

“These are my camera glasses”: Wearable Digital Video Glasses for Recording and Examining Young Children’s Social Interactions

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Abstract

As new technologies emerge and evolve, possibilities open up for their use in research. In this article, we consider wearable digital video glasses as a data collection tool in qualitative research involving child participants. We draw on data from a recording made during our pilot study of the ways young children’s social interactions produced learning opportunities during family shopping experiences. The recording was produced when the digital video glasses were worn by one six-year old boy when shopping with his family. Four extracts from the recording are analysed briefly to demonstrate how data collected through use of the digital video glasses informed transcription and the analysis. Issues and implications for use of the wearable technology are discussed focusing on methodology and methods, implications for transcription, benefits and limitations as a data collection tool, ethical considerations and applicability for researching young children’s social interactions.

Keywords: young children, digital video glasses, technology, interactions

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Introduction

Video recordings are a predominate tool for collection of naturally occurring data in the social sciences. In particular, video recordings are fundamental to those researching from a social interactionist perspective (Jewitt, 2012). From this perspective, video recordings enable “description of the structures of the interaction order, the social and behavioural mechanisms and regularities that people use to coordinate and organize their activities with others: to making sense of and to reveal the structures at work” (Jewitt, 2012, p. 4).

In comparison to audio-recordings, videos provide for examination of various multimodal resources that produce social interaction, as well as orientations to others, physical objects, and spaces (Mondada, 2008). As with any data collection tool, selection and use of video recording as a data collection tool involves numerous considerations and consequent limitations (Jewitt, 2012; Sumsion et al., 2013), including the ways video recordings represent and reduce naturally occurring interactions.

Use of video recordings of children, even very young children, is of increasing interest to researchers (Jewitt, 2012). The technology has potential to give researchers “insight into children’s lived experiences” (Pálmadóttir & Einarisdóttir, 2016, p. 721). This capacity has contributed to paradigm shifts in early childhood research, specifically to theoretical and methodological perspectives that view children as competent contributors to their social worlds (Danby & Davidson, 2007; Pálmadóttir & Einarisdóttir, 2016). Video recordings of children’s experiences in preschools is an important source for understanding this influential aspect of children’s everyday lives (Flewitt, 2008; Pálmadóttir & Einarisdóttir, 2016), particularly their social interactions with adults and with other children (Cobb-Moore, Danby, & Farrell, 2008). As well, video recordings of interactions in homes have enabled detailed analyses of young children’s multimodal production of orderly interactions (e.g. Davidson, Danby, & Thorpe, 2017; Filipi, 2009).

Flewitt (2008) highlights the importance of video recordings for accessing children’s non-verbal communications or actions and for foregrounding the importance of multimodal resources in children’s communications. At the same time, Flewitt (2008) emphasizes that video recording “generates a new multisemiotic dynamic, creating relationships between different data sets with the inherent tensions and contradictions of all relationships, and producing conflicting evidence that challenges and eventually strengthens emerging themes”

(p. 30). This is the case with wearable recording glasses – a fairly recent technology whose “first person” (Betancourt, Morerio, Regazzoni, & Rauterberg, 2015, p. 744) perspective enables at the same time as it constrains.

Wearable technology includes digital video recording devices such as glasses. The glasses are variously referred to as “recording glasses”, “wearable recording glasses”, and “digital video glasses” (Skinner & Gormley, 2016, p. 235) in the research literature. These recording devices offer “point of view”, “first-person vision” (Kanade & Hebert, 2012, p. 2442), “first-person viewings” (Skinner & Gormley, 2016, p. 235) or a “first person perspective” (Betancourt et al., 2015, p. 744). A first person perspective may be contrasted with a “traditional third-person point of view” (Lee et al., 2017, p. 62) that results from video recordings made by a camera that is held or used by a researcher.

Antecedents of the recording glasses include wearable GoPro cameras mounted in a chest harness and the head-mounted recording camera. To illustrate, the latter was employed in a study of students’ navigations of a university library (Kinsley, Schoonover, & Spitler, 2016). The researchers deliberately sought the first person perspective of university students through use of GoPro cameras worn in a chest harness. Such studies – termed wayfinding studies – show use of GoPro cameras with think-alouds plus researchers following to note behaviors. There are distinct advantages of GoPro wearable cameras for studies involving mobility – see, for example, Evers (2015) and Dinhopf and Gretzel (2016) respectively for studies of surfing and snowboarding. Given the ubiquity of such cameras in our everyday lives (Evers, 2015), there is likewise great potential for examining our social worlds, including those of children. However, the technology has been used more widely in studies of adults and has had limited application in research with children.

Lee et al. (2017) examined benefits of using wearable cameras in their research examining mother-child interactions. In the study, 15 mothers and their infants (aged between 3 and 12 months) wore cameras on their foreheads. A comparison between the use of wearable cameras and video cameras used by a researcher established ways that the wearable cameras addressed limitations of use of video cameras in homes. In particular, third-person recordings resulted in mother’s reactivity, participant and researcher burden through time required, and “false representation” (Lee et al., 2017, p. 63) of children’s experiences. Wearable recording technology eliminated the need for researchers to be

present, considerably reduced participant burden by eliminating researcher visits, and recorded the viewpoints of mothers and infants. The authors conclude the relevance of wearable technology for the work of particular researchers, including those who focus on infants' point of view.

Sumsion et al. (2013) used a version of wearable technology in a phenomenological study of infants' experiences in childcare. Dubbing the technology "baby cam", researchers sought children's participation in research by recording their experiences using a camera worn on their heads. "Baby cam" consisted of a micro video camera system that could record visual and audio. The researchers explored a number of ways of recording infants' activities and finally settled on a camera attached to a headband that could be worn by infants. Elwick (2015)'s methodological consideration of use of "baby cam" on the project makes a strong case for the ways its use "may provide participatory researchers with a useful heuristic device in that generated images can remind researchers of the limits of their own 'gaze' and ways of knowing and theorising infants" (p. 336). However, there is still much to be explored about the use of this type of technology as a research tool with young children (Sumsion et al., 2013).

A unique examination of the innovative use of recording glasses is provided by Wettstein and Jacob (2010) who employed the glasses to examine aggressive adolescents' interactions with their social and material environments over substantial periods of time. According to the researchers, the glasses allow for "low reactivity data-gathering in the field from the perspective of the adolescent, and in different life settings" (p. 26). The researchers note the capacity of glasses to record during periods of mobility and the benefits of an inbuilt stereo microphone. They highlight that the glasses have the capacity to contribute new understandings in certain fields, such as aggression research, but come with limitations that are particular to the settings in which the glasses are employed.

In our own pilot study of the ways young children's social interactions produced learning opportunities during family shopping (MacDonald, Fenton, & Davidson, 2018), we were interested methodologically in addressing (1) how various recording technologies produced data that would allow us to address best the interactions between family members and with store environments, (2) implications of incorporation of particular recording technologies for analytic methods, and (3) delineation of interactional phenomena of potential relevance

to the design of a larger study. We were particularly interested in the use of wearable digital video glasses as a novel way to gain information about young children's social interactions. Here, we draw on our analysis of noticing sequences (Schegloff, 2007) to inform a consideration of digital video glasses as a tool for researching with young children.

Conversation Analysis and Social Interaction

An important perspective on social interaction is that of Conversation Analysis (CA). This approach has been identified as a systematic way to approach analysis of video data (Smith, Mountain, & Hawkins, 2016). We briefly outline CA here in order to inform our later discussion of the use of digital video glasses for examining children's social interactions.

CA was developed by Sacks (1992). Sacks addressed ways in which humans interact to accomplish social activity. His analytic gaze was on talk in social interaction and it required the detailed analysis of sequences of interactions. Initial research by Sacks and his colleagues, Schegloff and Jefferson, detailed ways people orient to particular rules for turn-taking such that turn-taking is accomplished with minimal or no overlap between turns (Sacks, Schegloff, & Jefferson, 1974). The exchange of turns is considered fundamental to orderly ways of doing social activity, particularly through maintenance of intersubjectivity through conversational repair (Schegloff, Jefferson, & Sacks, 1977) when misunderstandings occur.

Examinations of requests and noticing in talk illustrate some other fundamental aspects of the CA approach to sequential analysis of talk and are relevant to the interactions we examined. Requests are turns considered to be the first pair part, or action, in a two turn sequence. Requests make compliance salient (Levinson, 2013). Should the second part not provide compliance then it is frequently marked, for example, an explanation might be provided as to why a request has been refused. Wootton (2007) established that often young children's requests will escalate in some way if there is no response from a parent, so requests may become louder or children may add talk that increments the original request. Adding "please" works as an increment (Wootton, 2007).

Noticing is another type of turn. Schegloff (2007) states that "doing a noticing makes relevant some feature(s) of the setting" at the same time as "projecting the relevance of

some further action in response to the act of noticing” (p. 219). The CA perspective on noticing requires identifying the specific action (turn in talk) that does the noticing. A noticing may be verbal or “performed bodily-visually” (Kääntä, 2014, p. 88). Kidwell (2009) showed, through analysis of gaze, how children adapted their behaviour following noticing by caregivers in day care settings. Davidson et al. (2017) examined noticing produced by preschoolers during use of digital technologies. In our pilot study, we discerned noticing by young children in store environments (MacDonald et al., 2018).

CA studies also examine interaction as aspects of broader activities. As Goodwin (2000) notes,

a primordial site for the analysis of human language, cognition, and action consists of a situation in which multiple participants are attempting to carry out courses of action in concert with each other through talk while attending to both the larger activities that their current actions are embedded within, and relevant phenomena in their surround (p. 1489).

Studies have examined activity such as talking when walking (Mondada, 2014) and talking when driving (Mondada, 2012). Such studies provide insights into how people manage talk when moving individually or when coordinating their activity such as we might expect to find when family members shop together.

Method

Our over-arching research focus is on opportunities for young children’s learning produced during interactions when families are shopping. Examination of this topic raises challenges for data collection and data analysis. For example, decisions need to be made about selection and placement of recording equipment so as to record actions and interactions of varying numbers of family members as they move through the busy supermarket environment, frequently with a trolley in tow. Our pilot study was intended to allow us to explore some of the challenges and address these in the design of a larger study.

Although we are not reporting the pilot study per se here, readers may find some details helpful. We recruited six families and two large retailers (and the recruitment process is documented in MacDonald et al., 2018). Family details are provided in Table 1 and

demonstrate the diversity of family size and ages of children. The diversity enabled variation in use of recording equipment that we needed to consider. Overall, we used three types of recording devices – an audio recording device, GoPro cameras, and a pair of digital video glasses. The actual data collection consisted of recordings involving a combination of these and was informed by children's interest in particular recording devices and the number of family members present during specific recordings at each shop.

Table 1. *Family Participants*

Site No.	Family No.	Parent Participant	Child Participant/s
1	1	Mother: Karen	Daughter: Evie, 23 months
	2	Father: Corey	Son: Jasper, 22 months
	3	Father: Brett	Son: Damian, 10 years
			Son: Nelson, 8 years
			Son: Cash, 6 years
			Daughter: Rebecca, 3 years
2	4	Mother: Sandie	Son: Zack, 8 years
			Son: Callum, 7 years
			Daughter: Ava, 3 years
	5	Mother: Jillian	Daughter: Tilly, 3 years
			Son: Leo, 12 months
	6	Mother: Lucy	Daughter: Isobel, 6 years

*(MacDonald et al., 2018)

This article draws on recordings of Family 3. Recording devices included a GoPro camera on each of two trolleys (to form "trolley cams"), an audio digital recording device worn by the father and the digital video glasses that Cash (aged six years) chose to wear. The young daughter, Rebecca (aged 3), referred to as Bec by the family, sat in the trolley pushed by her father and the "trolley cam" was pointed towards her back. The second trolley was pushed variously by either of the two older boys Nelson and Damian (aged 8 and 10).

Multiple recording devices made available a number of recordings of the same shopping event. The recording from the father's "trolley cam" was used to develop an initial transcript using Jefferson notation system (Atkinson & Heritage, 1999) shown in Table 2

below. At times, it was difficult to make out talk or to identify the recipient of particular utterances. Viewing other recordings enabled a more complete record of the talk. Sequences where a noticing was produced were selected for sequential analysis. At this point, stills from the digital video glasses recording were incorporated for analysis of these sequences.

Table 2. *Transcription Conventions*

Symbol	Represents
[[	Utterances that begin at the same time
[	Overlap in speakers' talk
]	Point where simultaneous talk finishes
=	Talk between speakers latches or follows without a break
()	Indicates length of silence e.g. (0.2)
:::	Indicates that a prior sound is prolonged e.g. li::ke
-	Word is cut off e.g. ta-
> <	Words enclosed within are said at a faster pace than surrounding talk
?	Rising inflection
.	Stopping fall in tone
,	Continuing intonation
!	Animated tone
↑	Marked rising intonation
↓	Marked falling intonation
<u>no</u>	Underline indicating greater emphasis
CA	Upper case indicates loudness
°	Softness e.g. It's a secret
(it is)	Words within are uncertain
()	Indicates that some word/s could not be worked out
(())	Verbal descriptions e.g. ((sits down))

*(Atkinson & Heritage, 1999)

Transcripts of the same recording were considered to be working transcripts (Mondada, 2007) or constructions, at particular points in the research process, representing particular activities, actions, and interactions. The analysis that follows is of the final transcript that resulted when images from the digital video glasses were inserted into noticing sequences.

Examples from Analysis

We have selected three examples of noticing by the child from our sequential analysis. A fourth sequence involves a verbal noticing by the child's young sister and then an embodied noticing by the child wearing the glasses.

In Extract 1, the use of images from the digital video glasses and written encoding of interaction enable identification of two types of noticing: verbal and embodied. The images show that lollipops are spotted before Cash produces his verbal noticing and that the noticing is followed by a verbal request. Integral to the request is that the noticing works to achieve shared attention.

Extract 1: Chilli flakes and lollipops

- 1 Dad: tell you what (1.0) we ran out of those (1.0) come over
- 2 this way guys guys (0.4) we ran out of those chilli flakes
- 3 the other day
- 4 (0.4)
- 5 Cas: chilli flakes
- 6 Dam: yeah I'll get some
- 7 (0.8)
- 8 Dad: can you just see if you can find em (1.0)



Figure 1. Line 8 of Extract 1

- 9 Bec: Daddy
- 10 Dad: a:::h I don't you know chilli flakes
- 11 Cas: Daddy

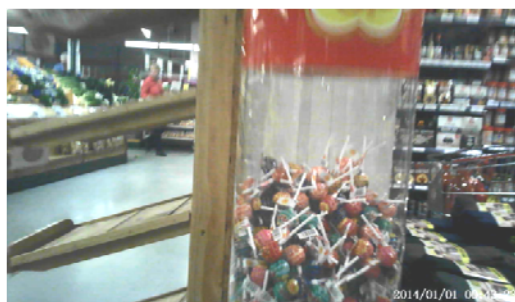


Figure 2. Line 11 of Extract 1

- 12 Cas: Daddy lollipop
13 Dad: in that (0.4) sorry (0.4) ah in the packet
14 Cas: Daddy

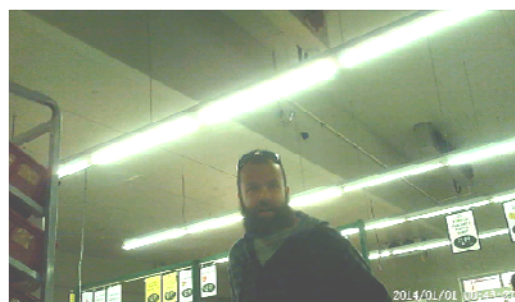


Figure 3. Line 14 of Extract 1

- 15 Cas: can I have one
16 Dad: no::::
17 ((Cash looks at lollies again))



Figure 4. Line 17 of Extract 1

18 Dad: you're off the lollies mate (0.4)

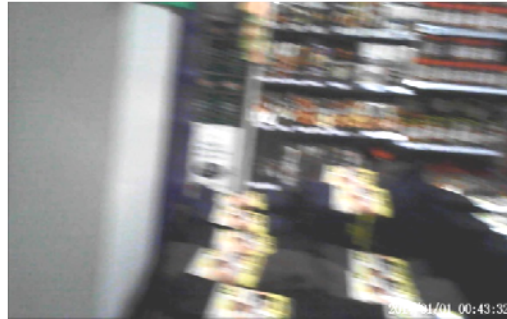


Figure 5. Line 18 of Extract 1

19 Dad: you know what they do to ya

20 (2.0)

21 Cas: I kno::w

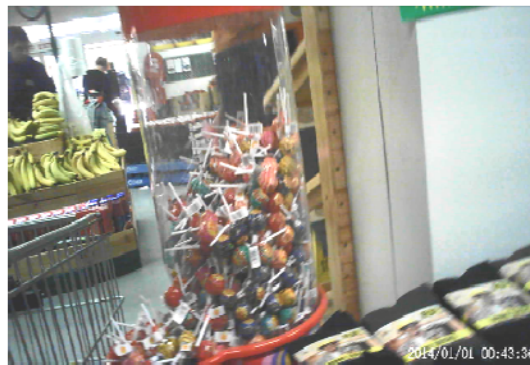


Figure 6. Line 21 of Extract 1

22 Dad: just (1.0) they've got like little packets of 'em

23 Damian

24 (0.6)

25 Dam: yeah

26 (1.0)

The father informs his children that they have run out of chilli flakes and one son offers to go and get them (lines 1-6). The father offers the clarifying directive that the son should

locate them. In the first image, directly under the comment by the father, the child wearing the glasses looks in the direction of the place where spices are kept. Just outside the entrance to this area is a display of lollipops. Cash draws his father's attention to the display and the products through a verbal noticing (lines 11-12). The verbal noticing begins with naming his father and a repetition of that naming to further seek the father's attention. When Cash says the name for the second time, the image shows that his gaze is directly on the lollipops. His father is still speaking with his brother, so Cash follows this with a direct request for the lollipop ("Can I have one?"). His father denies the request and we see that the child's gaze is on the lollipops when the word is uttered, but then it moves away as the father reminds that Cash is "off the lollies." Although Cash confirms that he knows about the lollies not being good for him (lines 19-21), he looks again to the display before moving away as the family members move on with the trolleys.

In the next extract, Cash notices some pineapples on display. The recording shows how this leads to several noticings, however, these are not followed by verbal requests. Recorded images from the digital video glasses show how Cash moves closer to the pineapples, eventually picking one up. Use of image in this extract documents the child's increasing closeness to the pineapples without needing to use written description in the transcript.

Extract 2: Pineapple

1 ((Cash looks in the direction of pineapples))



Figure 7. Line 1 of Extract 2

2 Cas: pineapple



Figure 8. Line 2 of Extract 2

3 Dad: um (1.0) just- just- let me check this list

4 Cas: ow pineapple

5 (1.0)

6 Cas: looks cool

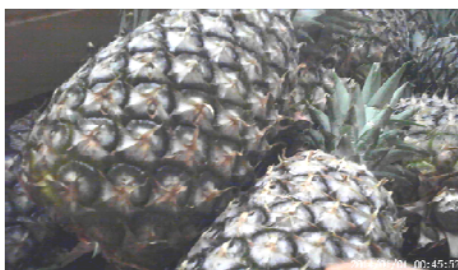


Figure 9. Line 6 of Extract 2

7 Nel: pineapple

8 Cas: pineapple looks cool

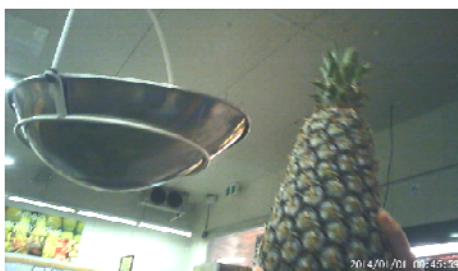


Figure 10. Line 8 of Extract 2

- 9 (2.0)
10 Dad: oh one last thing (1.0) you guys like Brussels
11 sprouts



Figure 11. Line 11 of Extract 2

- 12 Dam: oh yes
13 Dad: see if you can find some

The first verbal noticing is the word “pineapple” (line 2) although Cash is already looking in the direction of the pineapples (line 1). His father can be heard talking quietly as he has moved away and is not visible on recordings. The recorded images show that Cash moves closer to the pineapples (lines 2 and 6), repeating the word “pineapple” and providing a verbal assessment (“looks cool”). The various noticings attract the attention of at least one brother (line 4) and Cash finally lifts up a pineapple, holding it high – perhaps an additional attempt to gain a response from the father who makes final decisions as to whether or not to purchase something. The father does not respond to any of the talk and shifts attention to Brussels sprouts. During his utterance, a hand is seen placing the pineapple back on the stand (line 11).

Similarly, the next extract shows how Cash sights mangoes and provides a verbal noticing directed at his father through use of “Daddy.” Pointing accompanies the word “mango” (lines 2-3). This also serves to draw the father’s attention.

Extract 3: Mangoes

1 ((Cash sees the mangoes))



Figure 12. Line 1 of Extract 3

2 Cas: mango Daddy [mango:
3 [((Cash pointing at mangoes))]
4 (1.0)
5 Cas: mango
6 Dad: no::



Figure 13. Line 6 of Extract 3

7 Dad: I wouldn't no we won't worry about mangoes
8 at the mo[m]ent
9 Bec: [Daddy
10 Dad: yes Bec
11 Bec: I [wanted some of those
12 [((Bec pointing))

Although Cash does not make a direct request that they buy a mango, the response from his father (line 6) indicates his understanding that drawing attention to the mangoes makes salient a possible request, or perhaps even works as a request. The father declines, however, mitigates his response through the use of “at the moment” (lines 7-8), thus leaving open that purchase is a possibility at some stage in the future. The summons from Bec (line 9) and the talk that follows shift the father’s attention away from Cash.

Of course, the young child wearing the glasses saw many more items in the shop. As shown in the extracts, some produce or products became the source of attention through the child’s use of verbal noticing and requests or non-verbal actions such as pointing. At other times, the recording from the glasses showed the child attending to some product or produce because another child in the family had drawn attention to it.

The final extract captures part of the recording where Cash was silent for several seconds. During that time, his baby sister used pointing to draw attention to packets of savoury cheese snacks (called Cheezels). Although Cash does not participate verbally in the interchange between the other family members, the images show that he visually locates the Cheezels, so responds to talk about them.

Extract 4: “They’re bad for you”

- 1 Bec: eh eh eh eh ((pointing))
- 2 Dad: what? no:: what are they!
- 3 Nel: Cheezels
- 4 Dad: no that’s no good (0.8) they’re bad for you
- 5 those things
- 6 ((Cash looks at Cheezels))



Figure 14. Line 6 of Extract 4

7 ((Cash looks away))



Figure 15. Line 7 of Extract 4

8 ((Cash looks back at Cheezels))



Figure 16. Line 8 of Extract 4

9 ((Cash continues to look at Cheezels))



Figure 17. Line 9 of Extract 4

10 ((Cash begins moving away))



Figure 18. Line 10 of Extract 4

Pointing accompanying articulations was an important way that the youngest family member was successfully able to draw attention to produce and products and to indicate her own requests to have those things. In relation to the Cheezels, the father's response indicates that the object of Bec's interest is not good for her (lines 4-5) and he moves on with the trolley. At the same time, the images show that Cash lingers to look at the Cheezels, to look away, and then to look again before beginning to walk away himself (with the movement resulting in the blurred final image in the extract). Cash does not speak during this time.

Discussion and Implications

This section considers the use of digital video glasses for examining young children's social interactions. We address benefits and limitations as experienced in our pilot study and suggest considerations for future research, including for studies that seek to use the technology in public places.

Methodology and Methods to Take Account of Multimodal Interaction

CA has oriented increasingly to examination of multimodal interactions (Mondada, 2008). Our analysis of noticing sequences encompassed verbal and embodied actions. As

shown, images from the digital video glasses make possible sequential analysis of embodied and verbal actions, sometimes in ways that are not possible through use of recordings from other devices. For example, the recording showed when the child looked in the direction of particular produce and products, sometimes leading to verbal comments. Therefore, the use of glasses provided us with visual "grounds" for including a non-verbal noticing as the initiating action in a noticing sequence. Third-person recordings do not necessarily make available this specific non-verbal information.

Our use of the glasses, in tandem with other recording devices, addresses an absence of CA studies that examine "multiple recordings of the same participants, activity or environment; multiday recordings; usage of multiple cameras; and recordings of mobile activities" (Hoey & Kendrick, 2018, p. 165). For our work, it was the interplay between recordings from various devices that enabled us to explore interactions in the shopping environment in new ways and contribute understandings of family members' multimodal activity. As well, the digital video glasses documented movement through the shopping environment, thus captured mobility as integral to family shopping. At the same time, mobility impacted upon the recording device, sometimes resulting in blurring of the recording. Blurring occasionally made viewing the recording difficult.

Video recordings are particularly useful for those interested in multimodal interaction (Jewitt, 2012). In the case of the digital video glasses, it is possible to view and think about multimodality through the eyes of the participant who is wearing the glasses. Recordings enable consideration of multimodal aspects of communication and other social actions, including interactions with materials aspects of the environment. Capturing multimodal actions of others allows for insight into meaning-making observed and experienced by the wearer of the glasses.

Our work with digital video glasses suggests the importance of being clear about the need for the technology in the data collection process and the implications for analysis of first-person recordings (Smith et al., 2016). With our pilot study and future research informed by it, it is important to consider carefully how the use of the glasses adds to the perspectives captured by other recording devices. For example, we considered the advantage of the glasses over fixed cameras that accompany research participants in other ways (such as being affixed to shopping trolleys). Cash was often out of "line of vision" of

the “trolley cams”, but the recording from the glasses gave us information about where he was and what he was looking at in the store.

Ultimately, there needs to be the good fit between the methodology, data collection, and analytic methods. Researchers should establish that fit. In our study, we maintained a focus on social interactions of young children. Recorded data from the glasses enabled us to think about interactions initiated by an individual child and about how the shop environment may have prompted such interactions. For example, sighting a lolly display led to a noticing and request to purchase the lolly. This led us to conclude the benefits of the purposeful inclusion of the digital video glasses in our future examinations of the ways that young children’s social interactions produce opportunities for learning. For others interested in recording young children’s activities, digital video glasses or other wearable digital cameras may serve different purposes within particular methodologies. For example, phenomenological accounts of the lived experiences of very young children have benefited from the use of “baby cam” in order to provide the first order perspective of young children not yet able to verbalize accounts of their social activity (Elwick, 2015; Sumsion et al., 2013). Elwick argues that the real impact of such technology is experienced when interested others view the recordings and she establishes how “baby cam” recordings disrupt educators’ taken-for-granted ways of looking (Elwick, 2015).

Implications for Transcription

Use of various recording devices enabled inclusion of images and other information from a range of sources when developing transcripts. Data from recording glasses also required making decisions about what images to include in a transcript and how to include it. Flewitt (2008) provides a very good example to illustrate decision making when transcribing – a silence in talk could be represented by a number recording the length of the silence (in seconds, for example) or an image might replace the length of silence to indicate what else was happening when research participants were not speaking. In our consideration of noticing, the use of images was important for delineating how each verbal noticing related to what was being viewed at the time prior to the utterance or after it was made.

Our use of images from the recording glasses was informed by understandings that transcription is a process that represents people, places, and events in certain ways and

involves multiple decisions about how and what to represent (Green, Franquiz, & Dixon, 1997). Inherent in this decision making are various issues of identity and power. In our pilot study, transcription of information from the wearable glasses presented an opportunity to take account of children's active participation in shopping interactions through representing their direct observations. However, images were still only those selected from a myriad of possible images. In the case of the extracts, the images were selected according to the non-verbal information that they provided about sequential accomplishment of each noticing, sequential accomplishment of activity being central to CA.

Drawing together information from the wearable glasses and other recording devices was complex. Since the differing sources of information are not necessarily apparent in the transcript that results, it is necessary to be explicit about how the transcript was constructed (Davidson, 2010) and to keep in mind that there is never a transcript that can capture everything that occurred. Consideration of transcription in relation to the glasses highlights, again, the interrelationship between theory, methodology, and methods in research and the need for congruence and explicitness in selection and descriptions of each (Davidson, 2010).

Recording Glasses as a Data Collection Tool

Every recording method in data collection has its limitations (Lankshear & Knobel, 2004). The recording glasses enable the recording of some information but not others. For example, they record many of the non-verbal actions of others whereas the recording of non-verbal actions of the wearer is limited frequently to use of hands and arms. At the same time, the recorded use of hands showed the importance of touch and pointing in the process of family shopping.

One distinct advantage of the recording glasses concerns use of the technology during activity that involves mobility. In our study, families moved through the supermarket – sometimes going back and forth in various aisles. Therefore, wearing of the recording device meant that some of that movement could be tracked rather easily. The lack of need for the researcher to physically record also meant that families could be mobile without needing to take account of an external recording device, perhaps carried by a researcher. The result was a recording, in real time, of movements through the store and interactions with aspects of the store environment.

A related advantage is that the glasses are not as intrusive for the generation of data in an everyday environment and during everyday activity. The glasses are realistic looking and do not draw attention to families or to the child wearer in the way that more visible recordings devices could or would. Future studies might examine children's responses to wearing the glasses in order to learn more about their impact on child participants.

In terms of our focus on noticing, the technology is a rough tool compared to the finer calibrations possible with the use of eye tracking technology in children's research (Addyman & Mason, 2016); however, the digital video glasses are far less obvious than eye tracking devices and produced information that was fine enough for us to draw inferences about what is visually noticed, talked about, and acted upon. This is not to say that the video recording glasses cannot be used in more detailed ways (Betancourt et al., 2015) for a thorough examination of ways that the technology has been used in quantitative studies through the use of first person vision video analysis. Lee et al. (2017) establish the value of all participants wearing the glasses although their study was limited to mother-child interactions.

It is important to remember that the glasses provide a "third eye" view (Skinner & Gormley, 2016, p. 236) or "version of the vision" (Skinner & Gormley, 2016, p. 236) rather than the exact view of the wearer or movement of the eyes. However, the camera is located between the eyes rather than above or under them or to the side. An important advantage over the GoPro camera worn in a harness is that the glasses turn with the head and record at eye level. In the case of the boy wearing the glasses, this meant that often it was possible to see the shop directly at his level, but also to see when he scanned around the shop to look up and down at different displays and objects.

Ethical Concerns

With any use of video recording involving children, there are numerous ethical issues that researchers must closely consider (Flewitt, 2008; Pálmadóttir & Einarsdóttir, 2016). Although use of wearable recording glasses removed the researcher from the presence of children during recording in the shop, there are other issues that use of the recording device produced or might potentially produce. One is that use of the recording glasses in public places may capture actions and interactions of people who are not the focus for the research

and who have not given consent to be recorded. The wearable recording glasses are a wearable technology not evidently "signifying filming to others" (Dinhopl & Gretzel, 2016, p. 66) as the presence of a researcher with a camera might indicate. This may be addressed in studies through signs or written materials that explain the recording process and seek consent from people for the potential use of images should they be inadvertently recorded during data collection.

Another limitation is that the recording device may capture aspects of a child's experience that may be of a sensitive nature and this may not become apparent until the recording is viewed by the researchers. One way to address this is shown in studies where research participants view their recordings before passing them on to the researchers. Participants may then request removal of parts of recordings if they wish. Incorporating this approach can add to the time burden for participants and for researchers and requires establishing trust between researcher and participants (Lahlou, 2011).

Child Participants

The glasses may have some appeal for child participants in research although we do not suggest, simplistically, that wearing the glasses should be the incentive for participating in the research nor that children will elect to wear glasses because they are children. Children given a choice from a range of devices may be drawn to wear the glasses or may not. This was so in our study where only some children wanted to wear the glasses. As well, the novelty of wearing the glasses may wear off and potentially this could create some anxiety for children. Parents need to understand that wearing of glasses is with the child's permission and that, if requested, glasses can be removed. Importantly, this must be made very clear to children who are wearing the glasses. In this way, researchers acknowledge the importance of "recognizing children's competence and agency" (Docket, Einarsdóttir, & Perry, 2011, p. 70) as research participants.

Attributing children with competence to make decisions about participation in research (Docket et al., 2011) extends to making decisions about how that participation will occur. In relation to wearable glasses, children may prefer to record others rather than being the focus for recording. That is, awareness that others are being recorded may "take" pressure off children who are wearing the recording devices. Although we did not show children the

recordings that resulted from their wearing of the glasses, we can think of interesting possibilities for the use of the recordings as a first person point of view elicitation tool (Evers, 2015; Skinner & Gormley, 2016) in research with children. Similarly, the focus on a single child's viewed experiences suggests possibilities for understanding shopping as multimodal, mobile, and coordinated activity where children do much more than simply provide verbal requests for products.

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