

How Do Audible Message Notifications Influence the Quantity and Quality of Child-directed Speech from Parents?

Keyao Li^{1,a,*}

¹Department of Psychological and Behavioural Science, London School of Economics and Political Science, London, WC2A 2AE, United Kingdom

a. k.li36@lse.ac.uk

**corresponding author*

Abstract: The impact of direct mobile phone usage on child-directed speech (CDS) has been frequently explored. However, little is known about the effects of passive mobile phone interaction regarding this aspect. Using a repeated measures design with counterbalancing and a yoked control design, the present study examines the influence of audible message notifications on the quantity and quality of CDS delivered by parents. Results indicate that receiving message notifications reduces both the amount and quality of CDS and that a familiar message notification has a greater effect on diminishing parent-child interaction than an unfamiliar message notification. The findings thus have implications for parents, highlighting the importance of reducing passive mobile phone usage to construct a better language-learning environment for toddlers.

Keywords: passive mobile phone interaction, child-directed speech, parent-child interaction, audible message notifications

1. Introduction

Child-directed speech (CDS) is typically used by parents and other caregivers when communicating with children. Compared with adult-directed speech (ADS), child-directed speech has features of “higher pitch, shorter utterances, and more repetition” [1]. Since several research has demonstrated the role of CDS in facilitating children’s language learning outcomes, it is important to understand why CDS varies between families [2, 3]. Mobile devices have been shown to influence in-person communication: although the effects of direct phone use have been widely discussed, the impact of passive mobile phone interaction on CDS is underexplored. Therefore, in this study, an experiment will be conducted to explore the influence of audible message notifications on CDS patterns.

2. Background

Many researchers have considered media use as a factor that impacts CDS. The effect of background TV exposure is frequently explored among all types of media use. Anderson and Evans defined background TV exposure as when infants or toddlers are incidentally exposed to TV content not designed for them and are not paying active attention to it [4]. This exposure usually occurs when an older family member is watching a TV program or when the TV is on with no one

but the child present.

Several studies suggested that parent-child interaction would decrease due to background TV. For example, Pempek et al. found that the quantity of CDS reduced when the TV was on—the number of words and utterances spoken to children per minute decreased [5]. Pempek et al. suggested that parents' attention to children was diverted to the TV program, which resulted in less communication [5].

Other types of media use have also been widely investigated. Reed et al. revealed that mothers answering a phone call when teaching their children new words would lead to ineffective word learning [6]. Reed et al. argued that parents' responsiveness was impaired when they used their phones directly, which contributed to children's poorer learning outcomes [6].

On the other hand, empirical research have shown that the presence of mobile devices could divide people's attention and lower the quality of in-person conversation, even if the person is not actively checking the phone [7, 8]. Therefore, it is critical to examine how the passive mobile phone interaction influences CDS from parents. Passive mobile phone interaction (PMPI) is defined as "an individual attending to the mobile phone's current state without physically or virtually interacting with the mobile phone [9]." An example of PMPI could be the individual hearing a message notification without knowing its content. However, few studies have examined this topic. Corkin et al. found that the frequency of audible message notifications is negatively associated with children's vocabulary [10]. Specifically, receiving more message notifications caused parents to be more directive in front of their children—giving brief instructions instead of delivering meaningful, continuous responses to children's speech—and contributed to children's poorer vocabulary size. However, in this study, parents were asked to self-report the frequency of receiving audible notifications when their children are present and their children's vocabulary size. The reliability of this study is thus questionable as parents might conform to social desirability bias. Thus, it is necessary to conduct a lab study where parent-child interaction during audible message notifications can be directly observed.

3. Proposed Study

I plan to investigate whether hearing audible message notifications influences CDS from parents, given that they are not allowed to check the message in time. I hypothesize that hearing audible notifications reduces the quantity and quality of CDS. Since parents can't check their phones when hearing the notification, they might worry about missing something important, wonder what the content will be, lose focus on their children, and talk less to them. On the other hand, checking messages can distract parents' attention by making them constantly think about the message afterward. However, such distractions will not occur if parents are not allowed to check their phones. Therefore, hearing message notifications may not impact CDS delivered by parents.

In the present study, parents will hear message notifications from their own phones during the treatment condition. The quantity and quality of CDS will be compared with those in the control condition when parents will not receive any notifications. If parents speak fewer words and utterances to their child in the treatment condition than in the control condition, I can conclude that hearing message notifications will have a negative impact on the quantity of CDS from parents. If parents deliver more different words to their child in the treatment condition than in the control condition, I can conclude that audible message notifications will negatively influence the quality of CDS.

Additionally, the yoked control condition has been set up to investigate whether the pattern of CDS can be influenced by any type of mobile phone message notification or if the effect is restricted to the parent's own phone message notification. I hypothesize that both familiar and unfamiliar message notifications will influence parent-child interaction, while a familiar ringtone

will have a greater influence than an unfamiliar ringtone.

4. Methods

4.1. Participants

I will recruit 100 dyads of participants who can speak English — I was inspired by Corkin’s study, where 82 dyads of participants were included, and enough data was gathered [10]. Each dyad will include one toddler and one parent, selected from one local community in central London, UK. Pempek et al.’s demonstrated that among 12-, 24-, and 36-month-old toddlers, parents of older toddlers spoke more words than those of younger toddlers [5]. All the toddlers in the study will be 24 months old, as I want to ensure that sufficient data will be collected. Also, including 36-month-old toddlers might generate too much data, making data analysis time-consuming. Parent participants will be aged between 30 and 50.

In the recruitment process, random sampling will be adopted. Following the requirements listed above, the sample will be generated based on the name list provided by the community. Parents who report having no English-speaking skills and the habit of keeping their phones silent will be excluded from the study.

An independent measures design will be employed. On three consecutive days, the sample will experience three conditions: the treatment, control, and yoked control conditions. These conditions differ in the frequency of message notification displayed (either zero or three times) and the origin of the notification (whether it comes from the participant’s own phone or a phone of a yoked participant).

To ensure counterbalancing, the sample will be randomly divided into two groups and experience three conditions in a different order. The yoked control design is also used: for each participant in the first half of the sample, there will be a matched participant in the second half who receives the same message notification. Specifically, half of the participants will hear their own phone notifications on the first day, followed by the notifications of their yoked participant on the second day, and no notifications on the third day. In contrast, the rest of the sample will not be exposed to any notifications on the first day, hear their yoked participants’ notifications on the second day, and receive notifications from their own phones on the final day.

4.2. Materials

Before the study, an online survey will be sent to each parent to collect some basic information, including their phone number and habit of using phones. Parents will also report their ethnicity and proficiency in speaking English.

In the treatment condition, a fake message will be sent to parents three times. It is an advertising message from Boots, a local health brand in the UK. Parents will not be able to check their phones until the end of the study. The message notifications each parent receives depend on the type of phone they use. The bell will be the one they have set up for new messages received, which they are familiar with. In the yoked control condition, the text notification will come from the sample’s yoked participant’s phone, which they are not familiar with.

During data analysis, two observers will independently watch and score video recordings. The scoring criteria will be based on Hoff and Naigles’ measures of language quantity and quality: to measure the quantity of CDS, the number of words and utterances spoken per minute will be tallied for each dyad, and the two numbers will be added to generate the “quantity” score [11]. On the other hand, the quality of CDS will be measured by the number of word types delivered and the average length of utterances, which will be combined to create the “quality” score. The average “quantity” and “quality” scores will be compared between the three conditions.

4.3. Procedures

Before the study, participants will fill out the consent form and be told that the purpose of the study is to explore the type of toys 24-month-old toddlers love to play with the most. Parents will be told to avoid using their phones during the study, including that they are not allowed to check their phones even if they hear a new message notification.

The study will be conducted in a laboratory setting, which simulates a 25-square-meter living room in a house. I will adopt a design similar to that of Pempek et al., which involves using a one-way mirror to observe parent-child interaction and hanging two microphones from the ceiling to capture CDS [5]. In the left section of the room, where there are some rugs and one sofa, the toddler will be given several toys that they can play with, including dolls and blocks; the right section will be set up like a reading corner, where newspapers and books are placed on the table. Parents are asked to act normally as if they are at home—they can either read or interact with their children.

Each dyad of participants will go through a one-hour session on three consecutive days. CDS from parents will be recorded throughout the session. In both treatment and yoked control conditions, message notifications will be received every 20 min; in the control condition, the pattern of CDS will be recorded with no notification received.

After the study, the dyad will be led to the researcher's office, where they will be debriefed about the real purpose of the study, including that the messages are feigned.

5. Results and Discussion

According to my hypothesis, receiving audible message notifications will reduce the quantity and quality of CDS delivered by parents. Therefore, the average “quantity” and “quality” scores will be lower in the treatment condition than in the control condition. I also hypothesize that hearing their phone's message notification will have a greater impact on parents' CDS than hearing an unfamiliar one. Therefore, the average “quantity” and “quality” scores should be lower in the treatment condition than in the yoked control condition. Simultaneously, the control condition should show higher average scores than the yoked control condition if an unfamiliar message notification can impact one's CDS, although the impact is smaller than that of a familiar notification.

6. Conclusion and Future Directions

Parents are not allowed to check their phones in this study, which differs from what they experience in the real world. This means that the reduction in quantity and quality of CDS might be caused by the inability to check messages rather than the hearing of message notifications. In other words, if parents are allowed to check messages in time, their CDS might not be influenced even if they receive a new message notification. Therefore, in future studies, whether parents can check new messages timely should be studied as a mediator variable, and how it is linked to the two variables in this study can be investigated.

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