

Calling All Parents: Leveraging Behavioral Insights to Boost Early Childhood Outcomes in the Developing World

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- Early childhood is critical for cognitive and socio-emotional development Heckman (2006)
- Parenting programs improve child outcomes but are hard to scale in low-capacity settings Leer et al. (2016)
- This project evaluates a low-cost, remote support program for vulnerable families with children aged 0–3 in Uruguay

The Intervention

- In coordination with the national early childhood agency we designed an 8-month program:
 - Weekly phone calls from trained operators
 - WhatsApp text and audio messages
 - Chatbot
 - Real-time feedback and adaptive content using AI tools
- Goals:
 - Promote language stimulation and positive parenting
 - Support access to social benefits

- RCT with 1,360 vulnerable families across Uruguay
- Randomized into:
 - Control group (restricted chatbot)
 - Treatment group (over-the-phone support)
- Baseline + 2 follow-up surveys (4 and 8 months after start)
- 3 batches due to insufficient tele-operators

Baseline Balance

- Families: 99% women; only 31% completed middle-school; 96% receive government assistance; 38% at risk of depression at baseline
- Children: average age 25 months; 84% live in households that experienced a negative shock; 69% live in overcrowded households
- Treatment and control groups balanced on observables

Take-up and Implementation

- 76% of the dispatched messages were successfully received or viewed on the intended mobile phones
- Average of 16 answered calls out of 24
- Families sent, on average, 2 audios throughout the intervention (8 requests in total)
- High satisfaction: 90% found it useful
- No differential attrition among groups

	Probability of completing telephonic survey		Probability of sending audio
	First follow-up	Second follow-up	Second follow-up
	(1)	(2)	(3)
Difference in response rate between treatment and control	-0.004 (0.026)	0.025 (0.028)	-0.031 (0.024)
Batch 2	-0.111*** (0.029)	-0.049 (0.031)	0.023 (0.027)
Batch 3	-0.092*** (0.032)	-0.135*** (0.034)	-0.002 (0.029)
Control response rate	0.753*** (0.025)	0.587*** (0.027)	0.242*** (0.024)
N	1360	1360	1360

Results: Government benefits and parenting outcomes

	First follow-up (ITT=1)-(ITT=0)			MHT p-value (4)	Second follow-up (ITT=1)-(ITT=0)			MHT p-value (8)
	(1)	(2)	(3)		(5)	(6)	(7)	
Panel A: Government transfers and programs								
Transfers	0.296*** (0.068) [873]	0.306*** (0.066) [871]	0.300*** (0.059) [866]	0.010	0.301*** (0.076) [705]	0.329*** (0.074) [704]	0.337*** (0.069) [700]	0.010
Labor programs	0.230*** (0.071) [939]	0.232*** (0.072) [937]		0.010	0.074 (0.079) [747]	0.068 (0.079) [746]		0.594
Panel B: Parental knowledge and involvement								
Parental knowledge – Parenting	0.097 (0.068) [932]	0.099 (0.067) [930]		0.010	0.029 (0.079) [733]	0.015 (0.078) [732]		0.713
Parental knowledge – Language					0.150** (0.075) [730]	0.145* (0.075) [729]		0.099
Frequency of parental stimulation					0.187** (0.077) [740]	0.181** (0.076) [739]		0.059
Quality of parental stimulation					-0.082 (0.071) [740]	-0.069 (0.071) [739]		0.891
Controls								
Strata and unbalanced vars at baseline	N	Y	Y		N	Y	Y	
Variable at baseline	N	N	Y		N	N	Y	

Results: Parental mental health and child's anthropometry

	First follow-up				Second follow-up			
	(ITT=1)-(ITT=0)		MHT p-value	(ITT=1)-(ITT=0)		MHT p-value		
	(1)	(2)		(3)	(5)		(6)	(7)
Panel C: Parental wellbeing and stress								
Wellbeing index	0.006 (0.094) [467]	0.013 (0.094) [466]		0.307	0.156** (0.079) [697]	0.156** (0.079) [696]		0.080
Parental stress index	-0.066 (0.091) [479]	-0.061 (0.092) [478]		0.723	-0.193** (0.078) [697]	-0.193** (0.078) [696]		0.080
Panel D: Child's anthropometry								
Weight for age	0.186 (0.121) [329]	0.185 (0.123) [328]	-0.152 (0.155) [155]	0.673	0.116 (0.107) [389]	0.109 (0.108) [388]	0.029 (0.113) [269]	0.228
Height for age	-0.107 (0.128) [309]	-0.108 (0.130) [308]	-0.107 (0.166) [133]	0.663	-0.070 (0.106) [354]	-0.080 (0.106) [353]	-0.162 (0.127) [217]	0.762
Controls								
Strata and unbalanced vars at baseline	N	Y	Y		N	Y	Y	
Variable at baseline	N	N	Y		N	N	Y	

Results: Language interactions from audio recordings

	Mother				Child	
	Words per minute (1)	Vocalizations per hour (2)	Pitch range (3)	Average pitch (4)	Vocalizations per hour (5)	Turns with adult (6)
Coef.	0.369* (0.216)	0.114 (0.149)	-0.152 (0.176)	0.355* (0.185)	0.036 (0.171)	-0.064 (0.162)
N	123	123	123	123	123	123

Heterogeneous effects by "no cash transfers" at baseline

	First follow-up			Second follow-up		
	ITT (1)	ITT x no TUS (2)	N (3)	ITT (4)	ITT x no TUS (5)	N (6)
Transfers	0.086 (0.068)	0.473*** (0.121)	868	0.122 (0.083)	0.453*** (0.140)	701
Labor programs	0.156 (0.098)	0.155 (0.143)	934	0.173 (0.109)	-0.209 (0.158)	743
Parental knowledge - parenting	0.119 (0.091)	-0.047 (0.132)	927	0.002 (0.105)	0.050 (0.156)	729
Parental knowledge - language				0.087 (0.100)	0.124 (0.151)	726
Frequency of parental stimulation				0.075 (0.102)	0.245 (0.151)	736
Quality of parental stimulation				-0.090 (0.093)	0.055 (0.145)	736
Wellbeing index	-0.149 (0.123)	0.333* (0.188)	464	0.085 (0.105)	0.164 (0.158)	693
Parental stress index	0.090 (0.127)	-0.333* (0.181)	476	-0.033 (0.106)	-0.368** (0.159)	693
Weight for age	0.286 (0.175)	-0.201 (0.252)	328	0.107 (0.139)	-0.035 (0.221)	387
Height for age	0.076 (0.168)	-0.358 (0.263)	308	0.062 (0.141)	-0.321 (0.214)	353

Heterogeneous effects by negative baseline shocks

	First follow-up			Second follow-up		
	ITT (1)	ITT x shocks (2)	N (3)	ITT (4)	ITT x shocks (5)	N (6)
Transfers	0.494* (0.271)	-0.196 (0.308)	205	0.354** (0.148)	-0.063 (0.172)	705
Labor programs	-0.207 (0.321)	0.537 (0.368)	219	0.195 (0.133)	-0.161 (0.163)	747
Parental knowledge - parenting	0.309 (0.250)	-0.576* (0.293)	218	-0.088 (0.158)	0.155 (0.180)	733
Parental knowledge - language				0.242* (0.133)	-0.123 (0.160)	730
Frequency of parental stimulation				-0.120 (0.154)	0.419** (0.176)	740
Quality of parental stimulation				0.010 (0.134)	-0.109 (0.159)	740
Wellbeing index	-0.065 (0.282)	-0.090 (0.319)	208	-0.051 (0.141)	0.293* (0.169)	697
Parental stress index	0.032 (0.293)	0.183 (0.331)	215	-0.176 (0.137)	-0.025 (0.166)	697
Weight for age	0.415 (0.352)	0.030 (0.413)	167	-0.074 (0.189)	0.227 (0.231)	389
Height for age	0.296 (0.404)	-0.505 (0.455)	154	-0.258 (0.190)	0.244 (0.232)	354

4 months after start

- ↑ Access to government transfers (+0.30 SD)
- ↑ Participation in job training programs (+0.23 SD)

8 months after start

- ↑ Access to transfers (+0.30 SD)
- ↑ Cognitive stimulation (+0.19 SD)
- ↑ Knowledge of language stimulation (+0.15 SD)
- ↑ Parental well-being (+0.16 SD)
- ↓ Parental stress (-0.20 SD)
- ↑ Quality of language interactions (+0.20 SD)

- Stronger effects on stress and well-being for families not receiving Uruguay Social Card (cash transfer) at baseline: program helps buffer economic shocks in vulnerable households
- Positive impacts on frequency of parental involvement concentrated among families reporting baseline shocks (proxy for behavioral barriers): messages help counteract cognitive load

Conclusions

- **Contribution:**

- Uses mobile technology to deliver parenting support at scale
- Combines calls, messages, and adaptive content to personalize the intervention at low cost in a developing country
- Builds on evidence from messaging programs (e.g., Ready4K, Crianza Positiva)
- Expands the use of tech to real-time content adaptation and multi-channel behavior support

- **Highly scalable:**

- Estimated cost: USD 350 per family
- Much lower than traditional home visiting (USD 10,500)

- **Institutional buy-in:** National Ministry has created a dedicated remote support team to scale the intervention

- **Medium-term impacts:** Third follow-up after 2 years is underway. Early signs of gains in language development (WPPSI-IV) and socioemotional development (ECOS)

- **Next steps:** Linking to administrative data for long-term tracking; increasing chatbot's complexity