10	0.11
Student's mother level of education:							
Basic Education (1-6 years)	0.32	0.33	0.32	0.30	0.32	0.26	0.41
Intermediate education (7-12 years)	0.59	0.56	0.60	0.63	0.59	0.67	0.49 *
University or higher (13 and +)	0.09	0.11	0.08	0.07	0.09	0.07	0.10
Student's travel time from house to school (min.)	16.97	16.57	17.09	16.16	17.63	19.88	14.96
Student is alone at home after school	0.05	0.03	0.06	0.07	0.05	0.08	0.00 **
Student's course (schooling year)	6.84	6.74	6.87	6.79 ^	6.89	7.16	6.61
Student enrolled on morning shift	0.64	0.67	0.63	0.64	0.63	0.59	0.68
Student's Violence Index	0.043	0.042	0.044	0.046	0.043	0.057	0.027 ***
Observations	308	70	238	87	151	82	69

Table 1 shows descriptive statistics of the available variables at baseline for the full sample. It summarizes information obtained from the enrollment form that was used as determinants in the IVV estimation. p-values are presented in Table A1 in the Appendix. ^ indicates differences statistically significant at 10% between HT and Control; ¨ indicates differences statistically significant at 10% respectively between HM and Control; and *, **, *** indicate differences statistically significant at 1%, 5% and 10% respectively between HM-Low and HM-High groups. In the comparison between HT = HM groups and T and C groups, we have balance in all variables at baseline.

TABLE 2: OVERALL EFFECTS OF THE ASP ON NEURO OUTCOMES.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Arousal	Valence	Positive Valence	Negative Valence	Locus of Control	CRT	Raven	Positive Valence Difference	Negative Valence Difference
Any treatment	0.025	-0.349**	-0.042	-0.112	-0.255**	-0.019	-0.032	-0.307*	-0.237
	(0.114)	(0.153)	(0.159)	(0.182)	(0.113)	(0.131)	(0.121)	(0.173)	(0.181)
IVV	0.001	-0.024	0.101**	-0.046	-0.027	0.081	0.020	-0.125	0.022
	(0.051)	(0.150)	(0.049)	(0.092)	(0.082)	(0.058)	(0.081)	(0.148)	(0.189)
IVV2	0.000	0.001	-0.007**	0.003	0.004	-0.001	-0.001	0.008	-0.002
	(0.004)	(0.011)	(0.003)	(0.007)	(0.006)	(0.006)	(0.007)	(0.011)	(0.014)
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28
MDE T = C	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21

***, **, * significant at 1%, 5% and 10% respectively. Robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables student's IVV and education level-school fixed effect (stratification level). Results are weighted by the probability to be selected within each strata.

TABLE 3: HETEROGENEOUS EFFECTS OF THE ASP ON NEURO OUTCOMES BY GENDER

	(1) Arousal	(2) Valence	(3) Positive Valence	(4) Negative Valence	(5) Locus of Control	(6) CRT	(7) Raven	(8) Positive Valence Difference	(9) Negative Valence Difference
(1) Any treatment	-0.196	-0.554***	-0.115	-0.061	-0.241	-0.051	0.120	-0.439	-0.493**
	(0.166)	(0.207)	(0.279)	(0.167)	(0.164)	(0.156)	(0.169)	(0.315)	(0.201)
(2) Male x Any treatment	0.444	0.407	0.124	-0.111	-0.017	0.089	-0.301	0.282	0.518
	(0.307)	(0.314)	(0.324)	(0.253)	(0.221)	(0.247)	(0.234)	(0.465)	(0.395)
Total effects on Male = (1) + (2)	0,248	-0,147	0,009	-0,172	-0.258*	0,038	-0,182	-0,157	0,025
p-value Effects on Boys = Effects on Girls	0,148	0,195	0,701	0,660	0,937	0,719	0,198	0,543	0,190
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE 4: HETEROGENEOUS EFFECTS OF THE ASP ON NEURO OUTCOMES BY VIOLENCE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Arousal	**Valence**	**Positive Valence**	**Negative Valence**	**Locus of Control**	**CRT**	**Raven**	**Positive Valence Difference**	**Negative Valence Difference**
PANEL A. EFFECTS ON TOP HALF									
Any treatment (T) (1)	-0.164	-0.570**	-0.160	-0.077	-0.468***	-0.016	0.039	-0.410	-0.493**
	(0.167)	(0.229)	(0.289)	(0.172)	(0.130)	(0.198)	(0.158)	(0.328)	(0.212)
In top half of IVV distribution x Any treatment (2)	0.382*	0.442	0.224	-0.065	0.433*	0.018	-0.141	0.218	0.507
	(0.212)	(0.330)	(0.327)	(0.207)	(0.242)	(0.286)	(0.241)	(0.433)	(0.356)
Total effects on top half (1) + (2)	0,217	-0,128	0,064	-0,143	-0,036	0,002	-0,101	-0,192	0,015
p-value (Total effect on top half)	0.122	0.570	0.714	0.562	0.857	0.991	0.577	0.386	0.957
p-value Effect on top half = bottom half	0,072	0,181	0,494	0,752	0,073	0,949	0,560	0,614	0,155
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE 5: GROUP COMPOSITION EFFECTS ON NEURO OUTCOMES.

	(1) Arousal	(2) Valence	(3) Positive Valence	(4) Negative Valence	(5) Locus of Control	(6) CRT	(7) Raven	(8) Positive Valence Difference	(9) Negative Valence Difference
PANEL A. ALL STUDENTS									
Homogeneous treatment	0.096	-0.367*	-0.013	-0.097	-0.314***	-0.006	-0.071	-0.354	-0.270
	(0.114)	(0.194)	(0.154)	(0.169)	(0.113)	(0.136)	(0.109)	(0.234)	(0.192)
Heterogeneous treatment	-0.101	-0.318	-0.094	-0.140	-0.150	-0.042	0.038	-0.223	-0.178
	(0.134)	(0.200)	(0.195)	(0.244)	(0.156)	(0.162)	(0.184)	(0.224)	(0.307)
IVV	-0.012	-0.021	0.096*	-0.049	-0.019	0.079	0.025	-0.117	0.028
	(0.052)	(0.148)	(0.049)	(0.093)	(0.083)	(0.060)	(0.084)	(0.144)	(0.188)
IVV2	0.001	0.001	-0.007**	0.003	0.003	-0.000	-0.001	0.007	-0.002
	(0.004)	(0.011)	(0.003)	(0.007)	(0.006)	(0.006)	(0.007)	(0.011)	(0.014)
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28
p-value Het = Hom	0,019	0.846	0.511	0.800	0.215	0.788	0.459	0.675	0.779
MDE Het = C	0.244	0.245	0.245	0.245	0.251	0.251	0.251	0.244	0.244
MDE Hom = C	0.221	0.222	0.222	0.222	0.224	0.224	0.224	0.222	0.222
MDE Het = Hom	0.205	0.205	0.205	0.205	0.210	0.210	0.210	0.205	0.205

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE 6: HETEROGENEOUS EFFECTS OF THE GROUP COMPOSITION ON NEURO OUTCOMES BY GENDER

	(1) Arousal	(2) Valence	(3) Positive Valence	(4) Negative Valence	(5) Locus of Control	(6) CRT	(7) Raven	(8) Positive Valence Difference	(9) Negative Valence Difference
(1) Homog treatment	-0.119	-0.493**	-0.161	-0.145	-0.300	0.009	0.170	-0.332	-0.348
	(0.170)	(0.209)	(0.269)	(0.158)	(0.184)	(0.172)	(0.171)	(0.325)	(0.216)
(2) Heterog treatment	-0.334*	-0.666**	-0.029	0.093	-0.129	-0.169	0.017	-0.637*	-0.760***
	(0.180)	(0.300)	(0.320)	(0.243)	(0.175)	(0.140)	(0.255)	(0.367)	(0.278)
(3) Male x Homog treatment	0.426	0.217	0.290	0.118	-0.014	-0.012	-0.503*	-0.074	0.099
	(0.312)	(0.385)	(0.349)	(0.298)	(0.246)	(0.260)	(0.264)	(0.490)	(0.442)
(4) Male x Heterog treatment	0.483	0.744*	-0.170	-0.519*	-0.041	0.276	0.051	0.914*	1.262**
	(0.353)	(0.400)	(0.325)	(0.297)	(0.263)	(0.323)	(0.285)	(0.550)	(0.543)
Total effects of Homog on Girls = (1)	-0.119	-0.493**	-0.161	-0.145	-0.300	0.009	0.170	-0.332	-0.348
Total effects of Heterog on Girls = (2)	-0.334*	-0.666**	-0.029	0.093	-0.129	-0.169	0.017	-0.637*	-0.760***
Total effects of Homog on Male = (1) + (3)	0,307	-0,276	0,130	-0,027	-0.314**	-0,003	-0.333*	-0,406	-0,249
Total effects of Heterog on Male = (2) + (4)	0,148	0,077	-0,199	-0,425	-0,170	0,107	0,068	0,277	0,503
p-value Effects Homog = Effects Heterog on Boys	0,369	0,379	0,060	0,131	0,481	0,697	0,020	0,136	0,167
p-value Effects Homog = Effects Heterog on Girls	0,063	0,534	0,396	0,254	0,277	0,042	0,500	0,277	0,151
p-value Effects Homog on Boys = Homog on Girls	0,171	0,574	0,406	0,692	0,955	0,964	0,057	0,880	0,823
p-value Effects Heterog on Boys = Heterog on Girls	0,172	0,063	0,600	0,081	0,876	0,393	0,858	0,097	0,020
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE 7: HETEROGENEOUS EFFECTS OF THE GROUP COMPOSITION ON NEURO OUTCOMES BY VIOLENCE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Arousal	Valence	Positive Valence	Negative Valence	Locus of Control	CRT	Raven	Positive Valence Difference	Negative Valence Difference
Total Hom effect on Q4	0,525	0,042	0,159	-0,190	0,203	0,469	-0,236	-0,117	0,232
Total Hom effect on Q3	-0,076	-0,428	0,257	0,199	-0.511**	-0.633*	-0,215	-0,685	-0,627
Total Hom effect on Q2	0,262	-0,353	-0,465	-0,118	-0,119	0,187	-0,095	0,113	-0,235
Total Hom effect on Q1	-0.388	-0.705	0.034	-0.316	-0.844***	0.035	0.337	-0.738	-0.389
Total Het effect on Q4	0,198	0,118	-0,258	-0,410	0,305	0,366	0,310	0,376	0,528
Total Het effect on Q3	-0,092	0,087	0,319	-0,062	-0,210	-0,306	0,210	-0,232	0,150
Total Het effect on Q2	-0,147	-0.499*	-0,468	0,078	-0,241	-0,256	-0,465	-0,031	-0,577
Total Het effect on Q1	-0.452*	-1.051	0.019	-0.099	-0.535**	-0.009	0.024	-1.070	-0.952
p-value test HomQ1 = HetQ1	0,682	0,525	0,918	0,430	0,252	0,429	0,254	0,550	0,336
p-value test HomQ2 = HetQ2	0,040	0,696	0,988	0,606	0,690	0,063	0,178	0,690	0,562
p-value test HomQ3 = HetQ3	0,886	0,210	0,873	0,499	0,264	0,096	0,116	0,522	0,184
p-value test HomQ4 = HetQ4	0,081	0,896	0,102	0,411	0,720	0,820	0,022	0,486	0,665
Observations	308	308	308	308	295	295	295	308	308
Mean control group	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
SD - control group	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,42	1,28

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE 8: EFFECTS OF TRACKING ON NEURO OUTCOMES.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Arousal	Valence	Positive Valence	Negative Valence	Locus of Control	CRT	Raven	Positive Valence Difference	Negative Valence Difference
PANEL A. SECOND ORDER POLYNOMIAL									
High Homog. group	0.018	0.394	0.199	-0.077	-0.138	-0.534	-0.063	0.196	0.472
	(0.139)	(0.534)	(0.389)	(0.288)	(0.225)	(0.356)	(0.215)	(0.731)	(0.584)
Observations	151	151	151	151	145	145	145	151	151
PANEL B. THIRD ORDER POLYNOMIAL									
High Homog. group	0.067	0.361	0.232	-0.104	-0.180	-0.501	-0.089	0.129	0.465
	(0.144)	(0.478)	(0.413)	(0.249)	(0.243)	(0.372)	(0.217)	(0.699)	(0.522)
Observations	151	151	151	151	145	145	145	151	151
PANEL C. FOURTH ORDER POLYNOMIAL									
High Homog. group	0.052	0.268	0.256	-0.228	-0.011	-0.554	0.051	0.012	0.497
	(0.141)	(0.359)	(0.478)	(0.220)	(0.327)	(0.409)	(0.250)	(0.671)	(0.385)
Observations	151	151	151	151	145	145	145	151	151

***, **, * significant at 1%, 5% and 10% respectively. Bootstrapped robust standard errors in parentheses at course-school level. All outcomes are standarized from control groups at school-grade level after the intervention. All regressions include as control variables a second order polynomial of student's IVV and education level-school fixed effect (stratification level).

TABLE A1. *p-values* OF DIFFERENCES BETWEEN TREATMENT AND CONTROL GROUPS.

	Unadjusted p-values				
	Control = Heterog. = Homog.	Control = Heterog.	Control = Homog.	Heterog. = Homog.	Homog. High = Homog. Low
	[1]	[2]	[3]	[4]	[5]
PANEL A. VIOLENCE DETERMINANTS					
Student is male	0.422	0.565	0.324	0.676	0.000***
Student's age	0.520	0.872	0.413	0.241	0.019**
Student lives in urban area	0.838	0.365	0.712	0.062*	0.084*
Student's household composition					
Student living with both parents	0.356	0.495	0.290	0.642	0.392
Student living only with one parent	0.623	0.591	0.321	0.174	0.926
Student living with one parent and stepparent	0.642	0.325	0.886	0.067*	0.543
Student living with other relative /adults	0.700	0.574	0.762	0.654	0.582
Student's mother level of education:					
Basic Education (1-6 years)	0.871	0.856	0.949	0.781	0.120
Intermediate education (7-12 years)	0.584	0.566	0.678	0.613	0.092*
University or higher (13 and +)	0.363	0.413	0.402	0.724	0.746
Student's travel time from house to school (min.)	0.894	0.730	0.778	0.697	0.170
Student is alone at home after school	0.359	0.385	0.608	0.790	0.034**
Student's course (schooling year)	0.126	0.722	0.050*	0.463	0.153
Student enrolled on morning shift	0.324	0.358	0.498	0.820	0.352
Student's Violence Index	0.602	0.815	0.663	0.982	0.000***

This appendix table shows unadjusted p-values of the tests of mean differentes in baseline variables between treatements and control groups. Column (1) show p-values from the comparison between treated and control groups, columns (2) and (3) are p-values of the comparison between Control and and each treatment arm (Heterogeneous and homogeneous, respectively) and column (4) are the results of the comparison between treatment arms. The last column shows p-values of tests for differences between both homogeneous subtreatments. Specifications control by stratification cells. ***, **, * significant at 1%, 5% and 10% respectively. Robust standard errors in parentheses at strata level.

APPENDIX 1. p-VALUES OF MISSING VARIABLES FOR 13 OBSERVATIONS

	Locus of Control	RCT	Raven
Gender	0,457	0,457	0,457
Age	0,573	0,573	0,573
Area of residence	0,524	0,524	0,524
Travel time	0,544	0,544	0,544
IVV	0,041	0,041	0,041
Course	0,189	0,189	0,189
HH Composition A	0,851	0,851	0,851
HH Composition B	0,320	0,320	0,320
HH Composition C	0,632	0,632	0,632
HH Composition D	0,381	0,381	0,381
Mother education - Basic	0,784	0,784	0,784
Mother education - Intermediate	0,765	0,765	0,765
Mother education - Tertiary	0,963	0,963	0,963
Homog. Vs Control	0,181	0,181	0,181
Heterog. Vs Control	0,129	0,129	0,129
Homog. Vs Heterog.	0,522	0,522	0,522
Homog. High vs Homog. Low	0,627	0,627	0,627
Arousal	0,775	0,775	0,775
Valence	0,162	0,162	0,162
Positive Valence	0,213	0,213	0,213
Negative Valence	0,397	0,397	0,397
Positive Valence Difference	0,248	0,248	0,248
Negative Valence Difference	0,166	0,166	0,166


LIINC LAB EEG 3