Using behavioral insights in early childhood interventions: The effects of Crianza Positiva text and voice messaging program on parental investment and competences

Ana Balsa   Juanita Bloomfield   Alejandro Cid

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The Importance of a Safe and Nurturing Environment

- A safe and nurturing environment is key for child development (Almond and Currie, 2011; Cunha et al., 2006)
- The production of cognitive and non-cognitive skills of children is highly dependent on parental investment (Cunha et al., 2006)

Socioeconomic gaps in parental investments

- Families of lower SES:
    - spend less time with their children (Guryan et al. 2008)
    - show them less expressions of affection at early ages (Bradley et al 2001)
    - are more likely to exert physical punishment on children
    - are less likely to cognitively stimulate their children
    - speak less and read less to their children (Hart and Risley 1995): 30mm fewer words by age 4

Socioeconomic gaps in child development

Uruguay: % children aged de 0 to 36 months with lagged development (ENDIS 2014)
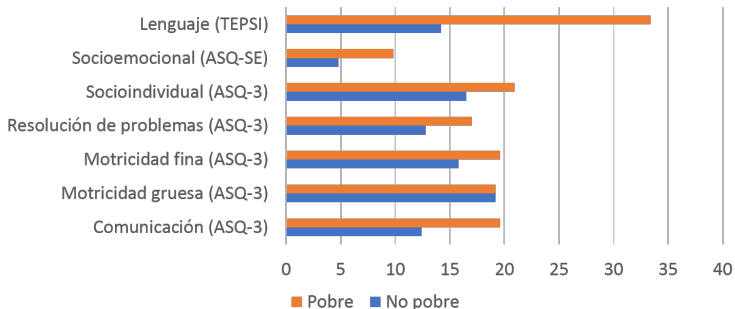
Can early environments be enhanced?

- Early environments can be substantially enhanced by programs that expand and increase the quality of pre-school care, and by interventions that foster parental competences (Berlinski and Schady, 2015)
- Parenting programs are yet scarce, targeted to specific populations, and in many cases short-lived and too costly to apply
- The challenge is to design cost-effective parenting interventions that can be scaled up to broad fractions of the population and are able to sustain parental behaviors over time

This paper

- Evaluates a messaging parenting intervention aimed at reinforcing and sustaining positive parenting competences over time

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    - Behavioral economics tools
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- Messages are sent after families complete a parenting workshop of 8 weekly sessions

Overview of findings

- We find that the messaging program increases the frequency of parental involvement with the child and the quality of that investment
- The program had stronger effects over parents more constrained initially by a negative identity and over parents that suffered from a negative shock

Behavioral economics and parenting

- To a large extent, parental interventions have been designed assuming that individuals act rationally (Gennetian et al., 2017).
- Behavioral biases that interfere in the parent child-relationship:
  - Present bias and time inconsistency
  - Complexity of parental role, inattention and decision fatigue
  - Negative identity
  - Status quo
- By focusing on ways to overcome behavioral biases, behavioral economics offers some promising tools, generally of low cost, to enhance parental behaviors

The Crianza Positiva Program

- Evidence-based intervention aimed at improving parenting practices and reinforcing children development
- Designed to be implemented at Children and Family Care Centers (CAIF) of Uruguay
- Multilevel intervention with varying treatment intensities:
  - Level 1: 8-session workshop (Gomez and Muñoz, 2014; Families First)
  - Level 2: 24-weeks text messages
 - Level 3: 4 counseling home visits

Crianza Positiva's text and audio messaging component

- 72 messages sent to families three times a week over a period of 24 weeks
- Messages are sent at the same day and time to all family members (text+audio)
- Structure organized around 12 biweekly modules:
  - M1: Reminder of a parental competence and its benefits / Reinforcement of positive identity
  - M2: Suggestion of a specific activity to be undertaken with the child
  - M3: Reinforcement of positive identity and invitation to reflect on performance / Reinforcement of the importance of a parental competence
- SMS are personalized
- Additional components: Commitments, Radio Butia, Facebook

# Type of messages and examples by behavioral barrier

Behavioral bias	Type of message to address this barrier	Example
Present bias and time in-consistency	• Messages that underscore the benefits of parenting practices • Reminders about the importance of parenting practices	*Children's brains are like sponges, they absorb everything: the sounds, the pitches of voices, the language they listen to. The more words your child listens to at this stage, the more [she] will develop [her] language. It is therefore very important that you speak to [child's name], this will impact heavily on [her] ability to learn.*
Complexity of parental role, inattention, decision fatigue	• Messages that decompose complex parental tasks into simple ones • Messages that relieve stress through breathing and relaxation techniques	*Talk to [child's name] while you are washing [him] or changing [his] diapers. Look [him] in the eye when you speak to [him]. When [child's name] tries to respond, don't interrupt [him] and do not get distracted. [Child's name] needs to know you are listening.*
Negative identity	• Messages that strengthen parental self-efficacy and empowerment • Messages that show that feeling stressed out or underconfident is normal, and that parents do overcome it	*There is no one that wants as much for [child's name] as you do. Think about one or two moments in the past days in which you felt you really contributed towards [her] wellbeing. Trust yourself and continue seeking more of these moments during the week.*
Status quo bias	• Messages suggesting concrete and simple activities • Messages reminding benefits of parental involvement	*The more you speak to [child's name], the better will [his] language develop and the more [he] will learn. Today and in the following days, remember and repeat this thought: I take advantage of all the moments with [child's name] to speak to [him].*

Theory of change
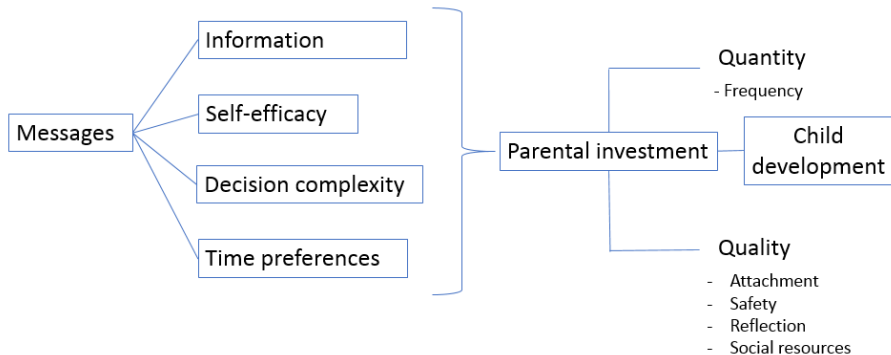
Experimental design
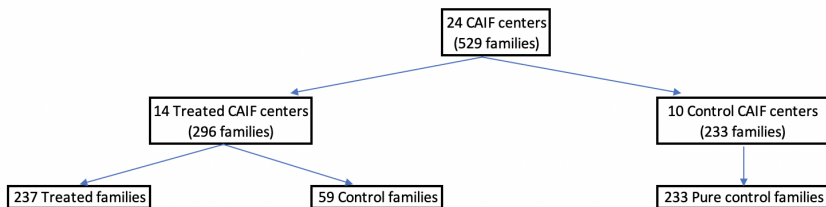
- RCT after workshop completion
- Sample and randomization:

Experimental design
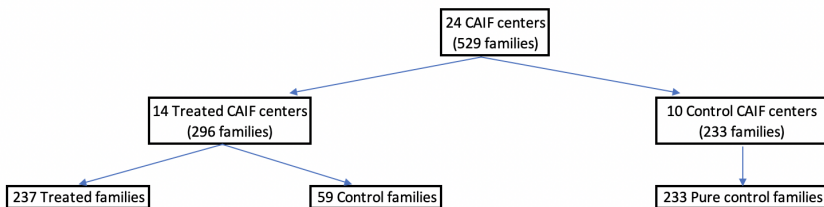
- RCT after workshop completion
- Sample and randomization:


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                        24 CAIF centers
                        (529 families)

        14 Treated CAIF centers              10 Control CAIF centers
            (296 families)                       (233 families)

237 Treated families    59 Control families    233 Pure control families
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- Survey to collect mobile numbers
- Intervention was delivered to all the contact numbers we had for each family (SMS through web platform and audios through WhatsApp)

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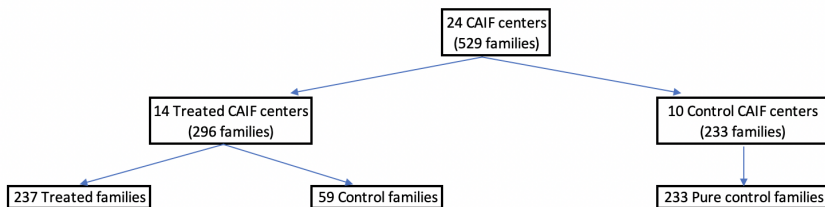
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                        │   24 CAIF centers   │
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                        └─────────────────────┘
              ┌────────────────┘              └────────────────┐
   ┌──────────────────────────┐              ┌──────────────────────────┐
   │ 14 Treated CAIF centers  │              │  10 Control CAIF centers  │
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   └──────────────────────────┘              └──────────────────────────┘
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┌──────────────────┐   ┌──────────────────┐   ┌──────────────────────────┐
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└──────────────────┘   └──────────────────┘   └──────────────────────────┘
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- Survey to collect mobile numbers
- Intervention was delivered to all the contact numbers we had for each family (SMS through web platform and audios through WhatsApp)
- Control families received one SMS that thanked them for participating in the Crianza Positiva workshop

Outcomes

Sociodemographic characteristics	• Sociodemographic questionnaire
Parental investment quantity	• Frequency of parental involvement in: physical games, didactic activities, social activities and caring activities with the child (Cabrera et al., 2004) • Stimulating material resources index
Parental investment quality	• Positive Parenting Scale (E2P) by Gomez and Muñoz (2015) • Father's involvement subscale of the Etxadi-Gangoiti Scale of Arranz et al. (2012) • Disciplinary methods used by parents (UNICEF MICS6)
Parental beliefs	• Parenting Stress Index (Short Form) (PSI/SF) • Parental Sense of Competence Scale (PSOC) • Center for Epidemiologic Studies Depression Scale
Parental information	• Parental knowledge about positive parenting
Parental preferences	• Monetary Choice Questionnaire (MCQ)

Attrition

- Out of the 237 families randomized to receive messages, 72% responded to the follow-up questionnaire
- The response rate for the 292 families randomized to the control arm was 78%

	Probability of being surveyed
Difference in response rate between ITT=1 and ITT=0	-0.056
	(0.038)
Response rate control arm	0.777***
	(0.024)
N	529

Descriptive statistics and balance

|	Treatment			Control			Balance	
	N	Mean	Std. Dev	N	Mean	Std. Dev	N	Diff.	Diff. s.e.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mother's age	168	30.292	6.626	225	28.311	6.552	393	1.981***	(0.672)
Female child	170	0.482	0.501	227	0.498	0.501	397	-0.015	(0.051)
Child's age (in months)	167	23.343	7.014	226	24.419	6.115	393	-1.076	(0.678)
Premature child	170	0.065	0.247	225	0.089	0.285	395	-0.024	(0.027)
Intact family	167	0.719	0.451	224	0.777	0.417	391	-0.058	(0.045)
Child still being breastfed	170	0.253	0.436	226	0.248	0.433	396	0.005	(0.044)
# of other children in hhld	159	1.138	1.285	216	0.903	1.151	375	0.236*	(0.129)
Other adults in household	158	0.158	0.366	215	0.228	0.420	373	-0.070*	(0.041)
Housing material problems	158	0.291	0.456	218	0.303	0.461	376	-0.012	(0.048)
No running water	168	0.018	0.133	226	0.022	0.147	394	-0.004	(0.014)
No sanitation	168	0.024	0.153	226	0.031	0.174	394	-0.007	(0.017)
No basic comfort goods	159	0.226	0.420	223	0.202	0.402	382	0.025	(0.043)
Asset index	150	0.241	0.140	222	0.256	0.139	372	-0.015	(0.015)
Beneficiary of cash transfers	170	0.700	0.460	227	0.634	0.483	397	0.066	(0.048)
Mother responds qx	170	0.935	0.247	227	0.916	0.278	397	0.019	(0.026)
Only child	163	0.337	0.474	220	0.414	0.494	383	-0.076	(0.050)
Mother completed middle school	167	0.317	0.467	226	0.332	0.472	393	-0.014	(0.048)
Mother completed high school	167	0.281	0.451	226	0.305	0.462	393	-0.024	(0.046)
Mother works full time	165	0.388	0.489	217	0.401	0.491	382	-0.013	(0.051)
Mother works part time	165	0.194	0.397	217	0.194	0.396	382	0.000	(0.041)
Father works full time	151	0.808	0.395	215	0.767	0.423	366	0.041	(0.043)
Family had negative shock 12m	165	0.642	0.481	224	0.576	0.495	389	0.067	(0.050)
Number of negative shocks	165	1.394	1.480	224	1.192	1.415	389	0.202	(0.149)

Results: Parental investment (time and material resources)

	ITT effect (in SD) (1)	Std. error (2)	p-value (3)	p-value (after clustering) (4)	MHT p-value (5)
Parental investment					
Parental time investment index	0.337	(0.110)	0.002***	0.002***	0.012**
Physical games	0.279	(0.119)	0.020**	0.036**	0.067*
Didactic Activites	0.302	(0.113)	0.008***	0.018**	0.061*
Social Activities	0.283	(0.122)	0.019**	0.020**	0.049**
Stimulating material resources					
Toy diversity	-0.203	(0.117)	0.091*	0.227	0.179
More than 5 children book	0.003	(0.108)	0.978	0.985	0.976

Results: Parental investment (quality)

|	ITT effect (in SD) (1)	Std. error (2)	p-value (3)	p-value (after clustering) (4)	MHT p-value (5)
Positive Parenting Competences					
Positive Parenting Scale	0.248	(0.127)	0.051**	0.068*	0.051**
E2P: Attachment	0.111	(0.116)	0.337	0.381	0.341
E2P: Routines	0.125	(0.106)	0.235	0.322	0.395
E2P: Social support	0.233	(0.110)	0.036**	0.051*	0.099*
E2P: Parental Reflection	0.268	(0.113)	0.018**	0.053*	0.064*
Father's involvement	-0.065	(0.111)	0.569	0.574	0.569
Violent disciplinary approach	-0.023	(0.109)	0.838	0.870	0.838

Mechanisms
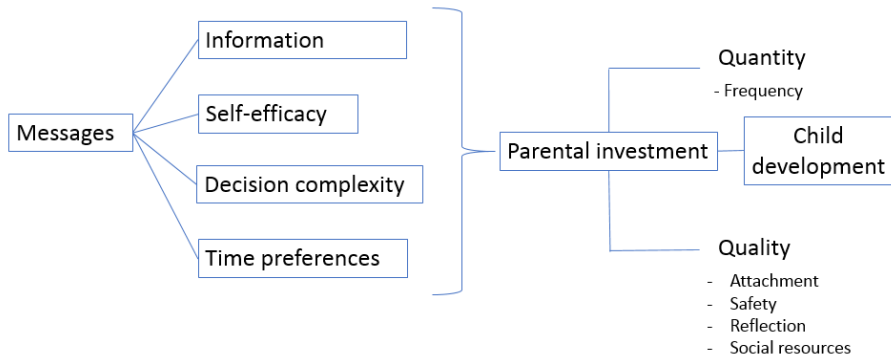
Mechanisms 1: Effects on information, beliefs and preferences

	ITT effect (in SD) (1)	Std. error (2)	p-value (3)	p-value (after clustering) (4)	MHT p-value (5)
Parental Stress (decision complexity channel)					
Parental Stress Index (PSI)	0.092	(0.138)	0.508	0.692	0.508
PSI: Parental discomfort	0.179	(0.115)	0.12	0.408	0.292
PSI: Dysfunctional Interaction	-0.059	(0.124)	0.631	0.702	0.626
PSI: Difficult child	0.127	(0.128)	0.322	0.433	0.520
Parental Sense of Competence (self-efficacy channel)					
Parental Sense of Competence Scale (PSOC)	-0.044	(0.119)	0.714	0.751	0.714
PSOC: effectiveness	0.218	(0.112)	0.052*	0.203	0.105
PSOC: controllability	-0.161	(0.114)	0.155	0.428	0.147
Parental knowledge (information channel)					
Parental knowledge Scale	-0.022	(0.023)	0.337	0.529	0.337
Time preferences (time preferences channel)					
Discount rate	0.010	(0.010)	0.304	0.523	0.304

Mechanisms 2: Heterogeneity by barriers
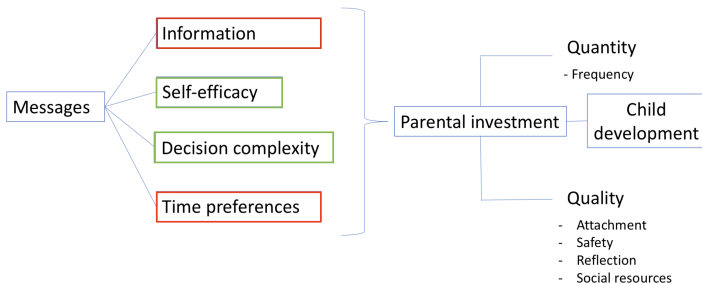
- Families with higher number of external shocks are more able to establish routines, they need to rely less on the use of violent discipline and their sense of parental competence increases more.
- Families with lower self-efficacy at baseline have a higher improvement in reflection capacity, ability to organize routines, and material investments.

Spillovers

	Coeff. and s.e.	Mht adjusted p-value	Power
Parental time investment	0.099		0.700
	(0.453)		
Physical games	0.100		0.804
	(0.126)		
Didactic Activites	-0.008		0.542
	(0.189)		
Social Activities	0.162		0.656
	(0.153)		
Father's involvement	-0.037		0.375
	(0.058)		
Toy diversity	-0.032		0.228
	(0.025)		
More than 5 children books	-0.048		0.781
	(0.066)		
Positive Parenting Scale (E2P)	-0.037		0.694
	(0.078)		
E2P: Attachment	0.062		0.412
	(0.09)		
E2P: Routines	0.220		0.722
	(0.166)		
E2P: Social support	-0.260		0.703
	(0.18)		
E2P: Parental Reflection	0.013		0.781
	(0.121)		
Violent discipline	0.170**	0.049	0.159
	(0.084)		
Parental Stress Index (PSI)	6.062		0.308
	(3.964)		
PSI: Parental discomfort	3.805**	0.082	0.350
	(1.637)		
PSI: Dysfunctional Interaction	-0.283		0.320
	(1.162)		
PSI: Difficult child	2.000		0.400
	(1.405)		
Parental Sense of Competence Scale (PSOC)	-0.083		0.745
	(0.097)		
PSOC: effectiveness	0.104		0.458
	(0.153)		
PSOC: controllability	-0.209		0.272
	(0.198)		
CES Depression Scale (# symptoms)	-0.980		0.050
	(1.508)		
CESD: At risk of depression	-0.025		0.059
	(0.057)		
Parenting knowledge	-0.971***	0.013	0.186
	(0.364)		
Time discount rate	0.020		0.460
	(0.017)		

Discussion and Conclusion

- The program had a positive effect (of around 0.25 SD) on:
  - Parental investment quantity: frequency of involvement in physical games, didactic and social activities
  - Parental investment quality: outreach for social support and capacity to reflect on parenting
- The program had stronger effects over parents more constrained initially by a negative identity and over parents that suffered from a negative shock
- The program was well-received by families 95% said messages had been very useful (61%) or somehow useful (34%)

Discussion and Conclusion

- External validity:
  - the program was designed for any socioeconomic setting and would need little adaptation to be delivered in other contexts
  - the intervention was embedded directly in a governmental-provided program which makes the implementation and results closer to a real-life intervention
- Back-of-the-envelope cost of implementation: 10 USD per family. Very cost effective!
- Extensions:
  - Understanding mechanisms
  - Messages to families that have not participated in workshop
  - Messages for families with older children
  - Other contexts