

Home Audio Observations of Parenting-in-Context: Evaluation of an Example Protocol

Joyce Weeland (This article is part of the PROFILE study funded by Netherlands Science Organization (NWO) Talent programme: 016.Veni.195.387). Contact: weeland@essb.eur.nl

Rianne Kok (This article is part of the Fami-LIES project that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme Grant agreement No. 949041). Contact: kok@essb.eur.nl

Youth & Family, Department of Psychology, Education and Child Studies, Erasmus School of Social and Behavioural Sciences, Erasmus University Rotterdam, The Netherlands

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1. Overview and Introduction

1.1 Overview.

Observations are a valuable tool for the assessment of parenting. Direct observation of parenting behavior via audio recordings may be among the least intrusive observation methods. However, unobtrusive naturalistic audio observations of parenting behavior, and specifically continuous, longer, observations, are rarely collected. We therefore know little about the acceptability, feasibility, and validity of these types of observations. The current project therefore aimed to develop and pilot a protocol to collect audio data of parenting behavior within its natural context. We collected unobtrusive naturalistic audio observations during two predetermined timeframes: family dinner and bedtime routines. The procedure consisted of three steps: two short home visits and an online interview (approx. 30 minutes). Researchers or research assistants visited participants at home twice to bring and collect the audio recorder. After the recording was processed, one of the researchers scheduled an online interview (via Microsoft Teams) for the evaluation of participants' experiences of wearing the recording device. We piloted this protocol with 11 families with two to four children between 10 months and 12 years of age. In this document we share the protocol and our pilot findings on the acceptability, feasibility, and validity of the protocol.

1.2 Introduction

Parenting, or the activities and behaviors of caregivers aimed to enable children to grow up to be healthy and well-functioning adults within their culture, is one of the most important and one of the most researched constructs in the field of child development. Parenting behavior is mostly assessed through the perspective of the caregiver, via a parenting interview or standardized questionnaire. Although self-reported parenting behavior has proven a valuable strategy to assess parenting, it has also been critiqued (Hawes & Dadds, 2006; Morsbach & Prinz, 2006). For example, self-reports of parenting can be influenced by feelings of self-efficacy, attributions about child behavior, or (dis)stress in caregivers (Herbers et al., 2017). Moreover, in general, psychometric support for these instruments is often limited (see for a review Hurley et al., 2013).

An alternative method that tackles some of these critiques is the direct observation and coding of parenting behavior. Observation of parenting behavior can limit reporter bias (self-reported behavior) and can provide valuable information about behaviors that are

automatic, brief, and not consciously recalled or reflected upon by caregivers when asked about retrospectively. In most cases, caregiver-child interactions are (video or audio) recorded in a lab or at home to be able to ensure systematic and reliable coding of parenting behavior (for exceptions, see, e.g., Ewin et al., 2021). Besides its clear strengths, direct observation of parenting behavior using video or audio also has important limitations.

The ecological validity of video recordings is most strongly debated. Video observations are often limited to behavior in one specific setting, situation, and/or task. Each setting has its own advantages and disadvantages: although lab observations create a controlled environment to observe parenting processes, making it comparable between caregivers or families, it may not always be representative of family daily life. Also, a lab setting may make caregivers and children more aware that they are being observed or recorded, which may affect their behavior. And although a home observation could provide more ecologically valid data, a person or camera in your private space can be experienced as intrusive.

Direct observation of parenting behavior via audio recordings may be among the least intrusive observation methods. Specifically, since technological advances enable us to use wearable devices (e.g., small audio recorders, smart phones) to do this. Another advantage of audio recordings is that it is more feasible to obtain longer recordings. Compared to a short observation, it may be more difficult for families to control their behavior in a socially desirable manner over a longer recording time, specifically in a home setting. Using audio recordings in naturalistic settings could therefore be an important addition to our observational toolkit since they capture caregivers' and children's everyday experiences. If this method is indeed successful, it may result in ecologically valid measures of parenting among which positive parenting behavior such as praise, caregiver regulation of child emotions such as encouraging emotional expression, negative parenting behavior, such as threatening, criticism or shouting, and parental use of untruths to influence the child's behavior.

Research using naturalistic audio observation methods to study parenting is steadily increasing. Studies so far often focus on a specific caregiver or child behavior (instead of focusing on the entire quality of interaction) and often analyze audio snippets (i.e., short audio fragments). For example, in a study on emotion socialization ambient sound around the child was recurrently recorded for 1 min every 10 min throughout a typical day (when the

child was awake). The audio recording snippets were transcribed and coded to assess caregivers' emotion coaching and emotion expression (Gerhardt et al., 2020). In a study on negative emotionality, an audio recorder was worn a full weekend day by children, and recorded continuously from the time the child woke up until bedtime (on average 10 hours and 1 minute of recordings) (Slatcher & Trentacosta, 2012). A random selection of 150 30-second audio files was transcribed and coded for each child. Although the use of snippets has important advantages regarding privacy (e.g., it does not record entire conversations) and feasibility regarding data processing, it may not be appropriate for all parenting behaviors. For example, to be able to interpret parenting behavior, and specifically behaviors such as disciplinary techniques and parental lying, it may be important to include information on the context of what you hear. Moreover, for behavior with a low frequency, such as corporal discipline, longer recording may be needed and selection of random audio snippets can result in missing cases.

Longer, unobtrusive naturalistic observations of parenting are rare. There are a few examples of studies recording and analyzing longer observations: in a study on corporal punishment, a voice recorder was worn by caregivers, in a sport pouch, on the upper arm which recorded from the time caregivers returned home from work (or at 5:00 p.m.) until their child fell asleep. Caregivers made recordings on four or six consecutive days (Holden, Williamson, & Holland, 2014). All audio was analyzed, and incidents of corporal punishment were identified (and counted) and analyzed in more detail. In a study on caregivers' mediation of screen media, children wore an audio recorder either around their neck or in the front pocket of a shirt to record caregiver-child conversations from approximately 4 to 8 p.m. for three days (Domoff et al., 2009). From each participant, 1 hour of audio was selected and transcribed. The transcripts were then coded thematically to identify themes of communication about media (i.e., qualitative analysis). In a study on mind-mindedness and conversational turns, caregivers were asked to wear an audio recorder to record a full typical day (Foley, Hughes & Fink, 2022). Conversational turns (i.e., adult/child utterance followed by a reciprocated child/adult utterance) were coded using data extraction software.

Thus, although there are some studies using continuous recording, little is known about the feasibility of this method, how are the recordings in length, content and quality, how acceptable continuous recording is for families involved, and whether caregivers consider the interactions that are being recorded representative for average interactions within their family. For this reason, the current study aimed to develop and pilot a protocol to

efficiently collect audio data of parent-child interactions and parenting behavior within its natural context. In this pilot study we conducted unobtrusive naturalistic audio observations during multiple predetermined timeframes (i.e., family dinner, and bedtime routines). These situations were selected since we expect much interaction between caregiver and child and (challenging) parenting situations to occur during these timeframes. Acceptability, feasibility, and face validity of the audio recordings was explicitly evaluated with the caregivers and researchers involved. This pilot was conducted in the context of two studies on parenting practices (ERC funded FAMI-LIES 949041 by Kok and NWO funded 016.Veni.195.387 PROFILE study by Weeland). In this report, we describe and evaluate our methods and procedure for collection of audio recordings of parenting behavior in the homes of families.

2. Description of the pilot study

Recruitment and consent procedure. Pilot data was collected in a convenience sample. Families were considered eligible when they had at least one child between the ages of 5-12 years and spoke Dutch in their family home. Participants were recruited via the network of the researchers, their students, and via social media and paper flyers. Interested caregivers were contacted via email and/or telephone with an explanation of the project. They also received the information letter (see Appendix B). If participants were willing to participate, they signed an online consent form (see Appendix B). We found it important to have consent from all persons that may be recorded. Therefore, we developed consent forms for participating adults; non-participating adults (partners, third parties such as friends, visitors); children aged 12 or older (for whom legal consent was necessary) and children under the age of 12 (for whom informal agreement is sufficient). See Appendix B for information letters and consent forms.

Participants. Participants were 11 families with two to four children (8 with 2 children, 2 with 3 children, and 1 with 4 children). Children were between 10 months and 12 years of age. Interviews were conducted with 9 female and 2 male caregivers of which most ($n=10$) had higher vocational training or a university degree, and all identified as Dutch. All caregivers that wore the audio recording device reported to be responsible for at least 50% and up to 70% of childcare-tasks.

Setting and procedure of data collection. The procedure for participants consisted of three steps: two short home visits and an online interview (approx. 30 minutes).

Researchers or research assistants visited participants at home twice to bring and collect the audio recorder. After the recording was processed, one of the researchers scheduled an online interview (via Microsoft Teams) for the evaluation of participants' experiences of wearing the audio recording device. See Appendix E for the interview protocol.

The first home visit was meant to deliver the audio recorder, to explain the procedure to participants and to collect consent forms. First, the study was introduced with a short explanation of the research aims, allowing time for questions from participants. Second, consent forms were signed. After that, the use of the audio recorder was explained (see Appendix A). Together with participants we discussed which days could be seen as a "typical" day, what their routines look like on such a day and what would be a logical starting point and ending of the recording. Together recording days, a starting point and end point of the recordings were discussed. Caregivers were asked to record on such a typical day. The discussed days, the starting and end point were written down on the instruction sheet as a reminder (see Appendix A).). When multiple caregivers were present, a decision was made which caregiver would wear the recorder. The same caregiver wore the recorder for all audio recordings of a particular family. Finally, an appointment was made to retrieve the audio recorder. See Appendix A and B for the full home visit protocols.

Participants recorded two daily routines (dinner and bedtime routine) on one or multiple days, in their own home, wearing a vest with an Olympus WS-852 digital voice recorder (see pictures in Appendix D). See Appendix C for the instruction form for participants (which was laminated and left with the participant).

During the second visit we shortly asked the participants about their experiences with the recording procedure and allowed for the opportunity to delete audio recordings when caregivers wished to do so (if so, this was done directly, without questions asked). Participants were given a brief explanation of what would happen next (i.e., a researcher will listen to the recordings, and will contact participants for an online interview).

During the online interview we asked participants more elaborately and systematically about their experiences with the procedure (acceptability, feasibility, and validity, see Appendix E). Participants received a gift card of 50 euros for their participation in the recording and the interview.

Ethics. Unobtrusive naturalistic audio recordings come with important challenges regarding privacy and ethics (see Cychosz et al., 2020). Importantly, given the inherently

sensitive nature of the data, it is crucial to protect the privacy and confidentiality of participants and third parties. First of all, before the recording it is important to receive consent from all parties that may be recorded. This includes all family members and possible third parties (e.g., neighbors, friends, visitors). During the recording it is preferable to give participants control and autonomy over what recordings are being used. Participants can give consent for recording beforehand, but unexpected things can happen, or private subjects can be addressed that the participants do not want to share with the researchers. Instead of retracting fully from the study, one can instruct participants on how they can pause or remove recordings or ask them to mark recordings or sections of the recording that are to be deleted. In our study, we asked participants to note down recordings they did not want us to use, which would be deleted in presence of the participants when we picked up the recording device. Moreover, although an “out of sight, out of mind” approach to the recording device can have important advantages for collecting naturalistic data, there are also ethical concerns in recording without participants being aware. We therefore chose to let caregivers wear a bright yellow vest, as a constant reminder of the fact that their family was being recorded.

The procedure of this pilot study was approved by the ethics committee of the Department of Psychology, Education and Child Studies, Erasmus University Rotterdam, The Netherlands (protocol ETH2122-0151) and the European Research Council (Ref. Ares (2022)1435556).

3. Quality of audio

We used an Olympus WS-852 digital voice recorder. The audio recordings varied in length between 19 and 65 minutes. The recording of the dinner routine lasted on average 30 minutes and that of the bedtime routine 36 minutes (see Table 1). The length of the audio recordings varied widely, due to multiple reasons. One reason for the differences in length of recording was ambiguity in starting point of the recordings. For example, one dinner routine recording includes almost 9 minutes of a caregiver cooking dinner (children were not home yet, but caregiver was expecting them any minute). However, in general, the variation in length of the audio recordings correctly reflected the variation in length of daily routines within the family that was observed. Some families had longer routines for dinner or bedtime, e.g., for some families bathing/showering was part of the bedtime routine and for others not, and for some families, dinner time included bible study and for others not.

Overall, the quality of the audio recordings was good. Despite the fact that the audio recorder was placed in a vest attached to one caregiver, multiple speakers are audible and conversations between multiple speakers comprehended. This was the case for both recordings made in one place (e.g., at the dinner table) as well as recordings in which family members were moving around (e.g., going upstairs to go to bed / walking in and out of the bathroom). Even when family members were in different rooms on the same floor the conversations were clearly audible.

In most cases different speakers can be told apart. It was more difficult to tell the voices apart of siblings that were close in age. Background noises, such as tv, radio, electric equipment (e.g., cooking equipment, electrical toothbrushes), plates and cutlery (i.e., during dinner), or running water (i.e., during showers) did not substantially interfere with the audibility of the conversations. Whispered conversations and conversations during a cuddle with the caregiver wearing the audio device or when the caregiver was carrying the child, were sometimes less audible. These instances were short.

Table 1.

Duration of Recording

	<i>N</i>	Minimum duration in minutes	Maximum duration in minutes	<i>M</i> duration
Dinner	11	19.4	50.6	29.8
Bedtime	11	21.1	65.4	36.1

4. Acceptability and face validity of audio recordings, based on participants' experiences

After processing the audio information an online interview with each participant was scheduled in which we asked participants about the experience of wearing the audio recorder (acceptability), about the potential impact of wearing the audio recorder on their own behavior or behavior of family members (validity), and whether the audio recording provided a good picture of how they normally talk to each other at home on an average day (validity).

To order the information in the interviews, we used operationally defined verbal counting (Sandelowski, 2001) and supported this by verbatim extracts (“quotes”) from the transcripts. For the counted information from the interviews, we used “a few” if something was mentioned in less than 3 interviews, “some” in 3-4 interviews, “several” or “half” in 5-6 interviews, “many” in 7-8 interviews, and “most” or “the majority” in 9 to 11 interviews.

Acceptability. Most participants indicated that the audio recorder and vest were easy to use. One parent indicated that they were not aware that the vest was adjustable, and one parent said they put the recorder on the table during dinner because that was easier. A few parents indicated that they felt somewhat restricted during physical contact with their children (cuddling, picking them up or picking them up from the bath).

Regarding how they experienced wearing the vest, many participants indicated it was fine or no problem. A few participants indicated they felt a little awkward but that they did not perceive it as problematic or annoying. One parent said it was doable, but that wearing the vest during the bath- and bedtime ritual was a little bit of a challenge. None of the participants said it was uncomfortable.

Face validity. Many participants indicated that they and/or their family members were aware of the recording, but several also indicated that this awareness decreased over time or during certain activities or moments:

No, yes, at first you are aware of it. Also, because it is so yellow. But you just do your thing, I noticed. At one point, yes, I bent too low, and it fell out, because I had to get something under the cupboard. And then I remembered: oh yes, I have it on! (ID 2)

Sometimes I noticed the kids that she looked at the device like that and like [hmhm], nod like is it on, you know? And then I nodded back: Yes, it's on. But at other times I didn't notice anything about them in that regard (ID 10)

About half of participants indicated that they felt their behavior was not influenced by the fact they were being recorded. Some participants felt the recording made them more conscious about their own behavior.

....when we went to bed, I didn't notice it because that was more hectic in a way. At dinner you just sit at the table and then [when going to bed] it is still brushing your teeth and he has to pee and then we still have some milk for the youngest. So, then you are much busier, so you completely forget about it. And when eating, it's a more conscious moment (ID 2)

I had no problem with it myself. But it was like: oh yeah, now it's being recorded, so you're like: oh, if only they would respond in the normal way. In the beginning you are also more alert too: oh, how do I say things, what do I say? And yes, you just try to let go. And that worked. But I can also imagine that parents will react differently as a result and that children will also react differently to parents (ID 9)

A few participants indicated that they themselves or family members did not discuss or talk about certain things during the recording or did not use certain words. For example:

And yes, of course the children also see me with that vest on, so on the other hand, yes, they also know a little bit: oh, I'm not going to say everything just like that. Because I did notice that my eldest son kept a certain subject until he was sure that thing was off (ID 8)

That you don't address certain things. To my husband or something, for example, something about the family or I don't know what (ID 10)

There was one moment. We laughed a lot about that. My sons were very much in the bath gesturing that I was not allowed to say a certain thing out loud, because I was recording. So, then there was a moment. I think I just laughed really hard because I was gesturing for them to clean their penis, but not saying it. That was the only thing I consciously did differently, that I wasn't going to say that word aloud (ID 6)

Regarding parenting behavior, some participants indicated that they think or felt that their or their partner's behavior may have been a little inhibited. Some participants specifically mention that they or their partner felt they may be self-conscious about their parenting behavior. Specifically, at times they needed to discipline their child, they felt they changed their behavior or thought they would have in such situations. One caregiver specifically mentioned he/she/they felt this was because they knew the research project was on parenting. Participants for example mentioned:

It's a kind of social control, just like I have when I correct my kids outside the house, maybe I do it in a different way than I do at home; No, yes, look, ... with me there is a little more of a footbrake. But it's not like I can completely change my behavior just because you're wearing that thing. I still think that you react to your children quite quickly anyway. That is a kind of natural process that is very difficult to stop (ID 3)

Yes, a little bit. Yeah, I did think: okay, the show is about to begin, here we go: start. As time goes by, that disappeared, it became normal. But in the beginning, everyone will be

on their best behavior, like showing desirable behavior. And I am consciously thinking about: Am I doing it right? (ID 5)

I think you are naturally holding back as if you would normally scold your child or something. But I don't think that was the case at the time of the recording. There wasn't anything in the recording that I would do differently at another time (ID 1)

My wife thought: if I get angry, can I then act or get angry? What do people think of that? (ID 11)

Regarding the children's behavior, some participants indicated that they thought their child did not act differently in any way because of the recording. A few indicated that they thought their children's behavior was affected at the start of the recording, but not anymore at a later point in time. For example:

In the beginning yes, they want to know what it is, and they come to ask for it. I think over time, I don't think they acted very differently than usual. At a certain point they just see it hanging and they actually let it go a bit and they just go on with their own thing, so to speak (ID 11)

Several participants explicitly mentioned that a typical day does not exist how things go may vary greatly across days. Some days are easier, some are more difficult. Nevertheless, regarding the overall ecological validity of the recording, many participants mentioned that, despite some minor differences, the recording is representative and does capture how their family normally interacts with each other on an average day. One participant says:

Yes, because this happens, yes, But it is not necessarily an everyday thing. It's really just a snapshot of how things might go together on a certain day (ID 2).

Some participants mention things they felt were different because of the recording which may affect validity, specifically increased communication, inhibited behavior, rowdy behavior, or children who repeatedly addressed the recording device. A few participants mention that they felt things went more smoothly or children were more compliant compared to non-recording days. Moreover, some participants explicitly indicated the effect of the audio recorder differed between children due to age. Younger children seemed less aware of, and affected by, the recording compared to older children.

5. Researchers' observations of acceptability, feasibility, and face validity of audio observations

All audio footage was listened back by one or two researchers, who both have experience with collecting and analyzing video observations of parenting behavior. Observations about acceptability, feasibility, and face validity method, as compared to other comparable observation methods such as video observations, are discussed below.

Applicability. Regarding interpretation of the data, the recorded interactions between family members were clearly audible and (with some exceptions) comprehensible. Audio footage does not allow to know all the details of the situation, e.g., facial expressions, how well the child is eating, whether indeed that one item of clothing is not in sight, but most of such details were not needed for the purpose of assessment of parenting behavior. The researchers identified three relevant factors to consider that could enhance interpretation.

First, interpretation is easier when the researcher knows, in advance, the family composition, particularly who will be audible in the recording. For the children in the audio, especially children close in age, we could not always identify who was speaking. This could be a complicating factor when parenting behavior of a caregiver towards a particular child is of interest. Second, some caregivers, by nature, vocalized more about the context than others, e.g., some caregivers explicitly mention what behavior they are correcting when they do so (“please do not kick your chair”), whereas other caregivers only utter a correction without mentioning why or about what (“don’t do that”). These vocalizations were helpful to understand the context of the interaction (more quickly). Nevertheless, we advise not to stimulate or instruct caregivers to vocalize more, because this could negatively affect the validity of the audio footage. The level and quality of vocalizations could, in some cases, even be the subject of study (e.g., mind-mindedness).

Third, in this pilot study, there was an interview with the caregivers about the audio footage afterwards. Whether this interview is necessary depends on the intended purpose of the audio footage. Most parts of the audio data were comprehensible without explanation or clarification by the parent. An interview with a caregiver could be relevant when the researcher is interested in parenting behavior for which a certain level of interpretation is needed (e.g., false promises, inconsistency) or for which the intention of the parent is crucial (e.g., inflated excessive praise, threat vs. warning). In general, a debriefing after collection of audio data is recommended for ethical purposes.

One unexpected advantage of audio recordings compared to video recordings was that caregivers appeared to experience a higher level of autonomy in what they shared. Naturally, caregivers used non-verbal signals or whispers in cases when they did not want to share something for the audio recording. These instances were very few and did not negatively influence the quality of the audio data. Thus, we see this as an advantage of audio over video because it ensures autonomy and control for parents during data collection. Moreover, although participants were given the option to delete recordings, none of the participants in this pilot made use of this option.

Feasibility. In general, we deemed it feasible to use audio footage to assess different types of parenting behavior in a casual and day-to-day setting. Examples of parenting behaviors that can be observed from audio, based on the collected audio footage in this project, is information about (consistency in) rule setting, verbal positive parenting behavior such as praise, parental regulation of child emotions (e.g., encouraging emotional expression), and verbal discipline practices, including warning, threatening, or shouting, and parental use of untruths to influence the child's behavior (e.g., eating carrots makes you grow taller). In general, similar to video observation data, audio observation data seem well-suited to collect information about parenting behavior of which parents are less conscious, that are automatic, and therefore not easily measured using questionnaires or interviews.

One of the main advantages of using audio instead of video observations is the fact that the investment of the researcher in data collection is limited. In most cases, the researcher is present when video data is collected. In our set-up, the audio footage was collected by the participants, on one or multiple days, outside of office hours, without the researcher's direct involvement. The researcher visited families twice, once for the instruction and delivery of the kit and once to collect the kit.

Face validity. From a researchers' perspective, the audio footage seems to provide a sufficiently valid picture of the parenting behavior of a caregiver in a daily setting. As with any observation tool, the mere fact that caregivers are observed can affect their behavior. We do not think this effect is any larger than for other types of systematic observation (i.e., video, or live). More so, comparing our experience as researchers with video observations (Choenni et al., 2022; Kok et al., 2013; Moens et al., 2018; Weeland et al., 2022), we believe the audio recorder is less invasive than video recording and possibly provides more ecologically valid

data as compared to video or live observations. This is a hypothesis worth testing in future research.

We deliberately chose to let the caregiver wear a bright yellow vest during recording. From an ethical perspective, we wanted to make sure that all participants were constantly aware of the audio recordings during recording. However, a disadvantage may be that family members get caught up in the fact that a parent is wearing the vest and why. In general, many audio recordings contained short conversations about the audio recording itself, mainly initiated by one of the children. This phenomenon is known from research using video observations. A study by Flaming and Mesman (2022) describes how camera-related behaviors (behavior which signals the awareness of a video recording device) are a part of the interaction, but only a negligible part of the total interaction time and are more common in children than in parents. Importantly, the camera-related behavior of children was associated with parental sensitivity only when children looked at the camera for more than one-third of the video. Although we do not know whether recorder-related behavior in our study was related to parenting behavior of the caregiver, we are assured by the fact that recorder-related talk in our study was also only a fraction of total recording time.

Many caregivers became less aware of the audio recorder when the recording progressed is illustrated by the fact that there are multiple instances where the audio recorder fell out of the vest when a caregiver bent over to pick up a child or to pick something up from the floor. To prevent this from happening, researchers are advised to provide a piece of tape to secure the audio recorder in the vest.

We have noted that especially younger children could be quite intrigued by the colorful vest. The vest itself became a topic of conversation which could have been a factor negatively affecting the validity of our footage. However, according to the participants, sensitivity to being recorded appeared related to the age of the children. Older children seemed more aware of being recorded, and this could affect their behavior in the audio footage. In this study, we particularly focused on middle childhood. We can imagine that this issue of sensitivity to being recorded is larger in adolescents, who are generally more self-conscious about their behavior and more sensitive to evaluations by others. Co-design sessions with adolescents and/or additional pilot testing in adolescents is needed to explore whether this method works equally well with this age group. In hindsight, we believe that a colorful vest might not be necessary to ensure that basic level of awareness. An alternative could be a vest in a more neutral color, with or without warning stickers.

One potential limitation that should be addressed is that extensive observations, especially in the home, can be experienced as invasive. Although the participants of this study did not report this, the experience of “being watched” could have been a reason for some potential participants to not participate in this study. This could be an explanation why our pilot sample mainly consisted of theoretical (vs. practical) educated caregivers, with an overrepresentation of caregivers with affinity with this field of study. Our experience as researchers using extensive observations shows that it is possible to involve a more diverse sample of caregivers (see e.g., Choenni et al., 2022), but this might need some specific effort from the researcher.

6. Lessons learned

The process of collecting and analyzing the audio data has resulted in a number of lessons learned.

Long, continuous home audio observations are accepted. Overall, caregivers seem to accept continuous audio observation as a research method. It is important to note that in this pilot mostly theoretically educated (i.e., college or university) and two-caregiver families participated. Different methods may be needed to recruit other types of families. Possibly, - since practical educated adults in general have less trust in scientific institutes (e.g., Achterberg, de Koster, & Vann der Waal, 2017)- more time needs to be invested to include these families in studies with audio observations.

Collect as limited data as possible but as rich data as needed. Processing the continuous audio footage that was collected is more intensive than processing short(er) video or audio snippets or fragments. For this reason, it is crucial to have a clear sampling strategy that allows for the collection of as little audio footage as possible, without losing sight of the fact that this method is intended to sample ecologically valid data that represents day-to-day parenting in context.

Accept a level of irrelevance. Our sampling strategy, focusing on parenting-intensive situations during dinner time and bedtime, worked well in collecting time-limited (on average about half an hour per situation) yet rich audio data on the interactions within the family. Still, it appears that parts of the audio footage collected do not contain any data for the research question at hand. For example, parts of our audio data consisted of reading from the Bible or reading practice of children. We believe that this is inevitable when you want to

sample data in an ecologically valid way. All potential solutions to this issue, such as deliberately pausing or ending the audio in these cases, can negatively impact the validity (e.g., it makes caregivers, again, aware of their recording) or reduce the comprehensibility of the audio (e.g., it would be unclear how different audio snippets form one whole interaction).

Choose what and when to record based upon your research interest, but in an open and inclusive way. The explicit choice of which segments of the day are sampled in an audio study should not only be based on the research questions but should also be sufficiently tailored to the intended participants. For example, if -such as in our case- dinner time routines are of interest be aware that if there is a set dinner routine, variations between families exist in what this routine looks like, what the starting point looks like, and what the endpoint of this routine is. An a priori or too rigid definition of such a recording segment may lead to exclusion of certain families. In our pilot, consisting mainly of highly educated families, we openly asked about the dinnertime and bedtime routines and, together with families, we set the start point and endpoint of the recording.

Be aware of data sampling bias. The validity of our audio footage could be affected by sampling bias. Although we generally discussed with parents on which day(s) they were going to collect the audio data, some parents mentioned in the interviews that they chose particular days of the week that were less busy or chaotic. This is not ideal for the ecological validity of the data. In future studies, it is important to consider other sampling methods that make the sampling more random (e.g., always sampling a Tuesday) or more directed (e.g., always sampling a busy day and a slow day).

The current project aimed to develop and test a protocol to collect audio data of parent-child interactions and parenting behavior within its natural context. In this pilot study we conducted unobtrusive naturalistic audio observations during multiple predetermined timeframes (i.e., family dinner and bedtime routines). Our pilot study shows that this method of data collection is overall considered acceptable and valid by both participants and researchers. Although validity of this method should be more thoroughly studied, face validity appears sufficient and comparable to existing methods for observation of parenting behavior. Moreover, collecting audio data has several advantages as compared to the more traditional ways of collecting data on parenting behavior, i.e., video observations and self-report questionnaires. In short, collection of audio data is less labor intensive for researchers and less invasive for families. The appendices of this report offer a blueprint of how an audio

observation study in families could be conducted. General guidelines on how to design (e.g., Cychosz et al., 2020; Mehl, 2017) and report on observation research can be found elsewhere (e.g., Hillen et al., 2023).

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Appendixes

Appendix A.

Protocol home visit 1

Preparation by researcher

Two days prior to the visit

- Send families a reminder by e-mail two days before the home visit (CC: PI):

Dear...,

Thank you once again for taking part in our study [title]!

On [date] at [time] I will visit you at [address] for a short instruction and to hand over the recording equipment. My visit will last about half an hour.

If this does not work out or if you have any questions prior to my visit, please let me know. You can reach me at [phone number].

Best wishes,

[name]

Before the visit

Requirements:

-Vest

-Audio Recorder

-Laminated instruction sheet

-Information letter

-Consent forms for children and adults

-Spare batteries (2x AAA)

Preparation before visit:

Pilot and Example Protocol

- check whether participant has completed the online questionnaire and consent form (if not, remind them during the visit and have the parent sign a paper version of the form)
- check whether the batteries of the audio recorder are still sufficiently full (at least 2 of the 3 bars).
- check if the audio recorder is empty. If there are audio recordings on it, make sure to empty it before you bring it to the next family (save files on location x, in folder y).
- ATTENTION: if the batteries are replaced, the date and time must be reset:

Press the buttons  to select the item to be set.

Press the + or – buttons to change the value.

Press the OK button to complete the setting.

During visit

Components of the visit:

1. Introduction
2. Short explanation of study
3. Time for questions
4. Consent forms
5. Explanation of audio recording
6. Discuss day and time recordings
7. Closing and appointment for retrieving audio

1. Introduction

Explain who you are, what your role is in the research project and what you will be doing.

2. Short explanation study

Preferably to caregiver(s) and child(ren).

Erasmus University Rotterdam studies how parents and children talk to each other during everyday moments, such as during dinner time and bedtime rituals. We do this by making a recording with this device [show recording device]. Your father/mother will wear this in this vest [show vest] and that

way we can listen to what you all say to each other afterwards. As researchers, we can learn a lot from this. We will also write down what we learn later in a scientific article. The names of parents and children who participated are not used here. You all participate anonymously.

Participation in this research is completely voluntary. So, you can decide for yourself whether you want to participate. If you want to participate, sign/write your name/draw something on this form [show instruction form]. You may stop at any time. You don't have to explain why you want to stop.

3. Time for questions.

Ask: Do you have any questions about this?

4. Consent

Briefly go through the bullet points of the consent form. Ask whether there are questions about this.

If the participating caregiver has already signed online, they do not have to sign. Otherwise, ask them to sign the consent form.

Ask the caregiver(s) about all the people who may be heard on the recording. All adults and children 12 years and older sign consent:

Ask all present family-members to do this on the spot.

Leave the information letter and consent form for absent family members or others who may be recorded (e.g., grandparents, friends).

5. Audio recording instruction for participants

Instruct participant as follows: Follow these steps if you want to start a recording:

1. Place the yellow vest over the head and **fasten the vest with the two clips at the front**. If necessary, adjust the straps until the vest is comfortable.
2. Turn the recorder on by **sliding the slider on the right side upwards** to ON.
3. **Press the red button with REC** to start recording.

A timer will start running on the screen.

4. **Slide the slider on the right side downwards** to HOLD.
5. Insert the audio **recorder into the black pocket** on the inside of the vest.

6. Start the activity (dinner or putting your child to bed).

Practice with participant

Follow these steps if you want to STOP a recording:

1. **Remove the audio recorder from the black pocket** on the inside of the vest.
2. **Slide the slider on the right side upwards to ON.**
3. **Press the black button marked STOP** to stop recording. The recording is saved automatically.

Practice with participant

Have they made a recording that they (afterwards) do not want to share with the researchers?

- They should not delete the recording themselves, but the researcher will do it for them
- They can make a new recording via the above steps on another day
- They can tell the researcher that they want a recording removed when he/she/they comes to pick up the audio recorder. The researcher will discuss with participants to find out which recording needs to be deleted and delete the file or files on the spot.

6. Discuss day and time recordings

Indicate that we would like a recording of the dinner and bedtime rituals, from the beginning (e.g., announcement 'we are going to eat') to the end (child leaves the table)

Ask parent what a typical day is for them.

Dinner: Ask parent how dinner goes on a typical day. Then determine what the start and end point of the recording is. Write these on the laminated instruction form.

Bedtime: Ask parent about how bedtime goes on a typical day. Then determine what the start and end point of the recording is. Write these on the laminated instruction form.

7. Closing and appointment for retrieving audio

Explain what comes next:

You come to pick up the audio equipment. We will remove recordings if participants want this.

We listen to the recordings.

We make an appointment for the follow-up interview. This will be via video calling.

We also ask parents to fill in a short questionnaire about upbringing after this meeting.

After this, participants will receive a gift voucher worth 50 euros by e-mail.

Make an appointment for when you/a colleague will pick up the audio equipment.

Protocol home visit 2

Preparation by researcher

Two days prior to the visit

- Send families a reminder by e-mail two days before the home visit (CC: PI):

Dear...,

Thank you once again for taking part in our study [title]! I'm very curious how the recording went!

On [date] at [time] I will visit you to collect the audio recorder.

If this does not work out or if you have any questions prior to my visit, please let me know. You can reach me at [phone number].

Best wishes,

Before the visit

Requirements:

Laptop

During visit

Components of the visit:

- 1. Ask how the recording went**
- 2. Ask if any recordings should be deleted**

If so, do this directly on your laptop.

- 3. Briefly explain what happens next:**

We listen to the recordings.

Pilot and Example Protocol

We make an appointment for the follow-up interview. This will be via video calling. The PI will contact participants.

After this, participants will receive a gift voucher worth 50 euros by e-mail.

4. Thank parents for participating

Appendix B.

Information and consent participants

Information letter

We are looking for parents and their children between the ages of 5 and 12 for a study on how parents and children talk to each other during everyday moments, such as during dinner and bedtime. Participation in this study is completely voluntary. You can decide for yourself whether you want to participate. The aim of this study is to learn more about the different ways parents talk to their children and what they say or don't say.

You can read more about the research in this letter. Please read this letter carefully. Discuss it with your partner, friends, or family. If you have any questions, please do not hesitate to contact the principal researchers [contact information].

What does participating entail?

Participation in this project is completely voluntary. This means that you can choose whether you want to participate or not. Participation has no disadvantages for you. It will, however, cost you time.

If you want to participate, you first fill out a short questionnaire about yourself and your family (duration: 5 minutes). You will then be given an audio recorder, which you can use to make recordings at home. We ask you to make these audio recordings during everyday moments, such as during dinner and when you put your child to bed. The researcher will explain how to make the recordings. A day is chosen in consultation with you when you will make these recordings. We will collect the recorder after you have recorded these moments. About two weeks later, we schedule an appointment with you to discuss the audio recordings. This allows the researcher to ask questions to better understand what she has heard. This appointment is via video calling (duration: 30 minutes).

We also ask you to answer a number of questions about parenting. We do not tell you in advance exactly what we are looking for in the research, to prevent you from saying or doing things that are not normal.

What do I get if I participate?

After making the recordings and the video call about the recordings, you will receive a gift voucher of 50 euros as a thank you for your participation and compensation for your time.

How do I let you know if I'm participating?

If you want to participate, please fill in the consent form.

What if I no longer want to participate?

You can stop participating at any time after giving your consent. You may also ask to delete audio recordings that you have made if you do not want to share them with the researcher. You don't have to explain why you want to stop or why you want to delete something. You may then keep the voucher. We will still use the other collected data for the study. If you do not want this, we will delete all collected data at your request.

Privacy

During this study, we ask you to provide us with some personal data. Personal data are pieces of information with which you can be recognized as a person.

Which personal data do we use in this research? We use your name, address, telephone number and/or e-mail address when we contact you about the research. We also ask you about your ethnicity, to ensure that parents from different backgrounds participate in the study, and about parenting. We make audio recordings to find out how you and your child talk to each other without us having to be at your home. We use fragments of the recordings converted into text when we publish about the research (such as in journal articles and book chapters). Your name is never used here.

Storing and sharing your data

The information you give us is never shared with anyone else and is stored on a secure computer. We use numbers instead of names. Only the researchers can view the data and know which name belongs to which number. They are listed at the bottom of this letter. We only share your personal data with people who are working on this research or who are working on the IT systems for this research.

We must keep your personal data (such as recordings) and research data for a minimum of 10 years. This is, among other things, to demonstrate that we have handled the data carefully and correctly. Some of the information you provide to us may be useful for educational purposes. We therefore ask you whether we may use your research data for education. Some of the data may be useful for future research, including in other research areas. According to the Dutch Code of Conduct for Research Integrity 2018, we ensure that other researchers can also use the research data for new scientific research. We only share anonymous survey data; so, you are not recognizable.

Your privacy rights and contact details.

You have the right to request access to your personal data and to request that data be modified, deleted, restricted, or transferred to others. In some cases, you can also object to the processing of your personal data.

If you want to invoke your rights or if you have a question about privacy in connection with this research, you can contact the data protection officer [contact information].

Pilot and Example Protocol

If you wish to submit a complaint in connection with privacy, you can do so with the national supervisory authority for personal data in the Netherlands (Authority for Personal Data), 088-1805250.

Who to contact.

If you have any questions about the study, please contact the principal investigators: [contact information].

This research has been reviewed and approved by the Ethics Committee of [contact information].

Research Consent Form – Adults

I have read the information letter and consent form and I understand the purpose of the study and that data will be collected from me.

By signing this form, I confirm:

1. I am at least 18 years old.
2. I have read and understood the information letter.
3. I could ask the researcher questions. These questions have been answered. I had enough time to decide if I wanted to participate.
4. I know that participation is completely voluntary.
5. I know that I can stop the research at any time. I don't have to give a reason for that.
6. I know that the researchers can view my data.
7. I give permission to use the data for scientific research.
8. I give permission for the storage and use of my data for future research, including in research areas other than this research.

Consent

I want to participate in the study. I consent to the collection, processing, use and storage of specific personal data for this research, namely: ethnicity and audio recordings.

Educational Purposes

I give permission for my data to be used for educational purposes, such as for training.

Contact you again

I give permission for the researchers to use my address details to invite me for follow-up research.

I can decide for myself whether or not I want to participate in follow-up research.

Name:

Date:

Signature:

Research consent form – Child (≥12 years of age)

I understand the purpose of the research.

1. I could ask the researcher or my parent(s) questions.
2. I know that participation is entirely voluntary. I can decide for myself.
3. I know that I can stop the research at any time. I don't have to give a reason for that.
4. I know that the researchers can view my data.
5. I give permission to use the data for scientific research.
6. I give permission for the storage and use of my data for future research, including in research areas other than this research.

Yes, I want to participate in the study:

Name:

Signature or name of the participant:

Date:

Research consent form – Child (<12 years of age)

Yes, I want to participate in the study:

Name or a nice drawing:

Appendix C.

Instruction form for participants

Agreements recordings on this day:

Recording 1 (dinner time) from to
.....

Recording 2 (bedtime) from to
.....

Instruction audio recording for participants

Follow these steps if you want to START a recording:

1. Place the yellow vest over the head and **fasten the vest with the two clips at the front**. If necessary, adjust the straps until the vest is comfortable.
2. Turn the recorder on by **sliding the slider on the right side upwards** to ON.
3. **Press the red button with REC** to start recording.

A timer will start running on the screen.

4. **Slide the slider on the right side downwards to HOLD.**
5. Insert the audio **recorder into the black pocket** on the inside of the vest.
6. Start the activity (dinner or putting your child to bed).

Follow these steps if you want to STOP a recording:

1. **Remove the audio recorder from the black pocket** on the inside of the vest.

2. Slide the slider on the right side upwards to ON.

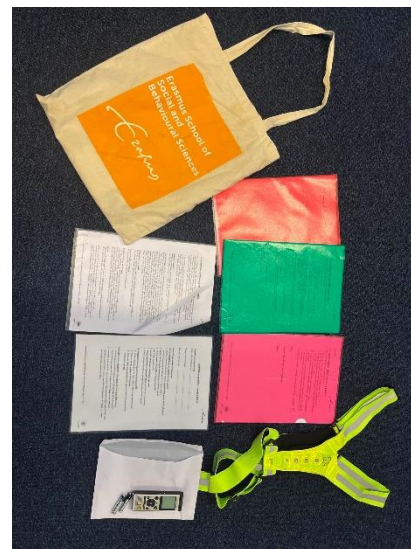
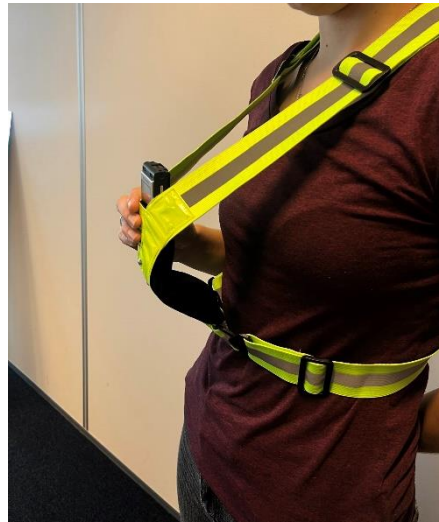
3. Press the black button marked STOP to stop recording. The recording is saved automatically.

Have you made a recording that you (afterwards) do not want to share with the researchers?

- You should not delete the recording yourself, but the researcher will do this for you!
- You can make a new recording following the above steps on another day.
- You tell the researcher that you want a recording removed when he/she/they comes to collect the audio recorder. The researcher will discuss with you to find out which recording needs to be deleted and delete the file or files on the spo

Appendix D.

Audio recorder placement and kit



Appendix E.

Online interview protocol

Researcher explains: *“In this study we want to try whether it is possible to use audio-recordings to study parenting in daily situations, such as dinner time and bedtime rituals, instead of video-recordings (which are more often used in research). I want to learn about your experiences and how you reflect on making these recordings. I also want to talk to you about some of the content of the recordings.”*

“For our research it is important to have as much feedback as possible, also negative feedback. We would appreciate you giving your critical and honest opinion!”

“I would like to record (the audio of) this conversation so that I don’t have to make notes and can focus on our conversation. Are you OK with me recording the audio?”

[If answer is yes] “I will start the recording now.”

I want to start with some questions about your experience and on how you reflect on making the recordings:

- How easy or difficult was it to attach and turn on the audio recorder?
- How did you feel about wearing the audio-recorder?

If necessary, ask follow questions: How much of a burden was it to collect the audio-recording? Did you find it difficult, uncomfortable, or bothersome?

- Can you shortly describe the day that you collected the audio-recordings? What kind of day was it? Was there anything special or out of the ordinary?
- Do you think your behavior was different because you knew you were being recorded? For example, did you say things differently, did you say something you

normally wouldn't say, or did you refrain from saying things you would normally say?

[If yes] What was different?

- Do you think your child's behavior was different because they knew they were being recorded? For example, did they say things differently, did they say something they normally wouldn't say, or did they refrain from saying things they would normally say?

[If yes] What was different?

- Do you think the behavior of others (e.g., partner or grandparent) was different because they knew they were being recorded? For example, did they say things differently, did they say something they normally wouldn't say, or did they refrain from saying things they would normally say?
- Do you think the recording is a good representation of how you would normally talk to each other on a regular day at home?

[If not] How do these recordings differ from a regular day?