

Clinical Child Psychology and Psychiatry

Randomized cluster trial of a parenting program in Chile: key mediators in the decrease in behavior problems in pre- school children

Journal:	<i>Clinical Child Psychology and Psychiatry</i>
Manuscript ID	CCPP-18-0116.R2
Manuscript Type:	Original Manuscript
Keywords:	multiple mediation, universal prevention, child behavioral problems, pre-school children, parenting
Abstract:	<p>Parenting Training is a proven strategy for the promotion of positive parenting practices and the prevention and treatment of behavior problems in children. The processes that explain this efficacy are less clear. The aim of this study was to assess the mediating role of parenting practice modification, encouraged through the implementation of a universal parenting training program, in the decrease of behavioral problems in 3 to 6 year-old children. Method: A cluster randomized trial was carried out in 19 educational centers in low and middle socio-economic areas. 178 families received the program and 154 were in the control condition. The following parenting practices were assessed: positive reinforcement, involvement, inconsistency, unsuitable treatment behaviors and corporal punishment, and hostility and humiliation behaviors. Parent-child interaction was also assessed using an observational instrument. A multiple mediation analysis was carried out, identifying indirect effects. Results: Reduction of harsh discipline and psychical punishment, and parental inconsistency mediated the effects observed in the reduction of child behavioral problems during the program. Conclusions: Within Chilean families, harsh discipline, corporal punishment, and parental inconsistency are important aspects to be considered in the implementation of universal parenting training programs.</p>

SCHOLARONE™
Manuscripts

Abstract:

Parenting Training is a proven strategy for the promotion of positive parenting practices and the prevention and treatment of behavior problems in children. The processes that explain this efficacy are less clear. The aim of this study was to assess the mediating role of parenting practice modification, encouraged through the implementation of a universal parenting training program, in the decrease of behavior problems in 3 to 6 year-old children. **Method:** A cluster randomized trial was carried out in 19 educational centers in low and middle socio-economic areas. 178 families received the program and 154 were in the control condition. The following parenting practices were assessed: positive reinforcement, involvement, inconsistency, unsuitable treatment behaviors and physical punishment, as well as hostility and humiliation behaviors. Parent-child interaction was also assessed using an observational instrument. A multiple mediation analysis was carried out, identifying indirect effects. **Results:** Reduction of harsh discipline and physical punishment, and parental inconsistency mediated the effects observed in the reduction of child behavior problems during the program. **Conclusions:** Within Chilean families harsh discipline, physical punishment, and parental inconsistency are important aspects to be considered in the implementation of universal parenting training programs.

Keywords: multiple mediation, parenting, universal prevention, child behavior problems, pre-school children.

Introduction

Parenting training has been shown to enhance the welfare and psychosocial development of children and, to prevent and treat various psychosocial and mental health difficulties (Scott & Gardner, 2015). This type of intervention has the highest level of efficacy evidence for prevention and treatment of behavior problems and disorders (Fonagy, 2015; Scott, 2015). In spite of these successful results, there are still relevant challenges to be addressed. The most successful and developed parenting training programs have been assessed, by and large, by their own developers and therefore, more independent replications are required (Greenberg & Riggs, 2015). They also require more evidence of their effectiveness when implemented in the context of usual services provided to the community, their sustainability and of the impact in their results when they are scaled up (Marchand, Stice, Rohde, & Becker, 2011). The study of these programs in low- and medium-income countries is also important since they have been developed and implemented primarily in high-income countries (Knerr, Gardner, & Cluver, 2013). Both targeted prevention and treatment programs have shown the best results but we need more evidence regarding the effectiveness of universal programs (Hiscock et al., 2008).

In addition to evidence of effectiveness, we also need to understand the mediating processes leading to successful outcomes. This research has been increasing in relevance since the first studies in 2000 (Fagan & Benedini, 2016). A fundamental and primary aspect of these analyses is to establish whether the change in parenting practices is related to the effects of parenting training programs in terms of the prevention and the treatment of behavior problems or whether these effects result from (or are complemented by) other factors (Forehand, Lafko, Parent, & Burt, 2014; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). More specifically, it is of interest to identify those parenting practices more directly implicated in the observed effects.

1
2
3 It is difficult to draw conclusions based on the results of previous research. Methodological and
4 statistical procedures to establish mediation are diverse and have also been modified in important
5 ways over time. Many studies were carried out using the classical approach of Baron and Kenny
6 (1986), which has been questioned in recent decades since it underestimates mediation effects
7 (Patel, Fairchild, & Prinz, 2017). Forehand et al. (2014) reviewed eight intervention and 17
8 prevention studies, observing that only 45% of the performed analyses showed significant
9 indirect effects resulting from the modification of parenting practices (that is, mediating effects).
10
11 Disciplinary practices and a measure consisting of global parenting practices were the ones that
12 showed more evidence of being a mediator in these studies.
13
14

15
16 In this study, we undertake a mediation analysis of the effectiveness of a parenting program. The
17 intervention program was called Day by Day. It was developed by the authors of this paper in
18 order to enhance positive parenting practices, specifically focusing on early intervention and
19 prevention of behavior problems in preschoolers. Theoretical and methodological components
20 identified as fundamental parts of the most effective programs were incorporated in the Day by
21 Day program: a foundation in social learning theories; the development of positive interaction
22 skills of parents with their children; and the use of several strategies to enhance adherence
23 (Gardner et al., 2009; Kaminski, Valle, Filene, & Boyle, 2008). A more detailed description of
24 this program, as well as the method of this cluster randomized clinical trial and its overall
25 effectiveness, appears elsewhere (Rincon et al., 2018).. The primary outcomes of this trial were
26 the frequency of disruptive behaviors and the concern they cause for the mother or father. In the
27 current analysis, we aimed to identify parenting practices (potential mediators) with the greatest
28 independent effect on the primary outcomes. For this, a multiple mediation analysis procedure
29 was used.
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Method

Centers

Nineteen education centers participated in this study. Eight centers were only for children aged 0 to 5 years. These centers belong to two kinds of public institutions. The others 11 centers were either public schools (six centers) or private schools (five centers) but with public funding. Most of the study population was from low socioeconomic strata. However, there were some middle class families in some of the private schools.

Participants

All mothers, fathers or caregivers from the relevant education centers' years (2 to 6 years) were invited to participate in the study. In each education center a open meeting was carried out, where the study was presented. In this meeting it was explained that the program could be useful for all mothers, fathers and caregivers of children. Although 416 families initially agreed, it was not possible to conduct the assessment on all of them. This was done before randomization; therefore, those who received the initial assessment (332) were considered participants of the research. Most of the participants were the children's mothers (87%); in 14 cases more than one person attended some sessions (in most cases, both parents) but only caregivers considered as the primary ones were considered in the assessments and included in the analysis. Families self-reported who was the primary caregiver.

Ten centers with a total of 178 participants were assigned to the Day by Day program, consisting of mothers of 94 boys (52.8%) and 84 girls (47.2%) with an average age of 3.7 years (SD=1.0); parents' mean age was 30.6 years (SD=6.8). Nine centers with a total of 154 participants were assigned to the wait list condition, consisting of 81 boys (52.6%) and 73 girls (47.4%) with an average age of 3.9 years (SD=1.0); their mothers were 31.5 years old (SD=6.9) on average.

The number of participants per cluster ranged from 13 to 23.

Randomization

The randomization of the centers was performed after inviting the participants to be part of the research and conducting a baseline assessment. At the time of the pre-test assessment, participants and evaluators did not know who would participate in each group. Stratified randomization was done according to the institutional membership of the centers. For each institution, the names of the centers were written on small sheets of paper and put inside an opaque box, from which they were randomly drawn. The first half of the selected centers were assigned to the experimental group and the remaining ones to the control group. In the case of private schools, which was an odd group, it was previously decided that three centers would be assigned to the experimental group and two to the control group. Thus, 10 centers in total were assigned to the experimental group and nine to the control group.

Training Program

The Day by Day Program contains the following seven components: affective communication; daily and child-directed play; directed attention; routines and transitions; reinforcement and incentive programs; planned inattention-ignore and time out; and logical consequences.

The implemented version of the Program had six two-hour weekly sessions. It was completely manualized and was implemented during the months of May through July of 2016. It was delivered by psychologists who were trained by the research team in a 40-hour program (26 face-to-face hours). They had to approve the acquisition of the skills required in a performance assessment. This assessment consisted in the performance of a part of one randomly selected session in front of people, who played the role of participants from a group of mothers, fathers and/or caregivers. Skill acquisition was assessed by two experts using a rubric that allowed appreciating the following aspects: a) effective communication, b) leadership, c) problem

1
2
3 solving, d) interpersonal sensitivity, e) relationship development and/or maintenance and e)
4 adherence to the intervention protocol.
5
6

7 **Measurements**

8
9
10 The pre-assessment was carried out four weeks before the beginning of the Program at each
11 center and the post-assessment, between five and six weeks afterwards. Evaluators were blind to
12 the condition of the participants. Every instrument was completed by the participating adult,
13
14 the condition of the participants. Every instrument was completed by the participating adult,
15
16 except for one observational instrument that was used in order to assess the interaction of the
17
18 child with the adult.
19

20
21 *Alabama Parenting Questionnaire (APQ)* (Shelton, Frick, & Wootton, 1996). This is a self-report
22
23 instrument where the mother or father self-assesses the frequency with which he/she shows
24
25 certain behaviors toward the child. With adaptations, it is a suitable instrument for preschool
26
27 families (Clerkin, Marks, Policaro, & Halperin, 2007; de la Osa, Granero, Penelo, Domenech, &
28
29 Ezpeleta, 2014). This questionnaire has been modified in order to be used with families in Chile,
30
31 where it was shown to have good psychometric properties (Cova et al., 2017). The positive
32
33 reinforcement (6 items), involvement (7 items) and inconsistency (7 items) sub-scales were used.
34
35 Each item has five response options (1= not much to 5= always). The internal consistencies of
36
37 each sub-scale in the initial assessment were 0.52, 0.69, and 0.75, respectively.
38
39

40
41
42 *Harsh Discipline Practice List (HDPL)* (Flores & Herrera, 2014): This 19 item scale measures
43
44 harsh discipline behaviors, verbal maltreatment, and physical abuse and punishment. On the basis
45
46 of an exploratory factor analysis, four items were removed because they affected internal
47
48 consistency or they were cross-loaded. Two factors were identified: 1) harsh discipline and
49
50 physical punishment (9 items) and 2) humiliation behaviors (6 items). The internal consistency of
51
52 each sub-factor in the initial assessment was 0.77 and 0.63, respectively.
53
54
55
56
57
58
59
60

1
2
3 *Keys to Interactive Parenting Scale (KIPS)* (Comfort, Gordon, & Naples, 2011). This is an
4
5 observational instrument, which evaluates the quality of parenting practices with children aged 24
6
7 to 71 months. The interaction is filmed during a 15 to 20 minute play session and afterwards
8
9 coded by a trained and accredited evaluator. Psychometric studies show that the instrument has
10
11 acceptable internal consistency and inter-judge agreement in its scoring (Inostroza et al., 2014).
12
13 Five percent of these assessments were coded again by an experienced evaluator and a
14
15 discrepancy of only 5.4% was seen. It showed an internal consistency of $\alpha=0.77$ in the initial
16
17 assessment.
18
19

20
21 *Eyberg Child Behavior Inventory (ECBI)* (Eyberg & Pincus, 1999; Garcia-Tornal et al., 1998):
22
23 This is a 36-item instrument, which uses parental report to assess behavior problems in children
24
25 aged between two and 16. It has an intensity problem scale with seven Likert format response
26
27 options, which measures the frequency of behavior problems and a problem scale with two
28
29 response options (Yes/No), which assesses the extent to which each problem is a concern for the
30
31 informant. In the initial assessment, it showed an internal consistency of $\alpha = 0.91$ for both scales.
32
33

34 35 **Ethical considerations**

36
37 The research protocol was approved by the Research Ethics Committee of the author's
38
39 University. When potential participants were asked to give informed consent, they were told they
40
41 would participate in the Day by Day program, either at the end of the initial assessment process
42
43 (experimental condition) or in the following year semester (control condition).
44
45

46 47 **Data analysis**

48
49 Data analysis was performed in R version 3, using packages lme4 (Bates, Maechler, Bolker, &
50
51 Walker, 2015) and mice (Van Buuren & Groothuis-Oudshoorn, 2011) .

1
2
3 The mediation analysis was carried out on an intention-to-treat basis, which includes every
4 participant who is randomized, irrespective of non-compliance, withdrawal or anything that
5 occurs after group assignment. The mediation analysis allows analyzing the causal path
6 expected for the intervention; i.e., that intervention changes several parental practices, and
7 these affect children's behavior. This analysis allows for the decomposition of the total effect
8 of the intervention on children's behavior into two parts: the indirect effect, which refers to
9 the changes on the children's behavior caused by changes in parental practices; and direct
10 effect, which comprises changes related to the intervention, not attributable to parental
11 practices. The recommendation for those situations where there are several potential
12 mediators is to implement a multiple mediation model. This enables adjustment of the
13 individual mediators from the effects of the other mediators (Hayes, 2013). This means we
14 can examine the effect of each mediator, contingent on the presence of other possible
15 mediators, rather than testing each potential mediator in isolation. Two parallel multiple
16 mediation models were implemented. The dependent variables were the two trial outcomes:
17 the frequency of behavior problems for the first model, and the concern they cause for the
18 mother or father for the second. The potential mediator variables for both models were:
19 positive reinforcement, involvement, inconsistency, unsuitable treatment behaviors and
20 physical punishment, as well as hostility and humiliation behaviors. First, the existence of a
21 total indirect effect, corresponding to the added effect of all putative mediating variables,
22 was studied; and, second, the existence of specific indirect effects was evaluated. It is
23 necessary to do both analyses, because it is possible to find a non-significant total indirect
24 effect, resulting from strong effects operating in opposite directions. Also, the analysis of
25 specific indirect effects allows one to identify the strongest mediators (Preacher & Hayes,
26 2008). The calculation of the coefficients was performed using an intercept-slope
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 hierarchical linear model (HLM). The fixed effects model for the calculation of the
4
5 mediation was based on the regression models for two MacKinnon's waves (MacKinnon,
6
7 2008). A Wald test was performed, analogous to an ANOVA for missing data analysis
8
9 (Rubin, 1987)□, to test if parental practices and group effects significantly predicts
10
11 behaviors problems and parental concerns. As no direct translation of R^2 is available for
12
13 mixed-models, the $R^2_{S\&B-1}$ index was used. This accounts for reduction of variance at
14
15 individual level accounted by predictors (Luo & Azen, 2013).□
16
17
18
19

20 The effect of the control group versus the experimental group was adjusted considering the
21
22 pre-test value, sex, and the age of the child. The mediation effect was calculated by
23
24 multiplying the effect of the program on the parenting practice measured in the post-test and
25
26 the effect of the parenting practice on the frequency of behavior problems or in the concern
27
28 they cause. The differences in pre-test values among centers, a possible higher variability in
29
30 post-test within the experimental group and the differences in the relationship between pre
31
32 and post-test by center, were considered as random effects. As statistical test of the indirect
33
34 effects, the bootstrap confidence interval was used on the product of the regression
35
36 coefficients of parent practices on intervention by the regression coefficients of children's
37
38 behavior on parent practices (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).
39
40 Bootstrapping is a computer-based procedure to estimate, without theoretical calculations,
41
42 the standard errors and confidence intervals for specific parameters, using multiple random
43
44 samples drawn with replacement from the original data (Efron & Tibshirani, 1993). We used
45
46 the BCA bias correction, which gives more precise confidence intervals by taking account
47
48 of the asymmetric distribution of the product of the coefficients (MacKinnon, Lockwood, &
49
50 Williams, 2004).
51
52
53
54
55
56
57
58
59
60

1
2
3 There are complete data for all participants for the pre-test. For post-test, 39 participants were not
4
5 available (11.7%). Due to the presence of missing data, multiple imputation was used with 20
6
7 imputed datasets. To calculate the confidence intervals considering multiple imputation, 1000
8
9 non-parametric bootstrap multilevel samples were drawn for each imputed dataset, according to
10
11 the method called MI Boot pooled (Schomaker & Heumann, 2018).
12
13

14 **Results**

15
16 Statistically significant differences were found in the experimental group between pre- and post-
17
18 test with regard to: behavior problems, concern for this behavior, parental involvement, parental
19
20 inconsistency and, harsh discipline and physical punishment (Table 1). However, in the control
21
22 group, the only statistically significant differences between pre and post-test were a decrease in
23
24 behavior problems and concern for this behavior.
25
26

27 *Path models for parental practices as mediators*

28
29
30
31
32 Figure 1 shows the path models for the mediation of parenting practices in the relationship
33
34 between the independent variable – control and experimental group membership – and frequency
35
36 of behavior problems. Coefficients a_1 to a_6 represent the standardized differences between the
37
38 control and the experimental groups for each parenting practice. Coefficients b_{11} to b_{16} represent
39
40 those standardized beta coefficients from the multiple regression of parenting practices on
41
42 behavior problems, indicating by how many standard deviations the frequency of behavior
43
44 problems increases or decreases when each parenting practice is modified by one standard
45
46 deviation (keeping other practices constant).
47
48
49

50
51
52 Figure 2 shows the same path models, but this time for the outcome parent concern about the
53
54 child's behavior problems. Coefficients a_1 to a_6 are identical to those in Figure 1, while
55
56
57
58
59
60

1
2
3 coefficients b_{21} to b_{26} represent the standardized beta coefficients from the multiple regression of
4
5 parenting practices on parental concern for behavior problems.
6

7
8 The child behavior problems model, that includes the direct effect of parent practices and
9
10 experimental group, is statistically significant, $F(17, 6812.7)=23.092$, $p<0.001$, and predicts a
11
12 relevant amount of individual variance, $R^2_{S\&B-1}=0.56$. The parental concern model is
13
14 statistically significant, $F(17, 4863.4)=30.104$, $p<0.001$, and predicts a great amount of individual
15
16 variance, $R^2_{S\&B-1}=0.63$.
17
18

19 20 *Analysis of the individual mediator models*

21
22 Higher parental involvement occurred in the experimental group in the post-test, $a_2=.234$, CI 95%
23
24 [0.005, 0.487], as well as a lower level of harsh discipline and physical punishment, $a_5=-0.467$,
25
26 CI95% = [-0.695, -0.178]. Regarding the relationship between parenting practices and frequency
27
28 of behavior problems at the post-test, it can be seen that a higher parental inconsistency is related
29
30 to a higher frequency of behavior problems, $b_{13}=0.230$, CI 95%= [0.087, 0.382]. Just as a higher
31
32 level of harsh discipline and physical punishment is related to more behavior problems,
33
34 $b_{15}=0.323$, CI 95%= [0.167, 0.488]. Likewise, in the case of parental concern for behavior
35
36 problems, it can be seen that a higher level of parental inconsistency, $b_{23}=0.207$, CI 95%= [0.077,
37
38 0.360], as well as a higher level of harsh discipline and physical punishment, $b_{25}=0.218$, CI 95%=
39
40 [0.078, 0.378], are related to a higher concern at outcome.
41
42
43
44
45
46

47 48 *Overall effects on behavior problems*

49
50 With regard to the individual indirect effects, it can be seen that effects of parental inconsistency,
51
52 $a_3b_{13}= -0.051$, CI 95% = [-0.142, -0.001], and harsh discipline and physical punishment, $a_5b_{15}=-$
53
54 0.152, CI 95%= [-0.281, -0.050], are statistically significant.
55
56
57
58
59
60

1
2
3 The total effect of the intervention on behavior problems was statistically significant, $c_1 = -0.305$,
4
5 95% = [-.53, -.11]. Our finding that the total indirect effect mediated by parenting practices,
6
7
8 $\sum_{i=1}^6 a_i b_{1i} = -.216$, CI 95% = [-.375, -.080], is statistically significant, but the direct effect is not
9
10
11 significant, $c_1' = -.088$, CI 95% = [-.304, .074], meaning that this is a complete mediation
12
13
14 model.

15 16 17 *Overall effects on parental concern about behavior problems*

18
19
20 Analyzing the specific indirect effects, it can be seen that, just as for the report of behavior
21
22 problems, effects of parental inconsistency, $a_3 b_{23} = 0.046$, CI 95% = [0.003, 0.136], as well as
23
24 harsh discipline and physical punishment $a_5 b_{25} = 0.101$, CI 95% = [0.027, 0.207] are statistically
25
26 significant.

27
28
29
30 The total effect of the intervention on concern for behavior problems is not statistically
31
32 significant, $c_2 = -0.271$, 95%CI = [-0.542, 0.018]. However, given that the indirect effect, mediated
33
34
35 by parenting practices, is significant, $\sum_{i=1}^6 a_i b_{2i} = -.167$, CI 95% = [-0.307, -0.041] and the direct
36
37
38 effect is not, $c_2' = -.105$, CI 95% = [-0.370, 0.169], once again we have a complete mediation
39
40
41 model.

42 43 44 **Discussion and Conclusions**

45
46
47 The effectiveness of universal parenting training programs is not clearly established and the
48
49 processes implicated in their possible positive effects have not been sufficiently studied (Simkiss
50
51 et al., 2013).

1
2
3 This study focused on a parenting training program, Day by Day, which aimed to strengthen
4 positive parenting practices, specifically focusing on early intervention and the prevention of
5 behavior problems in preschoolers. We developed this training program based on a systematic
6 review of existing programs, which had shown the most promising results worldwide. Its main
7 elements are the strengthening of positive and rewarding interactions between parents and
8 children, and the ability of parents to correctly apply social learning theories in order to promote
9 adaptive behaviors and reduce maladaptive ones in their children. Our results showed that the
10 changes in the primary outcomes (parent-reported frequency of behavior problems and their
11 concern about them) were mediated by the changes in parenting practices. Specifically, two types
12 of parenting practices showed a statistically significant mediation after adjustment for the effect
13 of other practices in the multiple mediation model. These were inconsistent parenting practices,
14 as well as harsh discipline and physical punishment practices.

15
16 These results confirm that the effects of the program are directly related to parental abilities that
17 can be taught rather than to other factors, such as the change in parents' perceptions, simply as a
18 result of participation in a program of this nature. It is particularly important that these abilities
19 were observed as mediators in a universally implemented program, where, in principle, many
20 parents already have suitable parenting abilities and many children do not show relevant behavior
21 problems (Greenberg & Riggs, 2015).

22
23 Parental inconsistency in the application of contingencies responding to the behavior of their
24 children is decisive in the development and aggravation of behavior problems. The same occurs
25 with harsh discipline and physical punishment, whose reduction appears in several studies as one
26 of the main mediators of the effectiveness of parenting training programs (Beauchaine, Webster-
27 Stratton, & Reid, 2005; Forehand et al., 2014; Fossum, Morch, Handegard, Drugli, & Larsson,
28 2009).

1
2
3 In Chile, harsh discipline and physical punishment are very frequently used and are usually
4 related to inconsistent parenting practices (UNICEF, 2015), which may explain the effectiveness
5 of the universal training program.
6
7

8
9
10 Positive reinforcement and higher level of involvement with the child did not show an
11 independent effect in this study. Reductions in negative practices seem to have a greater impact
12 than increases in positive practices (Forehand et al., 2014). However, this finding must be
13 cautiously interpreted, since positive practices enable both the deployment and the effectiveness
14 of other practices, such as suitable discipline or supervision. There are some studies that show
15 effects of positive parenting (Forgatch & Kjobli, 2016; Gardner, Dishion, Shaw, Burton, &
16 Supplee, 2007).
17
18

19
20 One limitation of this study is that it is based on a pre- and post-assessment, with no monitoring.
21 Therefore, it was not possible to estimate the sustainability of the effects or to demonstrate that
22 changes in parenting practices precede the changes in the behavior of the children. Ideally,
23 changes in parental practices would have been measured during the trial and before the primary
24 endpoint.
25
26

27
28 Another limitation is its dependence on self-reports. Thus, caution is needed in the interpretation
29 of our findings given that an observational measurement of parent-child interactions did not show
30 statistically significant changes. Similarly, it would be desirable to have an independent
31 replication of the Day by Day program.
32
33

34
35 In spite of these limitations, the results are of interest. First, it evaluated a universal program, an
36 unusual feature in the studies carried out to date (Forehand et al., 2014). Second, as it is common
37 in these studies (Chacko et al., 2016), a significant proportion of parents who consented to
38 participate, and were evaluated and randomized, did not attend any of the sessions (34%).
39
40

41
42 Nevertheless, our intention-to-treat analysis shows that the *offer* of the program led to significant
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 benefits overall. This result is key to whether or not service planners and policy makers scale up
4
5 such programs. Except for the full-longitudinal analysis, all of the other recent suggestions on
6
7 mediating studies were considered (Patel et al., 2017). In conclusion, our results show that a
8
9 universal parenting program is able to modify parenting practices and reduce behavior problems
10
11 in children, which have potential preventive effects. The decrease of inconsistent parenting
12
13 practices and, harsh discipline and physical punishment appear as important mediators of the
14
15 effects of the program in reducing behavior problems in children.
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

- Bates, D. M., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48.
doi.org/10.1177/009286150103500418
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.
- Beauchaine, T. P., Webster-Stratton, C., & Reid, M. J. (2005). Mediators, moderators, and predictors of 1-year outcomes among children treated for early-onset conduct problems: A latent growth curve analysis. *Journal of Consulting and Clinical Psychology*, *73*(3), 371–388. doi:10.1037/0022-006x.73.3.371
- Clerkin, S. M., Marks, D. J., Policaro, K. L., & Halperin, J. M. (2007). Psychometric properties of the Alabama Parenting Questionnaire-Preschool Revision. *Journal of Clinical Child and Adolescent Psychology*, *36*(1), 19–28. doi:DOI 10.1207/s15374424jccp3601_3
- Comfort, M., Gordon, P. R., & Naples, D. (2011). KIPS: An Evidence-Based Tool for Assessing Parenting Strengths and Needs in Diverse Families. *Infants & Young Children*, *24*(1), 56–74. doi:Doi 10.1097/Iyc.0b013e3182001bd3
- Cova, F., Bustos, C., Rincon, P., Streiner, D. L., Grandon, P., Saldivia, S., . . . Contreras, G. (2017). Psychometric Properties of the Alabama Parenting Questionnaire Adapted to Families of Chilean Preschoolers. *Infant Mental Health Journal*, *38*(2), 249–257.
doi:10.1002/imhj.21631
- Chacko, A., Jensen, S. A., Lowry, L. S., Cornwell, M., Chimklis, A., Chan, E., . . . Pulgarin, B. (2016). Engagement in Behavioral Parent Training: Review of the Literature and

1
2
3 Implications for Practice. *Clinical Child and Family Psychology Review*, 19(3), 204-215.

4
5 doi:10.1007/s10567-016-0205-2
6

7 de la Osa, N., Granero, R., Penelo, E., Domenech, J. M., & Ezpeleta, L. (2014). Psychometric

8 Properties of the Alabama Parenting Questionnaire-Preschool Revision (APQ-Pr) in 3

9
10 Year-Old Spanish Preschoolers. *Journal of Child and Family Studies*, 23(5), 776-784.

11
12
13 doi:10.1007/s10826-013-9730-5
14
15

16 Efron, B., & Tibshirani, R. (1993). *An Introduction to the Bootstrap*. London: Chapman and

17
18 Hall/CRC.
19

20 Eyberg, S. M., & Pincus, D. (1999). *ECBI & SESBI-R : Eyberg Child Behavior Inventory and*

21
22 *Sutter-Eyberg Student Behavior Inventory-Revised : professional manual*. Odessa, FL:

23
24 Psychological Assessment Resources.
25
26

27 Fagan, A. A., & Benedini, K. M. (2016). How Do Family-Focused Prevention Programs Work? A

28
29 Review of Mediating Mechanisms Associated with Reductions in Youth Antisocial

30
31 Behaviors. *Clinical Child and Family Psychology Review*, 19(4), 285-309.

32
33
34 doi:10.1007/s10567-016-0207-0
35
36

37 Flores, J. J., & Herrera, L. M. F. (2014). Design and psychometric validation of the Harsh

38
39 Discipline Practice List. *Revista Iberoamericana De Diagnostico Y Evaluacion-E*

40
41 *Avaliacao Psicologica*, 2(38), 137-153.
42
43

44 Fonagy, P. (2015). *What works for whom? : a critical review of treatments for children and*

45
46 *adolescents* (Second edition. ed.). New York: The Guilford Press.
47
48

49 Forehand, R., Lafko, N., Parent, J., & Burt, K. B. (2014). Is parenting the mediator of change in

50
51 behavioral parent training for externalizing problems of youth? *Clinical Psychology*

52
53 *Review*, 34(8), 608-619. doi:10.1016/j.cpr.2014.10.001
54
55
56
57
58
59
60

- 1
2
3 Forgatch, M. S., & Kjobli, J. (2016). Parent Management Training-Oregon Model: Adapting
4
5 Intervention with Rigorous Research. *Family Process*, 55(3), 500-513.
6
7 doi:10.1111/famp.12224
8
9
- 10 Fossum, S., Morch, W. T., Handegard, B. H., Drugli, M. B., & Larsson, B. (2009). Parent training
11
12 for young Norwegian children with ODD and CD problems: Predictors and mediators of
13
14 treatment outcome. *Scandinavian Journal of Psychology*, 50(2), 173-181.
15
16 doi:10.1111/j.1467-9450.2008.00700.x
17
18
- 19 Garcia-Tornal, S., Calzada, E., Eyberg, S., Mas, J., Vilamala, C., Baraza, C., . . . Trinxant, A.
20
21 (1998). Inventario Eyberg del comportamiento en niños. Normalización de la versión
22
23 española y su utilidad para el pediatra extrahospitalario. *Anales Españoles de Pediatría*,
24
25 48(5), 475-482.
26
27
- 28 Gardner, F., Connell, A., Trentacosta, C. J., Shaw, D. S., Dishion, T. J., & Wilson, M. N. (2009).
29
30 Moderators of Outcome in a Brief Family-Centered Intervention for Preventing Early
31
32 Problem Behavior. *Journal of Consulting and Clinical Psychology*, 77(3), 543-553.
33
34 doi:10.1037/a0015622
35
36
- 37 Gardner, F., Dishion, T. J., Shaw, D. S., Burton, J., & Supplee, L. (2007). Randomized prevention
38
39 trial for early conduct problems: Effects on proactive parenting and links to toddler
40
41 disruptive behavior. *Journal of Family Psychology*, 21(3), 398-406. doi:10.1037/0893-
42
43 3200.21.3.398
44
45
- 46 Greenberg, M., & Riggs, N. (2015). Prevention of mental disorders and promotion of competence.
47
48 In A. Thaper, D. Pine, J. Leckman, S. Scott, M. Snowling, & E. Taylor (Eds.), *Rutter's*
49
50 *Child and Adolescent Psychiatry* (pp. 215-226). Oxford: Wiley.
51
52
- 53 Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis : a*
54
55 *regression-based approach*. New York: The Guilford Press.
56
57
58
59
60

- 1
2
3 Hiscock, H., Bayer, J. K., Price, A., Ukoumunne, O. C., Rogers, S., & Wake, M. (2008). Universal
4 parenting programme to prevent early childhood behavioural problems: cluster randomised
5 trial. *British Medical Journal*, *336*(7639), 318-321. doi:10.1136/bmj.39451.609676.AE
6
7
8
9
10 Inostroza, C., Contreras, G., Cova, F., Rincón, P., Grandón, P., & Saldivia, S. (2014). Acuerdo
11 interjueces en el empleo de la escala observacional de prácticas parentales KIPS en una muestra
12 de madres/niños chilenos de 36 a 71 meses *Aijú*, *12*(14), 120-134.
13
14
15
16
17
18 Kaminski, J. W., Valle, L. A., Filene, J. H., & Boyle, C. L. (2008). A meta-analytic review of
19 components associated with parent training program effectiveness. *Journal of Abnormal*
20 *Child Psychology*, *36*(4), 567-589. doi:10.1007/s10802-007-9201-9
21
22
23
24
25 Knerr, W., Gardner, F., & Cluver, L. (2013). Improving Positive Parenting Skills and Reducing
26 Harsh and Abusive Parenting in Low- and Middle-Income Countries: A Systematic
27 Review. *Prevention Science*, *14*(4), 352-363. doi:10.1007/s11121-012-0314-1
28
29
30
31
32 Luo, W., & Azen, R. (2013). Determining Predictor Importance in Hierarchical Linear Models
33 Using Dominance Analysis. *Journal of Educational and Behavioral Statistics*, *38*(1), 3–31.
34
35
36 <https://doi.org/10.3102/1076998612458319>
37
38
39 MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. New York: Lawrence
40 Erlbaum Associates.
41
42
43 MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A
44 comparison of methods to test mediation and other intervening variable effects.
45
46
47 *Psychological Methods*, *7*(1), 83-104. doi:10.1037//1082-989x.7.1.83
48
49
50 MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect
51 effect: Distribution of the product and resampling methods. *Multivariate Behavioral*
52 *Research*, *39*(1), 99-128. doi:DOI 10.1207/s15327906mbr3901_4
53
54
55
56
57
58
59
60

- 1
2
3 Marchand, E., Stice, E., Rohde, P., & Becker, C. B. (2011). Moving from efficacy to effectiveness
4 trials in prevention research. *Behaviour Research and Therapy*, *49*(1), 32-41.
5
6 doi:10.1016/j.brat.2010.10.008
7
8
9
10 Patel, C. C., Fairchild, A. J., & Prinz, R. J. (2017). Potential Mediators in Parenting and Family
11 Intervention: Quality of Mediation Analyses. *Clinical Child and Family Psychology*
12 *Review*, *20*(2), 127-145. doi:10.1007/s10567-016-0221-2
13
14
15
16
17 Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and
18 comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3),
19 879-891. doi:Doi 10.3758/Brm.40.3.879
20
21
22
23
24 Rincon, P., Cova, F., Saldivia, S., Bustos, C., Grandón, P., Inostroza, C., ... & King, M. (2018).
25 Effectiveness of a Positive Parental Practices Training Program for Chilean Preschoolers'
26 Families: A Randomized Controlled Trial. *Frontiers in psychology*, *9*.
27
28 doi.org/10.3389/fpsyg.2018.01751
29
30
31
32
33 Rubin, D. B. (1987). Multiple imputation for nonresponse in surveys. New York: John Wiley &
34 Sons.
35
36
37
38 Sandler, I. N., Schoenfelder, E. N., Wolchik, S. A., & MacKinnon, D. P. (2011). Long-Term
39 Impact of Prevention Programs to Promote Effective Parenting: Lasting Effects but
40 Uncertain Processes. *Annual Review of Psychology*, *Vol 62*, *62*, 299-329.
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Scott, S., & Gardner, F. (2015). Parenting Programs. In A. Thaper, D. Pine, J. Leckman, S. Scott,
4 M. Snowling, & E. Taylor (Eds.), *Rutter's Child and Adolescent Psychiatry* (pp. 483-495).
5 Oxford: Wiley.
6
7

8
9
10 Shelton, K. K., Frick, P. J., & Wootton, J. (1996). Assessment of parenting practices in families of
11 elementary school-age children. *Journal of Clinical Child Psychology*, 25(3), 317-329.
12
13 doi:DOI 10.1207/s15374424jccp2503_8
14

15
16
17 Schomaker, M., & Heumann, C. (2018). Bootstrap inference when using multiple imputation.
18
19 *Statistics in medicine*, 37(14), 2252-2266.
20

21 Simkiss, D. E., Snooks, H. A., Stallard, N., Kimani, P. K., Sewell, B., Fitzsimmons, D., . . .
22
23 Stewart-Brown, S. (2013). Effectiveness and cost-effectiveness of a universal parenting
24 skills programme in deprived communities: multicentre randomised controlled trial. *Bmj*
25
26 *Open*, 3(8). doi:ARTN e00285110.1136/bmjopen-2013-002851
27
28
29

30
31 UNICEF. (2015). 4º Estudio de maltrato infantil en Chile: análisis comparativo 1994 - 2000 –
32
33 2006 - 2012. Santiago de Chile: Andros.
34
35

36
37
38 Van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Multivariate Imputation by Chained
39
40 Equations. *Journal Of Statistical Software*, 45(3), 1–67.
41
42 doi.org/10.1177/0962280206074463
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1***Descriptive Statistics for Outcomes and Potential Mediating Variables***

	Experimental						Control					
	M Pre	DS Pre	M Post	DS Post	η^2_G	p-value ^a	M Pre	DS Pre	M Post	DS Post	η^2_G	p value ^a
Behavior Problems	3.16	0.85	2.76	0.85	.056	<.001**	3.20	0.81	3.09	0.89	.005	0.036*
Parental Concern for Behavior problems	1.36	0.21	1.27	0.22	.040	<.001**	1.41	0.20	1.37	0.23	.007	0.001**
Reinforcement	4.66	0.35	4.71	0.35	.005	.090	4.62	0.36	4.63	0.36	.001	0.847
Parental Involvement	4.39	0.52	4.52	0.46	.017	<.001**	4.35	0.53	4.35	0.52	.001	0.949
Parental Inconsistence	2.48	0.83	2.23	0.78	.025	<.001**	2.51	0.77	2.42	0.74	.003	0.103
Humiliating treatment	0.06	0.21	0.04	0.13	.002	.180	0.07	0.14	0.06	0.12	.002	0.430
Harsh discipline and physical punishment	1.01	0.5	0.77	0.4	.073	<.001**	1.07	0.47	1.01	0.5	.004	0.066
KIPS	3.77	0.78	3.71	0.78	.002	.436	3.46	0.72	3.55	0.74	.004	0.276

N=332 ^a Corresponds to the result of a mixed ANOVA, with fixed effect time and random effect belonging to the educational center * p < 0.05 ** p < 0.01 ^b Keys to Interactive Parenting Scale.

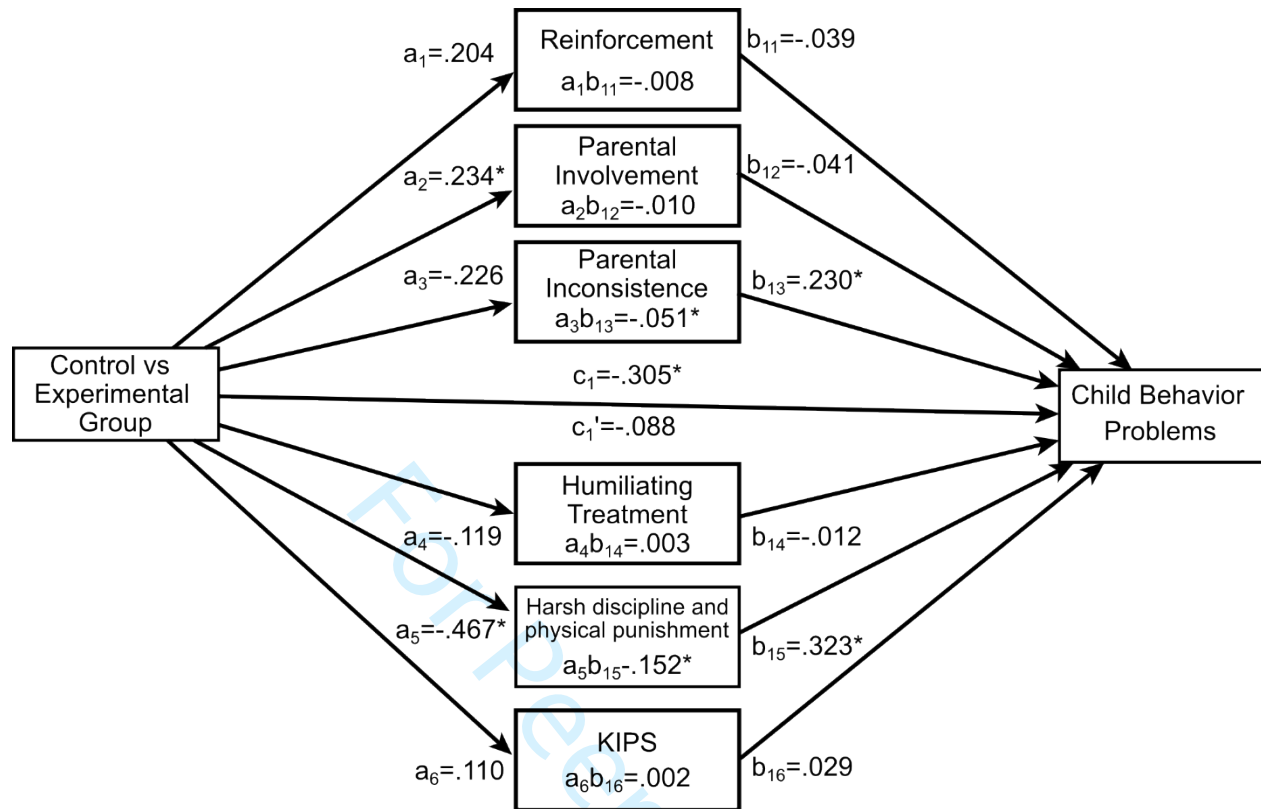


Figure 1. Results of the mediation model of parenting practices in the relationship between the effect of the treatment and the behavior in disruptive practices. Coefficients a_1 to a_6 = standardized differences between the control and the experimental groups for each parenting practice. Coefficients b_{11} to b_{16} = standardized beta coefficients from the multiple regression of parenting practices on behavior problems. Coefficients c_1' = standardized direct effect on child behavior problems. Coefficients c_1 = standardized total effect on child behavior problems. Products $a_1 b_{11}$ to $a_6 b_{16}$ = standardized indirect effects of control versus experimental group on child behavior problems through mediator parenting practices. *Confidence interval of the coefficient does not include the 0.

KIPS= Keys to Interactive Parenting Scale*

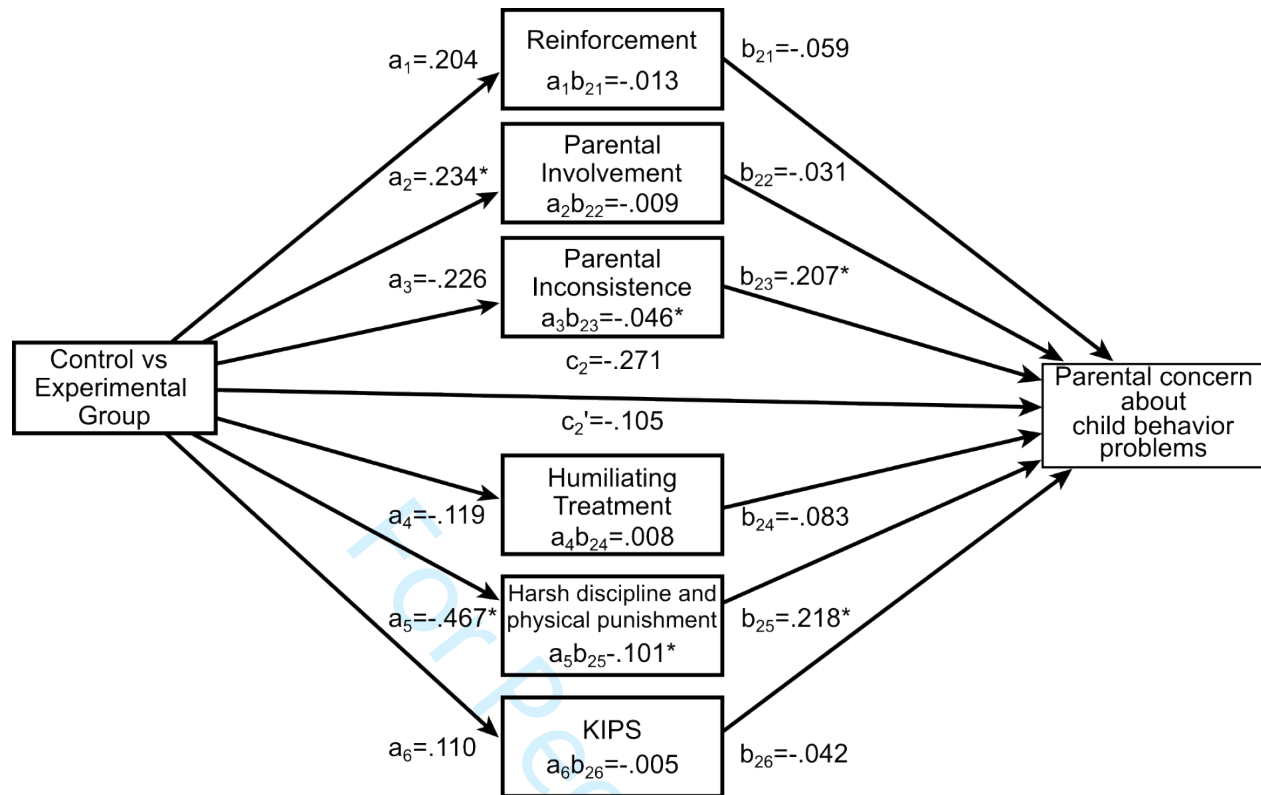


Figure 2. Results of the mediation model of parenting practices in the relationship between the effect of the treatment and parental concern. Coefficients a_1 to a_6 = standardized differences between the control and the experimental groups for each parenting practice. Coefficients b_{21} to b_{26} = standardized beta coefficients from the multiple regression of parenting practices on parental concern. Coefficients c_2' = standardized direct effect on parental concern. Coefficients c_2 = standardized total effect on parental concern. Products $a_1 b_{21}$ to $a_6 b_{26}$ = standardized indirect effects of control versus experimental group on parental concern through mediator parenting practices. Confidence interval of the coefficient does not include the 0.

KIPS= Keys to Interactive Parenting Scale