

play to learn ■



NYU

Global TIES
for Children

Lessons and Impacts of a Children's Media Program:

A Randomized Controlled Trial
Looking at Emotional and
Math Skills of Venezuelan
and Colombian Children
in Colombia¹



Summary

This study, led by Global TIES for Children at New York University, is a causal impact evaluation of a mass-media program delivering social-emotional learning (SEL) and math content to children via WhatsApp on the mobile phones of their caregivers. The program, Watch, Play, Learn (WPL), consists of videos produced by Sesame Workshop that aim to bring playful early learning opportunities to children, especially those affected by conflict and crisis. This study focused on the effects of WPL math and social-emotional skills content delivered to Venezuelan migrants and Colombian children living in communities in Colombia where families and children face challenges in accessing essential services, including early education. Implementation was led by the Colombia office of Innovations for Poverty Action.



Key Takeaways

- Watching WPL supports the development of children’s foundational emotional skills. Specifically, it increased children’s ability to verbally identify emotions and recognize the emotions of others in social situations.
- There were no effects on math outcomes, as many participating children learned math at preschool. However, there are promising trends that suggest the videos supported math skills among those who were not attending any preschools or early childhood centers.
- The average cost of delivering WPL videos to participating families in the program was approximately 50 USD per family, with the majority of the cost attributed to the technology used in program delivery (39%) and the provision of internet top-ups to families (26%).
- Internet access and high data costs were reported to be significant barriers throughout the program. Around two-thirds of families requested internet support during the program, suggesting a need to embed internet and data provision into the program in some way or to give videos offline.
- Behavioral nudges or messages to motivate parents to watch the videos slightly boosted video viewing and should be experimented with in future implementations to increase their effectiveness.
- Caregivers who opened videos generally either stopped watching in the first 45 seconds or watched more than 7.5 minutes. This suggests that catching the family’s and child’s attention early may be critical to increasing exposure to and engagement with the content.



Background

Early childhood development (ECD) interventions help support the long-term well-being of children and are especially critical for children in crisis-affected settings.^{1,2,3} These interventions often focus on school readiness (including early math skills) and social-emotional learning (SEL), both of which predict later social competence, academic achievement, and positive behavior and mental-health outcomes.^{4,5,6} Such interventions may be particularly important for children in crisis to boost their emotion management and relationship skills, as well as their ability to cope with challenges.⁷

While there is considerable evidence on the impact of home-based early learning activities for SEL and early math skill development,^{8,9} including from Colombia, there is notably less work focused on refugee and internally displaced populations. Indeed, despite the evidence, investments in social-emotional and math-focused ECD interventions in crisis and conflict settings remain limited.



Crisis-affected Communities and ECD in Colombia

Colombia is the largest host of Venezuelan migrants and the second-largest host of displaced people in the world.¹⁰ More than seven million Venezuelans have fled their country due to persecution, violence, and economic collapse, of which nearly 2.5 million (including more than 800,000 children) sought refuge in Colombia.¹¹ Colombia also has an estimated 6.8 million internally displaced persons (IDPs) due to decades of armed conflict.¹² The government has made many efforts to support both of these populations, including investments in national ECD services and

on topics such as social-emotional skills in the ECD and preschool curricula.¹³ Despite these efforts, however, migrants and IDPs in Colombia experience higher levels of hardship and violence and are less likely to access key services, including early childhood development and education services.^{14,15}

The metropolitan area of Barranquilla in the department of Atlántico, where this evaluation was conducted, is in an area with a relatively high proportion of both Venezuelan migrants and IDPs.^{16,17}

Leveraging Mass Media in ECD Interventions

Mass media, including broadcast television and radio, mobile phones, laptops, and internet-based apps like WhatsApp, offers one avenue to deliver ECD interventions at scale and overcome barriers to access of in-person programming.¹⁸ Phone-based delivery of ECD interventions has increased globally and in Latin America, especially as demand for remote early learning increased during the COVID-19 pandemic. Many programs have focused on providing text-message-based parenting support and stimulation and have had mixed success in improving child development outcomes.^{19,20,21} There have not yet been evaluations looking at the use of popular platforms like WhatsApp to provide early learning opportunities through educational videos sent to parents and other caregivers.

Sesame Workshop and Watch, Play, Learn (WPL)

Sesame Workshop has been at the forefront of developing evidence-based early learning programming for children.²² Utilizing television and other media, it supports ECD and school readiness across the globe by partnering with local producers and experts to create unique, culturally relevant programming. In Latin America, Sesame Workshop first introduced and evaluated Plaza Sésamo in Mexico in 1972 and found substantial benefits to young children's early learning and cognitive outcomes.²³ Plaza Sésamo is now broadcast in 14 countries across the region.

The Watch, Play, Learn (WPL) series is 140 five-minute animated videos created by Sesame Workshop for children experiencing crisis and conflict. Each video uses play-based learning to promote one of four ECD topics: math; science; SEL; and healthy, safety, and child protection. The content was developed in consultation with a global advisory council of trauma and ECD experts from eight countries (including Colombia) to ensure sensitive messaging



around challenging topics. The characters and songs in the videos were designed to model curiosity and playful problem-solving.²⁴

The videos were initially tested from 2019 to 2021 with young children ages 3 to 8 from displaced populations and host communities in nine countries and 11 languages, ensuring cultural and linguistic relevance. This formative research ensured the content featured relatable characters, themes, messages, and visuals that resonated with children in humanitarian settings.²⁶

Research Design and Methods

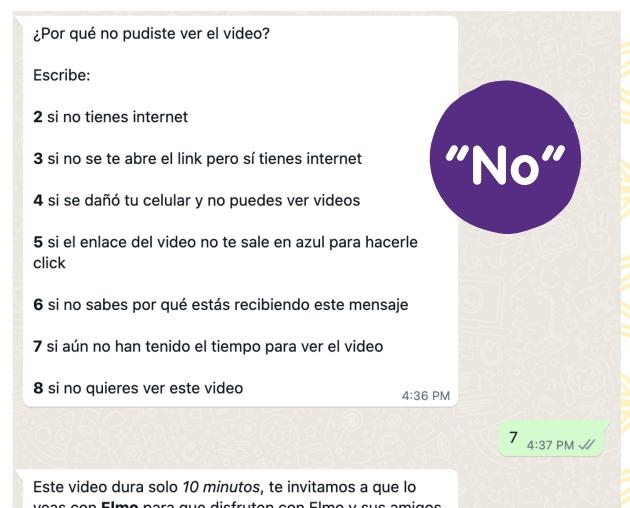
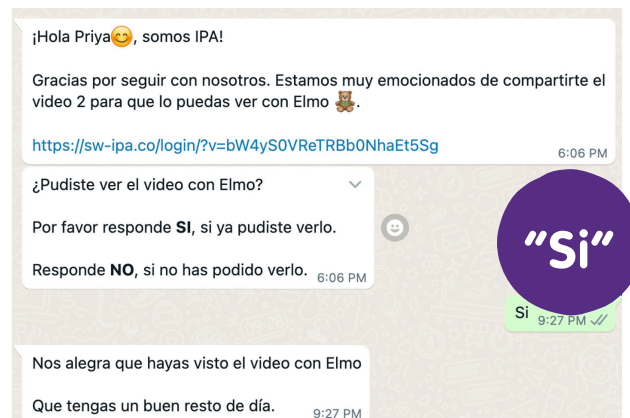
We asked the following questions to evaluate the effectiveness of the WPL math and SEL video series in Colombia. All impacts are in comparison to being sent non-WPL Sesame videos of the same duration and frequency.

1. What is the impact of being sent WPL videos on video-related, caregiver-reported interactions with children, caregiver and child character recognition, child-reported liking of the characters, and child use of phrases, expressions and concepts targeted by intervention?
2. What is the impact of being sent WPL videos on children's early math skills and emotion identification, emotion-situation knowledge, and emotion-regulation strategies?
3. What is the impact of being sent WPL videos on caregiver reports of child behavior and development?
4. Do effects on the above outcomes vary by the nationality, socio-economic background, gender, age, and preschool attendance of children or by caregiver educational level?
5. What is the cost of delivering WPL videos via WhatsApp in this context?

Design, Implementation, and Monitoring

Design

Over 19 weeks, parents received links to ten-minute-long videos to show to their 4-year-old children twice a week. The treatment group (n=509) videos included two segments of five minutes each, one for math and one for SEL. The sequencing of these videos varied across weeks. The control group (n=508) received 10 minutes of non-math and non-SEL Sesame content. Both groups received these messages on Tuesdays and Thursdays, and the days were decided based on preliminary research with caregivers. A WhatsApp Bot sent regular follow-up messages to participants to ask if they had watched the video and, if not, why not. These follow-up messages included texts that reminded and motivated participants to watch the videos.





Implementation

IPA²⁶ led the development of a custom technology platform to 1) establish and maintain contact with the participants, 2) host videos and send bulk messages with video links, and 3) track participants' engagement with the videos. This platform leveraged three existing applications: *Vimeo* to host and share unique video links per participant, *Twilio* to facilitate mass delivery of video links, and *WhatsApp* as a contact medium. The unique links generated per video per household allowed us to collect detailed data on participant viewership. WhatsApp was chosen as the medium of contact as it was widely used by the study population and offered secure communication. Additionally, because WhatsApp is phone number and phone-plan agnostic, it allowed the team to stay in touch with study participants even if they changed their phone numbers or devices.

Weekly monitoring of participant engagement data showed decreasing viewership rates. Initially, 65% of participants opened the first video, but only 49% opened the second. By the second half of the study, fewer than 25% opened the videos.²⁷ To boost uptake, we instituted a variety of strategies, many of which were informed by behavioral economics in consultation with Professor Ariel Kalil of the University of Chicago.^{28,29} These included removing password barriers, sending reminders and motivational messages, providing internet top-ups, and providing digital badges and cash vouchers. While most of these briefly increased uptake, we did not see large, sustained improvements.

Data Collection

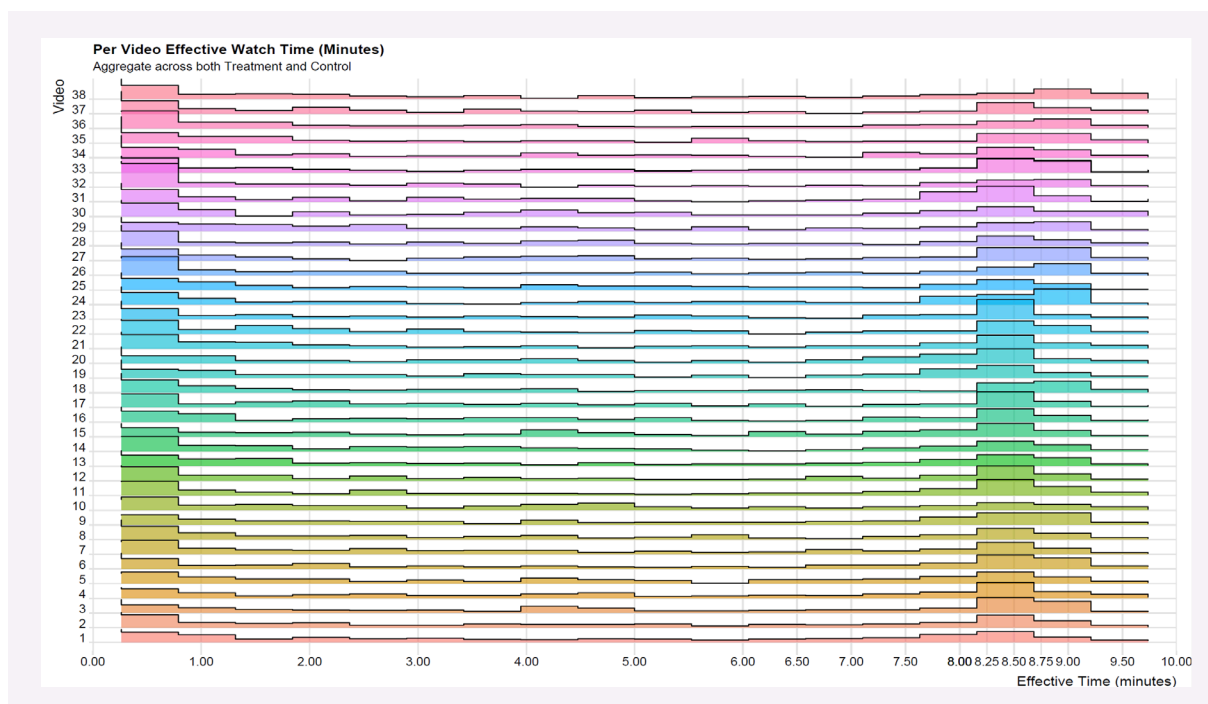
Data collection involved in-person caregiver surveys and child-direct assessments.

Baseline, conducted in September 2022, included 1,017 households, 36.5% of whom were Venezuelan and 63.5% of whom were Colombian. At the endline, in March 2023, we were able to reassess 874 (86%) of these households. For information on all measures, including psychometrics, see the full impact report.³⁰



Analytic samples

We were interested in both the impact of being sent the videos (as this is most relevant for future policies and programming) and, to the degree we could evaluate it, the impact of actually viewing them. Viewing them, however, is not a yes/no variable. Of the participating families, most watched some content, 13% watched over 380 minutes (meaning they watched at least some of the content more than once), and another 13% never opened a single video. As shown in the below figure, once a video was opened, most participants (both those receiving WPL and non-WPL videos), either stopped watching in the first 45 seconds or continued on to watch more than 7.5 minutes of the video. Thicker bars indicate more people leaving the video at that time point post opening and thinner bars indicate fewer people leaving. Given this, we defined the 'engaged' sample as the roughly one-third who watched at least 7.5 minutes of at least eight of the 38 videos.



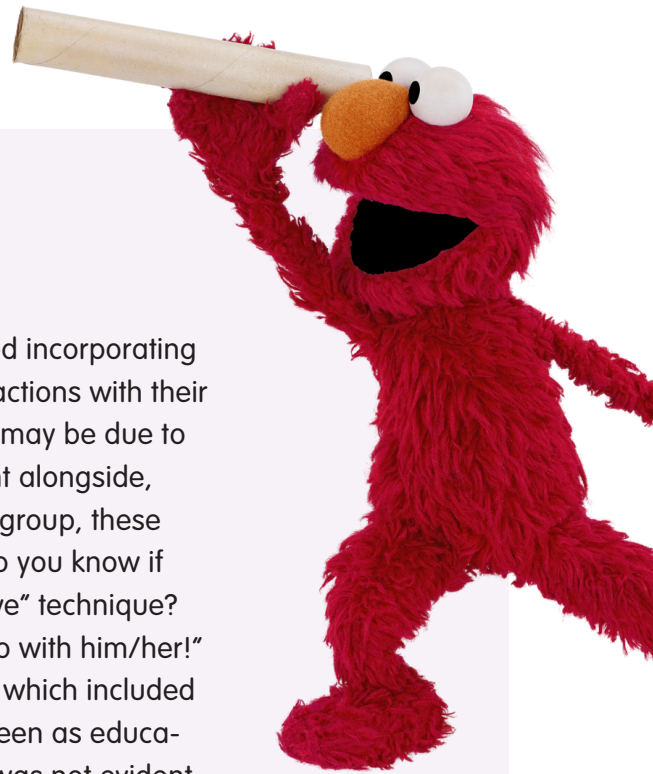
This engaged sub-sample included 154 treatment and 148 control families. Venezuelan parents, older parents, and parents with higher levels of education are more likely to fall into this subgroup. That said, we see no evidence that these 154 and 148 families differ from each other, on average, at baseline. The selection into higher or lower viewing appears to be comparable in both treatment and control groups.

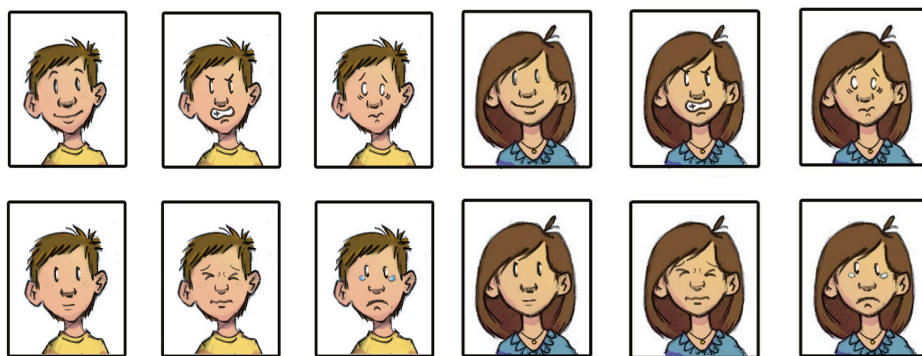
Study Findings

RQ1: Impacts on reported interactions and familiarity with video content

In the overall sample, treatment caregivers reported incorporating lessons from the videos at home during their interactions with their children more than control caregivers. This finding may be due to differences in the types of messages that were sent alongside, or as reminders, to watch videos. In the treatment group, these messages were often lesson-like. For example: “Do you know if [child’s name] has already used the “counting to five” technique? If you don’t know what that is, watch the past video with him/her!” This was much less the case for the control group, which included content-based keywords less likely to have been seen as educational by the caregivers. This difference, however, was not evident across the engaged sample in both groups. For this population, caregivers reported incorporating lessons at a higher rate regardless of whether they were in treatment or control conditions, but not at rates that were different from each other.

For both the overall and engaged sample, caregivers and children were more likely to recognize and say that they liked the characters that were featured more prominently in the videos they received. In the engaged sample, caregivers who received the WPL videos also reported that their children were also more likely to use language that was prominent in the WPL videos, including the word “excited,” the phrase “It’s time for the big feelings explorers,” and the phrase “The big feelings alert.” These findings suggest that the videos were delivered and watched as expected, i.e., the treatment group content to the treatment group and control to control. Among the group that watched more, this also translated to picking up some key words and phrases. Caregivers did not report any other significant difference in children talking about their emotions, using other emotion words, counting, or using other phrases from the curriculum.





RQ2: Impacts on directly assessed early math, emotion knowledge, and regulation strategies

Of the directly assessed outcomes in children, we found improvements in children's expressive emotion recognition (i.e. the ability to express/name emotions verbally) but not in receptive emotion recognition, emotion regulation strategies, or early math. The impacts on children's ability to name emotions were similar in size for the overall and engaged samples but only statistically significant in the overall sample. In both samples, children receiving WPL videos also showed improved emotion-situation knowledge, which means that when provided a vignette, they were more likely to identify the target emotion and/or give a plausible response (even if not the exact emotion) when asked about a character's experiences.

One reason we may have seen improvements in this kind of "expressive" emotion recognition skill, but not "receptive" emotion recognition skills (i.e. the ability to correctly identify what picture or character might be experiencing an emotion when hearing it named) could be that, on average, children had higher baseline scores on receptive emotion recognition than expressive emotion recognition. This suggests there might

have been more scope to improve expressive emotion recognition and emotion-situation knowledge skills.

Regarding other outcomes that we assessed, caregivers, in focus group discussions conducted post intervention, did tell us that they liked the math content but that it was very similar to material covered in preschool, which most of our sample attended. Descriptively, it appears that there may be an impact on math skills for children not attending any preschool, but our sample of non-preschool attendees is too small to determine whether this difference is statistically significant.

To assess emotion regulation strategies, we asked children to qualitatively indicate what a character should do or what the child would do when faced with different social scenarios designed to solicit a specific emotion. There were no significant differences between responses from treatment or control groups in either the overall or engaged samples. It may be that additional direct guidance from caregivers and opportunities for practice are required to deliver this more complex skill.

RQ3: Impacts on caregiver-reported child behavior and development

We also examined impacts on caregiver-reported developmental milestones and child behavior. These were exploratory outcomes. There were no effects of WPL videos on children's developmental milestones, positive behavior, or behavior problems.

RQ4: Variation in impacts by family/child characteristics

Impacts in both the overall and engaged samples did not differ by child nationality, gender, preschool attendance, age, socio-economic status, or by caregiver education for any outcomes.

RQ5: Cost of delivering WPL Videos

The Center for Benefit-Cost Studies of Education at the University of Pennsylvania collaborated with Global TIES to estimate the cost of delivering this 19-week mass media intervention. The total cost of delivering WPL videos to the families in the program was about \$20,600 USD, which comes to about \$50 USD per family. Of this, 66% of total costs were used to run the platform to deliver and monitor the implementation and to provide internet/data to participating families. Other costs incurred by IPA (e.g. staff, participation incentives) made up an additional 23% of total costs; and the estimated cost of caregiver time was the final 11%. The difference in average cost between treatment (i.e., participants receiving WPL content) and control families (i.e., participants receiving non-math, non-SEL content) was minimal, which is expected given that both groups received similar programmatic services.

It is important to note that this calculation does not include content creation costs, which Sesame Workshop incurred and which would need to be factored in if expanding or replicating this program beyond currently available multimedia content.

Limitations

One main challenge in implementing this study was the participants' limited access to quality internet services. Despite regular internet top-ups provided to families, issues with internet infrastructure and connectivity in some neighborhoods persisted. As a result, participants sometimes struggled to complete watching the videos, a barrier evident during the intervention and in the focus group discussions afterwards.



Implications & Recommendations

The study demonstrates the potential of educational media programming and WhatsApp or text-based delivery systems to enhance specific learning outcomes in children. The intervention improved Colombian and Venezuelan migrant children's emotional identification skills despite the moderate- to- low engagement with the video content. More intensive approaches (e.g., further intervention with caregivers) might be necessary to boost higher-order skills, such as emotion regulation skills.

Findings also suggest the importance of having multimedia content build upon and supplement existing ECD opportunities. We found no significant impact on math skills, the content of which — we discovered later — strongly overlapped with existing local preschool curricula. Data shows that 77% of Venezuelan and 92% of Colombian host-community children in our sample were attending preschool during the evaluation period, higher than the national averages that we had expected.

The cost analysis of this intervention indicates that delivering educational content through caregivers' smartphones can be a relatively low-cost way of supplementing more resource-intensive educational programs.



Recommendations for Future Research

- **Increase research on how to reach the unengaged participants and maintain a steady viewership of the content over time. In this study, 13% of participants across both groups never clicked on the links for any of the 38 videos sent during the intervention. This is not unusual for a digital intervention but still points to a need to understand what factors drive engagement in mass-media, text-message-based programming, and how we might increase the uptake of such services.³²**
- **Work with local preschool services to examine the role of such content and delivery in areas where preschool attendance is high, as it was for this evaluation.**
- **Test whether integrating additional in-person supports, activities, and prompts for structured caregiver-child interactions may reinforce more complex skills, such as children's emotion regulation.**

Recommendations for ECD Policies and Practices

- Consider options to further support the family's ability to engage with texted media content, e.g.:
 - Collaborate with telecom companies to improve internet and technology access in underserved regions
 - Supplement distribution of videos and SMS texts with other approaches focused on applying messages at home (e.g., sending guidelines or learning materials to caregivers/homes)
- Continue to collaborate with educational media makers to develop digital educational resources aligned with national and regional academic standards and to develop learning materials that complement local curricula.
- Continue to adapt delivery methods and strategies to increase home viewership and engagement with multimedia ECD content. This could include experimenting with nudge-based messaging, piloting chatbots that offer customized support and engagement, and trying other incentives to improve program uptake.

Overall, this study contributes valuable insights into the potential of mass media in improving access to and quality of early childhood education, especially in contexts of displaced populations and host communities. Additionally, this study shows the possibility and potential of tech-enabled platforms to facilitate the delivery of videos and provide rich implementation data. This can help researchers and practitioners improve their understanding of how remote interventions play out, for whom they work best (and who they do not seem to), and how to adapt them to achieve better learning outcomes for children.

Endnotes

- i The content of this brief is drawn from a longer report authored by Priyamvada Tiwari¹, Emily Franchetti¹, Kate Schwartz¹, Mariona Tres Vilanova², Hirokazu Yoshikawa¹, Dennis Hilgendorf¹, Maylee Montagut¹, Felipe Gonzales², Jorge Forero², Jacobo Gutierrez², Kimberly Foulds³, A. Brooks Bowden⁴, Sangyoo Lee⁴, Jere Behrman⁴, Sofia Granados², Catalina Reyes² [where ¹Global TIES for Children Center at New York University, ²Innovations for Poverty Action, ³Sesame Workshop, and ⁴University of Pennsylvania]
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26. IPA hired a South-America based IT consulting firm, Cleiman, to facilitate the development of the tech platform.
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31. A longer report looking at caregiver engagement with the videos in detail is forthcoming.
32. Toward this end, we are currently undertaking additional descriptive analyses to understand who did and did not engage with the WPL videos (and at what level).