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EMPIRICAL STUDY / ANALYSIS

The Intelligibility of Haptic Perception in Instructional Sequences: When Visually Impaired People Achieve Object Understanding

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Abstract

In this paper, we study the interactional organization of an instructed object exploration among sighted and visually impaired people (VIPs) in order to contribute to studies of instructional activities and the observable accomplishment of haptic perception. We do this by showing the situated, interactional, and co-operative organization of achieving object understanding. We focus on the dynamics of haptic perception as being reliant on instructions, while at the same time being an observable production that furnishes further instructions. We show the organization of visual and verbal instructions versus the touching of objects for haptic perception. Based on ethnomethodological conversation analysis of video data, we study a VIP's haptic actions in interaction with a professional, sighted ICT consultant who provides instructions on what an object is and what it can do. We show how the instructions are sequentially adjusted to make them relevant for a simultaneous, emerging exploration in which the VIP uses their hands and fingers to perceive very specific details of the object. We argue that achieving object understanding is accomplished in and through the fine-tuned coordination of haptic exploration, both as a response to verbal instructions and also as a means of conveying perception-related actions, which the ICT uses to build new actions. The paper thus makes a case for instructed and distributed haptic perception as observable in social interaction and as a resource for building object understanding within phenomenal fields.

Keywords Conversation analysis · Ethnomethodology · Video ethnography · Visually impaired · Perception · Instructions · Haptics · Objects · Phenomenal fields · Gestalt

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Introduction

The process of becoming familiar with new objects is a ubiquitous phenomenon in everyday life. It consists of recognizable actions, such as looking at the object, talking about the object, touching the object, locating features on the object, etc. (Day & Wagner, 2019; Nevile et al., 2014). What has been described as "object-centred sequences" (Tuncer et al., 2019) are situations in which the object is the main focus of attention, and is treated as something to explore, orient towards, manipulate or otherwise make the focal point of joint attention. A specific version of these practices concerns "inspection sequences" (Mortensen & Wagner, 2019), in which participants engage in a process of figuring out what an object is, what it does, how it smells, tastes, feels, etc. (Mondada, 2021). Without sight, however, the perception of objects, or any aspect of a phenomenal field, radically changes character (Hull, 1997). For sighted participants, joint attention and the production of object knowledge is typically first achieved by gazing and achieving visual perception (Kidwell & Zimmerman, 2007), and then, if relevant, through tactile and haptic perception, in which they explore the object by touching (Goodwin & Smith, 2020). For visually impaired people (VIPs), however, the perception of objects is predominantly achieved through auditory input and touch (Kennedy et al., 1992). Whenever sighted participants interact with VIPs in an attempt to perceive what an object is, there needs to be a transfer between sensory systems, as there can be no joint visual orientation. In this article, we show how a professional consultant's verbal descriptions and instructions in relation to a situated object result in the VIP performing haptic explorations and how these explorations and their emerging trajectories lead to further verbal descriptions and instructions.

The paper is based on video recordings of instructional activities and uses conversation analysis (CA) (Sacks et al., 1974) in the tradition of focusing on multimodality (Mondada, 2014b) and multisensoriality (Mondada, 2019b) to unpack how action production is embedded in sequential organizations. The aim is to show the interactional organization of the object exploration as an observable form of active haptic perception. We contribute to studies in instructional activities by highlighting how the timely progression of such sequences is not only structured on the basis of preplanned formula or other forms of standard professional procedure but that the progression of the instructional activity is also secured through the multimodal responses, trajectories and projections produced by the VIPs haptic explorations.

The Phenomenon

In this article, we will explore a single case in depth to show the degree to which instructed object explorations are finely coordinated as an emerging, situated sociality among sighted and visually impaired people. We start, however, by presenting a very short and concise example that illuminates the phenomenon.

Example 1: "if you go clockwise"


Figure 1

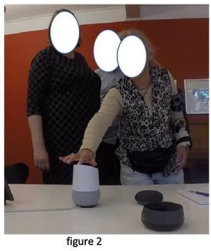
figure 2


figure 3


figure 4

1. Instructor1: hvis du kører med #luret
if you go clockwise
(VIP moves finger around = music plays louder)
2. VIP: det er dælme smart#2
that is really need
3. Instructor2: hvis du mærker' hvis du tager med fingrene og ligesom holder#3 rundt om med din pege' og langemand#4
if you feel' if you take with your fingers and kind of like hold around it with your index' and middle finger

This example shows the dynamic relationship between a verbal instruction relating to an object, as performed by a professional ICT consultant (l. 1), and the consequential embodied action in the next position, in which the VIP performs a detailed haptic exploration of the object using their fingers. This haptic perception (Fig. 2) is observable and accountable within the emerging situation and can be seen to prompt a new and different detailed instruction in relation to the haptic action (l. 3). This very short analysis reveals 1) that instructions are contingent on the specificities of the phenomenal field and the emerging responding embodied actions; and 2) that haptic explorations are treated as communicative actions that project specific next actions while addressing the haptic actions just produced. What is also apparent from this short example is that the phenomenon does *not* have a particular sequential structure in terms of which action comes first. Rather, the verbal instruction and the haptic exploration mutually elaborate on each other within the emerging contextual configuration (Goodwin, 2000). As has been shown, sequence organization and the consequentiality of actions (Sacks et al., 1974; Schegloff, 1968) are not only traits of verbal exchanges but also organize embodied actions, in which, e.g., a hand gesture can be treated as a recognizable and consequential social action (Streeck & Jordan, 2009). However, prior research has not dealt with the emerging transitions between instructed object exploration and the distributed character of haptic perception. Studies by Nishizaka have shown the organization of "instructed perception" (Nishizaka, 2014a) and the "distribution of visual orientations" (Nishizaka, 2013) in prenatal ultrasound examinations, and Goodwin, in several publications, has shown the fine-tuned organization of participants' spatial "positioning for perception" (e.g., Goodwin, 1995, 2007; Goodwin & Smith, 2020). However, whereas Goodwin has focused solely on professional *vision*, Nishizaka (2011) has also dealt with perception *without* vision, showing how reference to an internal body part is an interactional accomplishment. We build heavily on these studies to show the practical and interactional accomplishment of perception (see Coulter & Parsons, 1990) and contribute to them by highlighting how understanding of an object is

achieved in a context of sensory asymmetry, both in and through a fine-tuned coordination of instructed and distributed haptic perception.

Instructions in Social Interaction

Instructions have been a main focus in EM/CA from the beginning. According to Garfinkel, ethnomethodology was essentially founded on "a catalog of tutorial problems" (Garfinkel, 2002). As "a distinctively achieved phenomena of order" (Garfinkel, 2002: 19), instructions and instructed actions fundamentally highlight how social order and intersubjectivity are accomplished. Accordingly, various forms of instructional work are widely researched within EM/CA, including phenomena embedded within instructional activities, such as descriptions and instructed actions (Garfinkel, 2002), directives (Mondada, 2011), requests (Kendrick & Drew, 2016), and demonstrations (Nishizaka, 2017), to name a few. Whether the focus is on formal educational environments or providing guidance on how to conduct a specific situated task (e.g., Keevallik, 2013; Nishizaka, 2014), all studies stress that the interactional achievement of instructions is pivotal to the understanding of what instructional activities are and how they are conducted. Of particular relevance for this paper are studies of instruction during surgical procedures (Koschmann et al., 2011a; Zemel & Koschmann, 2014), in which the focus is on the crucial role of the collaborative coordination of intelligible, transparent instructions for the instructed embodied actions. For instance, Mondada's study from 2014, showing the fine coordination between producing and following instructions in situated surgical practices (Mondada, 2014a), finds that although the instruction itself can be produced in various ways, the instructed bodily action is silently achieved. As such, the decisive nonverbal and embodied exhibiting of understanding (Hindmarsh et al., 2011b) not only highlights the situated need for compliance but also emphasizes visual access as central to the instructor's ability to assess the instructed action (Mondada, 2009). In a similar manner, De Stefani and Gazin (2014), in their study of instructional sequences in driving lessons, conclude that whereas the instruction is verbally produced, the instructed actions are systematically bodily achieved (De Stefani & Gazin, 2014). Furthermore, guiding embodied practices–such as performances, exercises (Keevallik, 2013), postures (Nishizaka, 2014b) and (as in this paper) the utilizing of tools and objects (e.g., Koschmann et al., 2006), as well as other activities that require specific physical techniques–are often multimodally achieved through visual displays of mimicable embodied demonstrations accompanied by verbal deixis (Stukenbrock, 2014). However, as in Goodwin's groundbreaking studies on professional vision and instructions (Goodwin, 1994; Goodwin & Smith, 2020; Koschmann et al., 2011b), these studies focus on a presumed shared visual access to the world.

In a context of sensory asymmetry, perception and the coordination of instructions are achieved quite differently. For instance, in Nishizaka's study of the "guided touch" of a fetus in a midwifery practice (2020), neither of the participants have visual access. As such, both the instructee's perception and the instructor's perceived perception (Hausendorf, 2003a) are haptically experienced through "active touch"

(Gibson, 1962). Nishizaka shows how the participants' haptic experience, "the felt and the feeling" (2020:245), through the trajectory of the specific instructional activity, are integrated into one single, experienced world. Jenkings' (2017) research of rock climbers' sensory practices, which focuses on instructions provided in the absence of mutual visual access, shows how mundane auxiliary technologies, such as ropes, form part of an assemblage of technology, climbers, rock and the immediate environment, which enables an extension of the climbers' intercorporeality. In their research on climbing in pairs, Simone and Galatolo (2020, 2021, 2022) focus on visually impaired people and the instructions they receive from seeing co-climbers. They show the production of the climb as a co-operative accomplishment and highlight how the coordination of the trainer's instructions is consequential for the visually impaired persons' climbing actions.

In this paper, we contribute to the research on instructions as embedded in embodied activities, in which participants can be understood as having asymmetric access to sensory resources and to the gestalt contexture of the phenomenal field (Eisenmann & Lynch, 2021; Fele, 2008; Lynch & Eisenmann, 2022). We contribute to this line of research by showing not only how the professional instructors' descriptions and instructions sequentially lead to an embodied next action but also that the VIP's haptic actions project a subsequent characterization by the instructor, thereby emphasizing the notion of perception as a distributed achievement (Due, 2021a).

Haptic Perception in Social Interaction

Research has shown how knowledge and perception of objects are achieved not only by visual inspection and joint visual attention but also via the hands–by touching the object (Cuffari & Streeck, 2017), producing tactile and haptic experiences of the object (Smith, 2021), and manipulating the object into a new form, shape, function or position (Hazel & Mortensen, 2014; Licoppe et al., 2017). In this paper, we are interested in how exploratory bodily practices of touching and haptically inspecting objects become observable and have "communicative potential" (Streeck, 2009:71) because such actions may "exhibit an understanding" (Sacks, 1992:252, (Vol. 2); Hindmarsh et al., 2011a) of the object, both for practical purposes and for the establishment of intersubjectivity (Deppermann, 2019; Schutz, 1953). The human hand is not only an organ of action but also [as shown by Cuffari and Streeck (2017:175)] one of our most important resources for sensing, exploring, and discovering the world around us. Features like texture, shape and temperature may become known through the actions of the hands–indeed, in such matters, the hand is superior to sight. Our study of the haptic practices of visually impaired people contributes to this line of research by focusing on the intrinsic properties of what Streeck terms *exploratory procedures* (2009: 53), building on the understanding of these explorations as being accomplished by what Gibson calls *active touch* (Gibson, 1962). Drawing on Gibson and others, we understand *tactile* experiences as achieved by touching surfaces with a passive hand and letting the surface's texture, temperature, etc. affect the skin, whereas *haptics* refers to an active exploration in which the hand

is used to achieve an understanding of an object's shape and extension. Whereas sensory encounters with the world are an ongoing practical accomplishment (Ingold, 2000), active exploration differs in that participants can be seen to actively engage in sensory experiencing (Mondada, 2021:55). The focus of this paper is on precisely this kind of active haptic exploration in the context of verbal instructions and characterizations.

Visually impaired people (VIPs) constitute a perspicuous case study of this phenomenon. They do not perceive the world and its objects visually but instead rely greatly on achieving haptic and tactile experiences of the world via touch (Hull, 1997). For visually impaired people, the tactile and haptic features of any material surface, e.g., the built environment, material structures or objects, are not just "nice to have" but are essential for their perception of the world (Due & Lange, 2018; Hull, 2013; Lehn, 2010; Macpherson, 2009). Haptic explorations and experiences of an object are indicative of its identification and a key part of achieving situated, practical knowledge of *what it is, what it can do* and *how it can be used*. Achieving information about objects via touch can be, as Goodwin and Smith showed in their study of geological practice, "a diagnostic tool" and thus "indispensable" for "practice and reasoning" (Goodwin & Smith, 2020: 271). For Goodwin and Smith, geological fieldwork constitutes "a perspicuous setting for investigating tactility as public resource for building action" (Goodwin & Smith, 2020: 271). In this paper, we expand on the observability of haptic experience for producing a joint understanding of an object in a context with no shared visual domain, and in which, therefore, adjusting, projecting and timing the production of action is reliant on the sighted participants' ability to perceive the VIP's haptic perception as displayed action. As such, this paper contributes to the expanding field of understanding perception as both a practical and a distributed achievement.

Data, Method and Setting

This paper is based on data from the research project BlindTech, which investigates visually impaired people's (VIPs) social interactions around, with and through digital technological objects. The analyzed data are based on the video-ethnographic method and consist of recordings (Heath et al., 2010) of VIPs in an instructional setting involving an instructor and an unfamiliar digital device: a Google Home (GH) smart speaker. We are therefore studying the methods VIPs use to interact with advanced technologies equipped with artificial intelligence. During the initial encounter, the participants orient to these "abstract" technologies as objects with no particular characteristics in order to first obtain a tangible understanding of the technologies *as* material artifacts, via their manual texture, features, shape, buttons, etc. In this paper, we pay special attention to how a VIP's haptic perception, in which they use their hands for exploration, is treated as a form of communicative action to which the instructor responds with relevant new instructions.

The interaction analyzed here occurs in a VIP's home environment, with a participation framework consisting of an instructor and an observing researcher. The setting is thus a three-party framework in which the researcher is part.

Methodologically, we consider this data to be "naturally organized" (Lynch, 2002) and we find that, what Hofstetter (2021) call the "researcher-participant," is treated by the others as any other participant. The two people (ICT and VIP) in the excerpts display an understanding of what they are doing not only for each other but also for the researcher in the room.

To show the orderly, co-operative features of these kinds of activities, we perform an in-depth analysis of a single case in which a VIP and an instructor orient towards the GH. This single case has been chosen from a corpus of six similar examples to illuminate the process of achieving understanding of the object. The type of sequences analyzed are instructional and inspecting, and the practices in focus are the VIP's haptic actions using the hand and fingers and the instructor's verbal characterizations. We show how participants monitor each other's different modes of action in minute detail and that they shift between different sequential organizations: either the instructor produces verbal characterizations and instructions regarding a specific feature, in response to which the VIP produces haptic explorations of the object or vice versa–the VIP performs an exploration that is immediately followed by a verbal characterization of or instruction regarding the material feature and its significant functions. We show how there is conditional relevance (Schegloff, 1968) between the instructor's characterizations and instructions and the VIP's haptic actions and how this enables the practical achievement of object understanding. In these situated settings, the consultant is the professional, providing instructions and descriptions, and hence does not need to explore or gain an understanding of the object–rather, that is a task for the VIP. We will show how the observable and displayed haptic exploration of the object produces an exhibited understanding (concerning "exhibiting understanding," see Hindmarsh et al., 2011a; Nishizaka, 2011; Sacks, 1992).

The VIP in this example lost her sight later in life and, as such, possesses certain visual competencies, e.g., knowledge of the concept of seeing even though she has no visual sensation. However, the VIP has no prior visual knowledge of the Google Home speaker or similar objects, meaning that the realization and contextualization of the object and its functionality rely on non-visual senses and collaboration with the instructor. The case is split into three excerpts, transcribed using Jefferson's conventions for talk and a variation of Mondada's conventions for embodied and silent actions (Mondada, 2019a). All participants are anonymized according to the procedures of the University of Copenhagen.

Transcription symbols

VIP: ICT:	Participant Instructor
+	Delimits embodied left-hand (Lh) actions by VIP (Participant)
%	Delimits embodied right-hand (Rh) actions by VIP
> >	Marks gaze

Analysis: Haptic Perception of a Google Home speaker

In this setting, an instructor and a researcher visit the VIP in her home for the purpose of introducing and setting up the Google Home speaker. In the presented analysis, the instruction is part of the VIP's very first encounter with the unfamiliar object.

Excerpt 1: "With That Sloping Top"

1 ICT: **Δh. #vi #var ved og# øhΔ**
we were about to eh
ict >>looking at GH, gazing at the VIP fingers
ict Δgesture w right hand Δ
Fig: fig#1 #2 #3


figure 1


figure 2


figure 3

2 **+prøve +(.)#o:g ø:h (.) >lure<#+ (.)**
try (.) an:d eh (.) >figure out<
vip +turning GH btw hands +
vip +touch top of GH w. index finger
ict >>vip face
Fig: fig#4 #5


figure 4


figure 5

3 VIP: **+(.)Ja**
yes
ict >>GH
4 ICT: **+hvordan højtaleren bygget op↑+#(.)**
how the speaker is build (.)
+moves Lh up and down at GH -->
+touch edge of top w. thumb
vip #fig.7


figure 7

5 **med den skrå top der (.)**
with that sloping top
6 VIP: **ja**
yes

The excerpt begins after the instructor (ICT) has presented the Google Home (GH) speaker to the VIP, thereby framing the object-centered activity. The VIP holds the speaker with her right hand placed underneath the bottom and her left hand gently

touching the sides (Fig. 1) in a "position for perception" (Goodwin, 2007), displaying both a firm grip, using both hands, and a resting and "ready" posture. This initial positioning is a way of holding the object and is not yet part of an exploratory, active touch. While gazing at the VIP's hands holding the GH, the ICT prefaces the instructional sequence as a collaborative activity, saying: "we were about to eh try and eh figure out (.)" (l. 1–2). By using the word "we" instead of "I," the ICT produces the situation as a distributed activity, and her simultaneous gestural deictic display (l. 1, Fig. 1–5) emphasizes the object as a mutual referent (but it has no communicative effect, as it is not visibly accessible for the VIP). Following the ICT's turn-internal word search, "eh" (l. 1), the VIP turns the GH between her hands, sequentially aligning her embodied actions to ICT's ongoing turn of talk. During the short but noticeable pause following the completion of the turn (l. 2), right after the VIP has started moving her left index finger across the top of the speaker (Fig. 4–5), possibly feeling the shape of the top of the object, the ICT briefly moves her gaze from monitoring the VIP's hands and the GH (Fig. 4) towards her face (Fig. 5). After the VIP's observable, haptic exploration of the speaker's sloping top, the VIP verbally aligns (l. 3), at which point the ICT directs her gaze back to the speaker. While closely monitoring the VIP's haptic actions, the ICT then continues (l. 4), specifying the purpose of the instructional activity, i.e., to learn "how it is built" (l. 4). The VIP bodily responds by haptically exploring the sides of the GH by moving her left hand up and down (l. 4, Fig. 7). From this initiation of instruction, many types of next actions could be produced–the ICT could focus on the texture, size, material type, functionalities, etc. What is interesting is that the ICT instead refers to a specific detail on the top of the speaker: "with that sloping top" (l. 5). This is produced just after the VIP briefly touches the edge of the slope with her thumb (l. 4, Fig. 7). Orienting to that specific feature as relevant for the instructional activity can be seen as consequentially produced in this particular sequential environment, in which the VIP's visible haptic exploration makes the top contextually relevant. Via the deictic "that" (l. 5), the ICT makes an indexical reference to the haptic exploration of the object's sloping top, to which the VIP immediately responds with a confirming "yes" (l. 6).

This excerpt prefacing the actual instruction shows how the participants, despite the VIP's lack of visual sense, manage to establish common ground and a mutual perceptual phenomenal field through a collaborative and sequentially organized verbal and embodied production of intelligible actions. By closely monitoring the VIP's haptic exploration of the speaker, the ICT is able to coordinate and adjust her characterization of the object accordingly. Likewise, the VIP verbally and bodily aligns and displays understanding by following the ICT's instructional directives. Furthermore, by using deictic expressions, the ICT acknowledges the tactile knowledge of the GH obtained by the VIP, thereby exhibiting orientation toward the VIP's haptic actions. This analysis, therefore, demonstrates how the participants, through multimodal and multi-sensorial resources, transition between verbally instructed object exploration and observable haptic perception when exploring a specific material feature (the sloping top) of the Google Home speaker.

In the next excerpt, we will take a closer look at how the VIP's haptic actions and ICT's verbal instructions are finely coordinated as they collaboratively produce the instructional activity within the emerging contextual configuration.

Excerpt 2: "The Button Where You Turn Off"

```
7   ICT:  og +så↑+# +øh::#
          and  then  ah::
    vip      +Lh move down Gh-->
                 +middle finger touch button+
    ict   >>GH and VIP fingers
    fig:       fig#1  fig#2
```

figure 1

figure 2

```
8   ICT:  bag på++ den↓#(.)<%↑højeste# del%> #+der% #e:r
          behind   the       highest  part   there are
    vip           +move to bottom of GH+
                        %Rh grabs around GH-->
                                    %tilts GH%
                                        +Lh up along GH-->
    ict   >>GH
    fig:              fig#3          fig#4   fig#5  fig#6
```

figure 3

figure 4

figure 5

figure 6

```
9   ICT:  +#(0.6)++#knappen hvor man <sl+#u:kker#+> (.)
          the button where you  turn off
    vip   +middle finger moves up tw button+
           +puts middle finger on button
                                  +presses button+
    ict                        >>vip fingers
    fig:  fig#7;   #8              fig#9 fig#10
```

figure 7

figure 8

figure 9

figure 10

In this example, which immediately follows the first, the ICT produces a pre to an initiation (l. 7) while the VIP moves the fingers of her left hand down the speaker (Fig. 1–2). While monitoring the VIP's haptic exploration of the GH, the ICT

presumably notices, as it is visibly accessible for her, that the VIP's middle finger is moved towards and now touches the button (Fig. 2). Again, we have no idea whether, at this point, the ICT planned to introduce the buttons as a next relevant topic in the instruction, as a continuation of the uncompleted turn in line 7: "and then ah::," but we do know that ICTs do not have set procedures for giving instruction in GH devices. What is observable in the data is that the ICT refers to the back of the speaker (l. 8), to which the VIP responds by moving her fingers around the back (Fig. 3). As the ICT continues to further explain the relevant location ("the highest part") with the deictic turn design "there is the button" (l. 8), the VIP correspondingly slides her fingers towards the top (Fig. 4–6) and relocates the button (l. 9, Fig. 8). As the ICT describes its function, "where you turn off" (l. 9), the VIP simultaneously touches and then pushes the button (Fig. 9–10). Now, let us go back to line 7, Fig. 1–2, where the VIP already touched the button with her finger, which is visually perceived by the ICT. It can be seen to sequentially prompting a full turn in which the ICT does not just jump straight to a description of the button, but provides an explanation that spatially positions the button within the larger context of the object as a speaker–i.e., related to its position "behind the highest part" (l. 8). Incidentally, the description of a "highest part" is only understandable within this emerging situation, where the VIP has already haptically experienced the sloping top, from which it may be inferred that one side of the object is higher than the other. After receiving this contextual information, the VIP again touches the button, this time also pressing it, thereby displaying a reconfigured understanding of the functionality of the haptically experienced feature.

Throughout the excerpt, the ICT enacts a visual monitoring of the VIP's embodied actions. It, therefore, becomes evident that the haptic explorations are interpreted in situ as communicative actions that not only respond to the verbal instructions but also project particular next actions that address the just-produced haptic action. As such, the emerging understanding of the object as a particular material artifact related to a specific situational context is a multisensorial, sequentially organized production emerging from specific, perceived-as-significant features, e.g., the shape and the button, which receive their social meaning from the endogenously produced actions.

The instructional activity smoothly progresses from one instructional sequence to the next. In Excerpt 1, the instructional activity is initiated and the shape of the object is addressed. In Excerpt 2, information about a button emerges through haptic exploration and verbal instruction. In both cases, the ICT visually monitors and addresses the VIP's contextually relevant haptic perception as communicative actions that steer the trajectory of the responding instructional verbal action. This sequential progression–from opening and characterizing a feature through producing understanding via distributed sensorial perception and then smoothly moving on to the next situational relevant feature–is a recurring pattern, as we will see in Excerpt 3.

Excerpt 3: "If You Then Feel at The Bottom of The Speaker"

```
10  ICT:  =for +mikrofonen# .h (.)
           the  microphone
    vip        +Lh grab around GH-->
    ict                  >>gaze tw bottom of GH
    fig:               fig#11
```

figure 11

```
11  ICT:  og hvis du så mærker i ↑bu:n+den#(.)+%af #højtaleren↓#
          and if you then feel at the bottom    of the speaker
    vip                                  +Lh move downwards GH+
                                                %Rh GH side-->
                                      fig#12      fig#13      fig#14
```


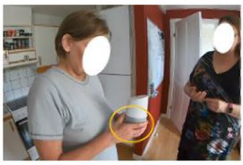


figure 12 figure 13 figure 14

```
12  ICT:  så%%# er+ #der også#++et%%#(1.0)%#
          then  there is also   a
    vip      %grabs GH----------%
                  +Lh tw bottom of GH+
                              +LH grab around side of GH-->14
                                  %Rh move to bottom of GH%
    ict   >>gaze tw VIP hands
    fig:   fig#15;  #16  fig#17   fig#18;  #19
```





figure 15 figure 16 figure 17 figure 18 figure 19

13 ICT: **%samme# sted # %der #bag %ved den #↑højeste(0.5)**
same place there behind the highest
vip %idx finger touch bottom%
vip %idx finger touch hole%
ict >>VIP face
fig: fig#20 fig#21; #22 fig#23




figure 20 figure 21 figure 22 figure 23

14 ICT: **det er++ der hvor#++ ledningen# skal sættes i↓**
this is where the cord should be plugged in
vip +Lh loosens grib+
+fastens grib--->
ict >>looking at GH, gaze tw VIP hands
fig: fig#24 fig#25


figure 24 figure 25

15 VIP: **%%>↑ja der er< sådan# et ↓hul i**
yes there is like a hole in
vip %middle and index finger holding still-->
fig: fig#26

figure 26

16 ICT: **jahr↓**
yeah

In line 10, the VIP holds the bottom of the GH with her right hand and grabs the side with her left, while the ICT monitors the ongoing haptic action (Fig. 11). Following the VIP's action, the ICT produces a verbal characterization: "if you then feel at the bottom of the speaker" (l. 11). This turn is designed using the word "feel" to project the next instructed haptic action, and includes a short internal pause during which the VIP moves her left hand further downwards. As the ICT has already visually observed (Fig. 11) how the VIP's hand is placed close to the bottom of the speaker, the bottom is then produced as verbally relevant for the instruction. The

VIP responds by continuing the movement of her hand further down, placing both hands at the bottom of the GH (l. 12, figs. 13–14). The ICT continues her turn by opening up for a characterization of a new feature by making another indexical reference to a particular spot on the bottom of the speaker: "then there is also a" (l. 12). This turn is produced with a self-initiated cutoff, which is sequentially adjusted to fit the monitoring of the ongoing embodied explorative actions, as the ICT observably gazes towards the position of the VIP's hands. After one second of silent haptic exploration, in which the VIP does not locate any significant features, the ICT offers a reference towards which the VIP can navigate: "same place there behind the highest" (l. 13). The turn is designed in fine-tuned coordination between the VIP's haptic exploration of the object and the previous verbal instructions. The relevance of this specific feature was already anticipated in line 12, with the indexical reference "then there is". Now, after the ICT has produced yet another indexical reference to the "same place" (l. 13), the VIP immediately starts moving her index finger back and forth to detect something specific that has not yet been mentioned but which has been projected by prior actions as eventually becoming relevant (figs. 20–23). While still closely monitoring the VIP's haptic actions (Fig. 22), the ICT continues the turn, first by the inserted deictic turn "there" (l. 13), which occurs just after the VIP starts moving her finger, and then a reference to the shape of the speaker "behind the highest," based on the previously established common ground of shared knowledge of the object (something being higher on the speaker due to the top being sloping, see Excerpt 1).

At the possible completion point of the turn (the short pause at the end of l. 13), the ICT transitions from monitoring the VIP's hands to gazing at her face, thereby making room for the VIP to take a turn and align. This shift in visual orientation occurs just after the VIP moves her finger, touches the hole in the speaker, and marks this touching by pressing and bending her finger (Fig. 23). Following this new, observable achievement of recognizing yet another feature on the GH speaker, the haptic sensation is made accountable, and thus observable as key for accomplishing intersubjectivity during this specific object-centered instructional activity. This is done first by the ICT, who explains the purpose of the hole: "this is where the cord should be plugged in" (l. 14). Interestingly, this turn-design does not explicitly mention the hole in the speaker but makes a deictic reference ("this"), before explaining the functionality. The VIP responds with verbal alignment that clearly displays understanding: "yes there is like a hole in" while maintaining the position of her index and middle finger over the hole (l. 15, Fig. 26). This final excerpt demonstrates fascinating instances of micro-attuning and coordination between the VIP's haptic explorations, using hands and fingers to perform communicative actions, and the ICT's temporarily organized characterizations, which fit nicely with the touching.

Conclusion and Discussion

In this paper, we have focused on object-centered sequences in which participants orient to and explore a rather unfamiliar object in and through social and embodied interaction in a context of sensory asymmetry. We have shown the production of an instructed perception, in which participants together build relevant information about the object by coordinating observable haptic explorations and verbal characterizations. We used a single case to show in depth the organization and coordination of haptically exploring actions that are produced to obtain sensory information through touch in the context of verbal actions. This case is not extreme or otherwise unique. This phenomenon–the co-operative (Goodwin, 2017) nature of building and exhibiting understanding of an object through multisensory resources (Mondada, 2019b), namely visual access, verbal characterization and bodily explorations–occurs frequently in the data corpus of visually impaired people in interaction with sighted participants in object-centered sequences. In this discussion, we highlight two key findings from the analysis: 1) that instructions are contingent on the situation and the emerging responding embodied actions, and 2) that haptic explorations are treated as communicative actions that project particular next actions addressing the just-produced haptic actions. We then finally discuss these two findings in relation to phenomenological gestalt theory.

We have shown how participants do not "just" orient to the object and perceive it as "a whole" but rather work to achieve an understanding of the details that make up the object in and through minute and co-operative actions. Whereas sighted people constantly visually perceive phenomena in the world and may, on closer inspection, recognize the details of distinct elements that constitute the phenomenon–e.g., the form, texture, materiality and buttons of new technologies such as smart speakers–visually impaired people must achieve this information through other sensory resources. We showed how the consultant, in coordination with the VIP's haptic actions, produces verbal characterizations of precisely the features of the object that the VIP bodily makes relevant and also produces turns to make the VIP move her fingers to a position more appropriate for perceiving these features. As such, although there is no particular sequential order to this production, e.g., in which the ICT first produces verbal actions, and then the VIP adjusts them, or vice versa, there *is* an order for a distributed production of the perception of the object's features through practical actions that are attuned to the other participants' unfolding actions in the midst of the larger instructional activity–whether bodily or verbally (see Due, 2021a, 2021b, 2022 for descriptions of "distributed perception").

In their study of visually impaired people in a climbing setting, Simone and Galatolo (2021) show how the systematic production of instructions occurs sequentially before the climber starts moving. They also show how there is a fine-tuned coordination of the instructions with the climber's movement. We contribute to this line of research on close coordination in sensorily asymmetric contexts (see Jenkings, 2017; Nishizaka, 2020) by highlighting the role of embodied and (in particular) haptic actions for the projection of next actions. Our analysis demonstrated the observability and accountability of the haptic actions and exploration of specific features

in order to exhibit qualitatively different features of the object. The instructor's perception is built on visible haptic actions that are displayable as situated perception in combination with indexical knowledge from her membership of the professional category "ICT consultant". She, therefore, possesses prior knowledge of the object and is thus able to recognize and draw inference from the VIP's object-directed actions–for instance, when the VIP locates the hole on the object, the ICT can explain what the hole represents in terms of functionality.

Haptic experiences are generally treated as private, subjective, hidden phenomena that seem to defy analysis. In the phenomenology of Husserl (1982), the object is not "real" in itself but is given to us in some situated, interpreted form via intentional acts. In *The Phenomenology of Perception*, Merleau-Ponty (2002) broke away from such subjectivism and instead made the phenomenon part of practical engagement with the world. Other researchers began to unpack the extent to which the perception of objects in the world is tied to practical circumstances (Coulter & Parsons, 1990; Gibson, 1979; Ingold, 2000). EM/CA research has contributed to this by showing the interactional organization of practical perception. Goodwin highlighted the multimodal practices employed in the constitution of mutual referents, showing how the production of perception is contingent on a situated activity system and associated discourse (Goodwin, 1994, 1995). To accomplish situationally relevant perception, participants physically arrange themselves so that they are oriented toward each other and the material objects at hand, in a "positioning for perception" (Goodwin, 2007). We have shown how this is also the case in the minute details of the hands and fingers. Speakers might visually display an embodied orientation towards recipients (Nishizaka, 2017) in order to achieve a haptic understanding of what is being perceived, thereby stressing gesture as a form of haptic epistemology (Streeck, 2009). However, the abovementioned research presupposes visual sense in the participant's orientation towards the physical environment, material objects, and each other in the multimodal production of mutual "perceptual fields" (Merleau-Ponty, 2013 [1945]). Studying the social interaction of visually impaired people, who have little or no visual sense, challenges the otherwise taken-for-granted assumption that perception and the shared production of mutual perceptual fields are merely visual accomplishments. In this paper, we have contributed to this line of research by showing how "perceiving perception" (Hausendorf, 2003b) is a multimodal and multisensorial practical action.

This paper thus provides new knowledge about the 'common ground' of social interaction specifically when studying the coordination of knowledge and action between sighted and VIP's. In very concrete terms, the "understanding" of the object is achieved in two interconnected important ways: through minute multimodal and multisensorial coordination, with haptic perceptions as the focal orientation, and by building the gestalt contexture, the wholeness of the object, through specifications of its functional significations–in terms of gestalt psychology (Gurwitsch, 1964). We believe that the study of visually impaired people enables us to respecify the taken-for-granted knowledge, that people perceive an ordered world by recognizing unity, rather than just distinct features. The key idea in this "experience-based gestalt psychology" (Maynard, 1996:1) is the basic and unavoidable relation between figure and ground. To take an illustrative example from Gurwitsch (1964:240–242), as

retold by Emirbayer and Maynard (2011:238): "when a navigator discovers land, it is first seen as a vague and somewhat indeterminate 'coastline' or 'island' and only secondarily and progressively in terms of its detail". The basic finding in gestalt psychology is that the whole is made up of parts, but also that the whole is greater than the sum of its parts. Without sight, however, perceiving the wholeness of an object or any aspect in a phenomenal field becomes "hard" (Hull, 1997). Vision is based on the "full and constantly present image of the visual field" (Arnheim, 1990:60), whereas audio and haptic perception are momentary and volatile as already noted in 1953 by Jonas (1953). That is why a "whole" exhibited understanding of the object (concerning "exhibiting understanding," see Hindmarsh et al., 2011a, b; Nishizaka, 2011; Sacks, 1992) must be achieved intersubjectively through a detailed inspection of significant elements. Instead of discovering land by seeing a coastline, a visually impaired person must feel the land bit by bit (in combination with other sensory resources). Whereas sighted people constantly visually perceive phenomena in the world for what they are, and may on closer inspection recognize the functional significance of distinct elements that constitute the phenomenon–e.g., the form, texture, materiality, and buttons of new technologies such as smart speakers–visually impaired people, on the other hand, must achieve this through other means. We have shown how significant elements of gestalt contextures–understood as a praxeological respecification (Eisenmann & Lynch, 2021; Fele, 2008; Garfinkel, 1991; Lynch & Eisenmann, 2022)—is achieved as observable actions and practices in situ. Earlier research argued that haptic perception is limited to achieving information on only small elements–the parts rather than the whole–and that visually impaired people are therefore unable to achieve a sense of a gestalt contexture (Arnheim, 1990). We have on the contrary shown exactly how, for all practical purposes, visually impaired people, through unfolding sequences in concert with coparticipants, do in fact produce gestalt contextures of an object through multimodal actions that inspect functional and significant features of objects. This paper has thus shown how transformations of sensory information is intelligible and occurs routinely as a "locally produced, naturally accountable phenomena of order" (Garfinkel, 1991).

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