Social Interaction. Video-Based Studies of Human Sociality.
2025 Vol. 8, Issue 2
ISBN: 2446-3620
DOI: 10.7146/si.v8i2.142277

Social Interaction

Video-Based Studies of Human Sociality

The Characteristics of Recruitment and Assistance Among Peers in Social Virtual Reality Gameplay

---

Heidi Spets, Tiina Keisanen & Laura Kohonen-Aho

University of Oulu

Abstract

This study illustrates how recruitment and assistance unfold in social virtual reality. Using conversation analysis, the study examines audio-visual data of peer interaction on the social VR platform Rec Room. Novice users' actions are examined as they familiarise themselves with the virtual environment and seek assistance from their peers. The findings show that participants orient to explicit requests as recruitment and respond to them with advice, whereas embodied trouble displays do not elicit assistance from the recipient. In turn, the examined advice turns show how participants avoid taking an expert position, and their turns are framed as suggestions. Recruitment and assistance make visible asymmetries of access to virtual and physical interactional resources and different perspectives in social VR.

Keywords: assistance, conversation analysis, fragmented interaction, recruitment, social virtual reality

1. Introduction

Social virtual realities (SVR) are increasingly popular platforms for interaction. As these environments constantly attract new users, examining novices familiarising themselves with them provides a perspicuous setting for understanding how emerging problems in progressing ongoing activities are attended to and solved (Locher et al., 2015; see also Piirainen-Marsh & Olbertz-Siitonen, 2024). The instances of trouble in progressing joint activities in SVR can become visible specifically when using hand-held controllers, which are necessary for navigating and performing actions in SVR. In this study, we focus on moments where participants attempt to use the controllers to pick up or drop objects and move individual fingers on the avatars' hands.

Previous research from co-located interaction settings has shown that when the trouble concerns physical objects, the trouble source is typically accessible to co-participants (see e.g., Lindwall & Ekström, 2012). In SVR, participants inhabit a shared virtual space with their avatar characters, but they still do not necessarily have shared access to the same resources at the same time. For example, the appearance of interactional resources, such as gestures, can vary between the one producing an action and the one receiving it (see e.g., Hindmarsh et al., 2006; Kohonen-Aho & Haddington, 2023; Spets, 2023a). In general, interaction in SVR can be considered *asymmetrical* or *fractured*, as participants have varying levels of access to each other's bodily conduct as well as to the objects and the surrounding space, both in the VR and in their physical locations (see e.g., Heath & Luff, 1992; Luff et al., 2003, see also Hindmarsh et al., 2006).

This study investigates participants' attempts in solving emerging instances of trouble together, using methods of recruitment and assistance. The concept of recruitment, as originally developed by Kendrick and Drew (2016), refer to participants' linguistic and embodied ways of seeking assistance and the ways in which others could recognise and respond to their needs. We use the terms recruitment and assistance to index two separate actions because we wished to examine both in detail. We have also extended our focus outside recruitment, as advice can occur in various contexts (see Couper-Kuhlen & Thompson, 2022).

Our collection includes sequences which are initiated by requests for assistance or trouble displays (Kendrick & Drew, 2016) and followed by different types of assistance (see e.g., Couper-Kuhlen & Thompson, 2022; Kendrick, 2021). By examining participants' actions, the study shows how recruitment and assistance are built multimodally by participants in SVR where they orient to both their physical and virtual bodies. Our findings show, first, that participants respond to explicit requests with advice whereas embodied trouble displays do not elicit assistance. Second, the examined advice turns show how participants orient to one another as peers who collaboratively explore the SVR space and thus avoid taking an expert position and rather frame their advice as suggestions. Finally, the analysis reveals how participants orient to having a

shared access to both physical and virtual resources when giving advice and solving problems, although they in fact had asymmetric access to them. Overall, this study contributes to our understanding of how the fractured ecology of SVR affects participants' orientation to help-seeking and formulation of advice, and how novice participants jointly explore virtual environments.

2. On Recruitment and Assistance in Interaction

Recruitment and assistance are a ubiquitous part of human sociality (Kendrick & Drew, 2016). Our everyday lives have us rely on others to help accomplish tasks and overcome trouble. As with any new technology, familiarizing oneself with SVR will include a period of learning about the affordances of the platform. During joint exploration, novice users can recruit their co-participants to assist them. However, neither the trouble source nor the resources used to assist are necessarily accessible to all participants in SVR (see e.g., Luff et al., 2003). This study aims to illustrate how participants recruit assistance from each other when they encounter difficulties in performing actions in SVR with hand-held controllers, and how others respond to such recruitment.

Recruitment refers to the ways in which "Others are recruited to help resolve difficulties" (Kendrick & Drew, 2016, p. 15). The methods of recruitment can range from largely verbal, explicit seeking or solicitation of assistance to reports and displays of difficulties (Kendrick & Drew, 2016). Others can also anticipate difficulties and act to pre-empt them. Difficulties can be displayed in various ways from explicit reports to more general alerts of trouble, such as interjections, that do not inform the recipient(s) of the exact problem. Embodied displays of trouble are used as well, such as through gaze (Mlynář, 2023; Vänttinen, 2022), or visible searches of the environment (Drew & Kendrick, 2018). All these methods make trouble recognisable. The form of the recruitment has an influence on the response. For example, verbal, explicit recruitment obligates the recipient to assist (Kendrick & Drew, 2016).

Embodied displays of trouble can escalate and become more exaggerated as the trouble continues (Kendrick, 2021). The trouble and the ways in which one displays and resolves it, in general, draw the attention of co-present others. This monitoring, including of embodied displays of others, precedes other methods of assistance and projects assistance as a possible next action. It has been found that in some contexts, such as doing handicrafts (Lindwall & Ekström, 2012) and driving (Rauniomaa et al., 2018), co-presence can enable participants to design instructions (and by extension, assistance) based on others' actions. In these cases, joint access to a situation and each other's actions allows for close monitoring and intervention, including specifying the instructions, parsing and correcting, for example (Tuncer et al., 2021). Parsing refers to dividing a complex action into smaller, recognisable steps that lead to accomplishing said action (see e.g., Rauniomaa et al., 2018).

In technology-mediated settings, the way in which the interactional environment is shared, varies. This is reflected in the methods of recruitment available to the participants. For example, Boudouraki et al. (2021) found that participants using mobile telepresence robots used implicit recruitment methods and highlighted obstacles to recruitment emerging from communicative asymmetries. Gudmundsen's (2023) study of L2 interaction in an online language café examined how recruitment methods were conventionalised and fine-tuned over time. The participants built their context-specific interactional competence as they figured out how to interact in the video-mediated setting. Hansen (2022) examined interpreters' embodied displays of trouble in a video-mediated environment. The study showed that complex spatial and audiovisual settings can feature embodied trouble displays that elicit responses. However, they were often not oriented to as recruitment and were either abandoned or followed by more explicit recruitment.

Assistance is one of the ways of responding to recruitment. It is an interactional outcome that can be achieved through different actions. One such action in relation to assistance is *advice-giving* (see e.g., Couper-Kuhlen & Thompson, 2022). Advice does not always occur in response to recruitment specifically. It can also occur either as a response to a troubles-telling (or similar), as a first position action, or embedded in another activity (see e.g., Couper-Kuhlen & Thompson, 2022; Shaw et al., 2015; Vehviläinen, 2012). Advice refers to naming a future action for the other participant(s) to carry out in order to solve the indicated trouble (see Heritage & Sefi, 1992). In some cases, the advice can be formulated as a suggestion. In Couper-Kuhlen & Thompson (2022), advice-giving sequences are described to have three parts:

A: complaint or troubles-telling turn or turns

B: advice-giving turn

A: response to advice-giving turn

If a turn is followed by advice, it shows that the recipient orients to the turn as making advice-giving a relevant next action. While the study of Couper-Kuhlen and Thompson (2022) features instances where the first position turn is not (necessarily) seeking assistance, our data features instances where the first position turns are used to seek help or display trouble.

Previous research has focused on advice-giving that has not been explicitly requested. For example, in such situations, advice can be resisted due to epistemic asymmetry (see e.g., Bademkorkmaz et al., 2022; Butler et al., 2010; Heritage & Lindström, 2012). Advice-giving has been studied more in institutional settings than in informal settings (see e.g., Dalmaijer et al., 2023; Heritage & Lindström, 2012; Heritage & Sefi, 1992). Institutional settings often feature, even highlight, asymmetric relations between the participants, as is the case in supervision, or professional-client interaction (see e.g., Bademkorkmaz et al., 2022; Vehviläinen, 2012; Waring, 2015). Even in informal advice-giving settings,

asymmetries can arise from social roles, for example, giving one participant a greater deontic status (see e.g., Shaw & Hepburn; 2013; Shaw et al., 2015; Piirainen-Marsh & Olbertz-Siitonen, 2024). In our study, the participants advising one another are peers, as they are both novices with no clear greater status a priori.

In face-to-face situations, the advice-giver or instructor can tailor their demonstration in the moment, as both the recipients' orientations and the instructor's own manual actions are publicly available (Lindwall & Ekström, 2012). It has been shown that in settings where one participant is alone in a virtual reality game environment and another with them in the same physical space, participants can deploy different embodied practices and fit them to the different realities (physical and virtual) in situ (Olbertz-Siitonen & Piirainen-Marsh, 2023; Piirainen-Marsh & Olbertz-Siitonen, 2024). While advice giving has been examined in technology-mediated settings, including one where advice is given to a participant playing a virtual reality game alone (ibid.), there is a gap concerning advice-giving in a setting including multiple participants interacting in social VR settings together, including symmetric epistemic status between these participants.

3. Context: Social Virtual Reality

This study is concerned with co-present, real-time interaction in social virtual reality. Virtual reality (VR) refers to three-dimensional graphical environments that provide an immersive experience for the users as being surrounded by or inhabiting that environment. Users often interact in VR with virtual characters called avatars. An avatar provides a body for its user to move and gesture as well as to touch and grab virtual objects and other features in the environment. The users have a first-person perspective to their avatar body and the surrounding environment, meaning that they see through the avatar's eyes.

VR is used with motion capture technology that detects the user's head, body and hand movements from a head-mounted display (HMD) and hand-held controllers. Thus, one's physical body movements, such as turning around or waving a hand, translate to avatar movements in real time. In most of the current VR environments, the micro-details of users' embodied actions, such as the full trajectories or details of gestures, do not yet translate to the avatars. Through motion capture technology, VR provides the users a high sense of presence as a perception of being inside the virtual space (Slater, 2018).

Social virtual reality (SVR) refers to such VR spaces that are specifically designed for real-time interaction between multiple users (McVeigh-Schultz et al., 2018). In SVR, users can participate in various social activities such as playing games, watching movies, or participating in events together. In addition to the avatar body, users can interact in SVRs via chat and audio connection.

The emerging research on the practices of interaction in SVRs has examined, for example, how participants work towards a shared understanding in situations where the fragmented nature of interaction in VR presents challenges for them, and how the avatar bodies and their embodied resources are drawn on (e.g., Haddington et al., 2023; Klowait, 2023; Kohonen-aho & Haddington, 2023; Spets, 2023a; Spets, 2023b). Further, findings in Spets (2023b) and Kohonen-Aho & Haddington (2023) reveal that as the participants exist in two environments at the same time when they are in VR – the virtual and the physical – it may have consequences for the coordination and intelligibility of action. Especially the users' physical bodies are not accessible to their co-participants, even though they are relied on during action formation (Kohonen-aho & Haddington, 2023). In addition, some visual features in the VR environment might not be shared between the participants due to choices related to VR design: some action trajectories or resources are visible only to the user themselves (e.g., when a user opens a menu in VR, it is not visible to co-participants). These *fractured ecologies* (Luff et al., 2003) are further examined in the current study, by focusing on how the participants navigate between the virtual and the physical resources to find out which of them, and in what way, can be utilised for recruitment and advice giving.

The research materials for the current study are collected in Rec Room[1], which is one of the most popular SVR platforms. In Rec Room, the users can freely interact in a virtual space that represents a recreation centre, both with other users who participate from all around the world as well as with various objects laying around in the space. The users can also take part in social gaming activities, such as Paintball, Disc Golf, and 3D Charades and create their own rooms to for example organize different social activities. The avatars in Rec Room have a partial body that includes a head, an upper body and two hands.

The use of the physical hand-held controllers is central for interacting in the Rec Room virtual space. The controllers enable the use of one's virtual hands to interact with and in the virtual environment, and perform gestures and actions such as pointing, grabbing and moving objects. The controllers are also used when moving with the avatar. The most common way to move in Rec Room is to use a teleportation feature; the controller is used to select a spot in the environment within the user's field of vision and then to move to this selected spot. The user can also select different areas and game rooms in Rec Room's user menu to move into them. In addition to using the controllers, the users can move their physical body to walk and turn within a small area defined in the physical room. The boundaries of the physical area are set in the VR environment, and a virtual boundary (a blue grid) emerges in front of the user if they are about to collide into a physical wall or object.

The Rec Room activity that is explored in this study is 3D Charades, a word explanation game for 2-8 players. In 3D Charades, players take turns in being an

[1] www.recroom.com

‘explainer’ who stands on a stage, picks up a word card from a box, discards the card, and then explains the word to the ‘guesser(s)’ who are situated in the audience. The controller needs to be used to pick up and discard the card. The explainer also uses one of their controllers as a 3D ‘maker pen’ with which they can draw the word as a 3D shape to the environment. The participants in our data accompanied their drawing also with verbal explanations. Once the players are selected and the game begins, the game automatically moves the players one by one on the stage as explainers and the pen appears in the explainer’s hand. The rest of the players remain in the audience. The explainer picks up a card from the box and then attempts to draw/explain it to the guessers before time runs out. The explainer can also discard the card and pick up a new one. When the explainer’s game time runs out, the explainer automatically changes.

4. Data Collection and Methods

The research materials used in this study were collected in two parts in 2021 and 2022. All participants gave their informed consent to being video recorded for research purposes. The participants were given the possibility to withdraw their consent to participate anytime during the data collection. The participants’ personal information has been pseudonymised in the transcripts and other representations made of the video data.

Dataset 1 was collected in 2021 as part of a research project *Remote Research and Collaboration Using VR and 360° Video*, which explored new ways of collecting, analysing, transcribing and viewing 360-degree video data. It comprises video data from two pairs interacting in Finnish in Rec Room. Pair 1 one consists of Jari and Aapo, and Pair 2 of Leo and Onni. Jari and Aapo interacted in Rec Room for an hour, 18 minutes of which they played 3D Charades. As for Leo and Onni, they were in Rec Room for an hour, 28 minutes of which they played 3D Charades. These two pairs used Meta Quest 2 controllers and HMDs to interact in SVR.

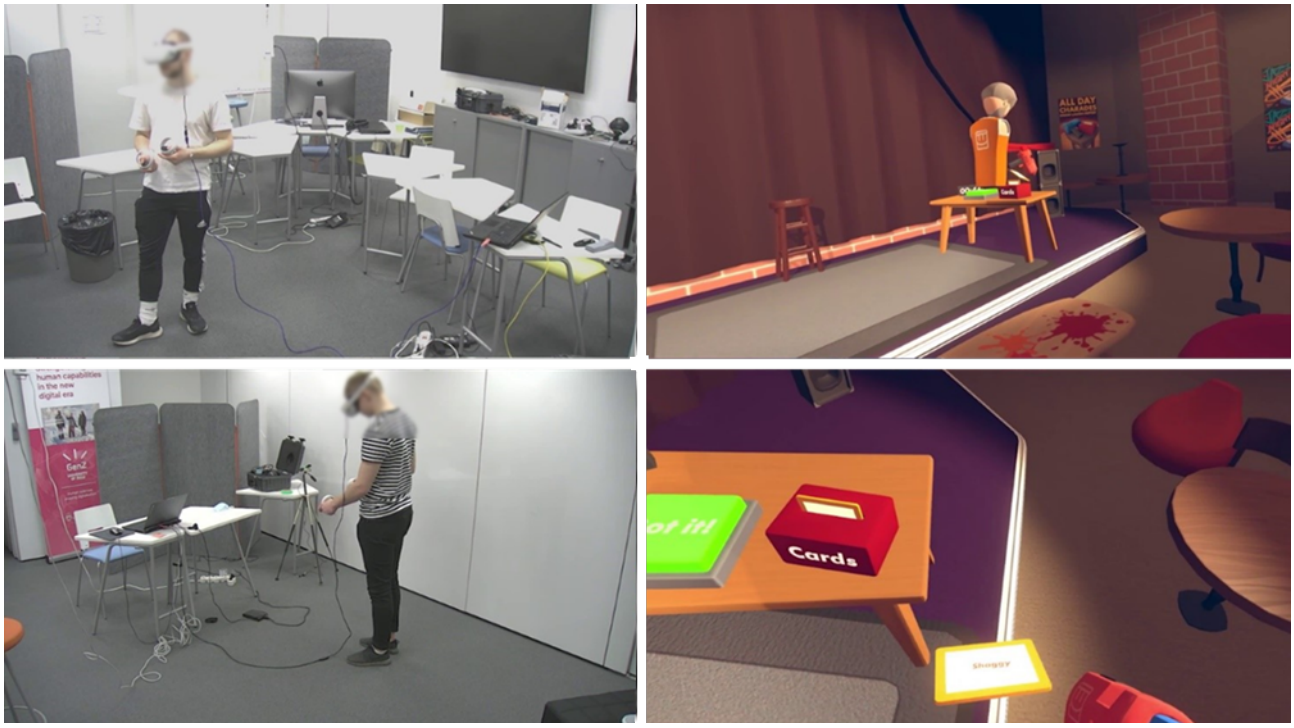
Dataset 2 was collected in 2022 as part of a university course on interaction analysis. The students in the course recruited two volunteers who were not students in the course. These participants are referred to as Pair 3 and called Ann and Sam. They interacted in Rec Room for an hour and 20 minutes, 25 minutes of which they played 3D Charades. The participants spoke English as a lingua franca, and used HTC Vive Focus 3 HMD and controllers during their interaction.

Both data collection events can be described as ‘quasi-experiments’, meaning that they were organized for research purposes (Due, 2015; Kendrick, 2017). Despite being invited to a laboratory setting, the participants were not instructed to interact or behave in particular ways when exploring Rec Room and its different activities. Thus, their interaction unfolded naturally inside the given

context. Interaction research benefits from quasi-experiments as they allow the simulation of, for example, group work and collaboration in novel environments, such as SVR, potentially revealing new aspects of social interaction (Kendrick, 2017).

In both datasets, the participants were physically situated in two adjacent rooms, so that they would see and hear one another only in Rec Room. All participants' perspectives to Rec Room were screen recorded through their HMDs. Additionally, video cameras recorded the participants' bodily conduct and talk in their physical environments. Both datasets contain four videos per pair, i.e., both participant's screen recordings from SVR and a recording of both participants in their separate physical environments. Figure 1 illustrates these four video recordings in dataset 1.

Figure 1. *Recordings of Pair 1 in dataset 1. Above: Jari in his physical environment and in SV R (gazing at Aapo's avatar). Below: Aapo in his physical environment and in SVR (gazing down at a card; his own avatar body is not visible).*



We use multimodal conversation analysis (CA) as a method (Sacks et al., 1974; Goodwin, 2018; Mondada, 2014, 2016). It allows us to examine how participants jointly advance their interaction, drawing on verbal and embodied resources, timing and sequential position of their turns (see Sacks, 1992; Schegloff, 2007). This involves attending to participants' orientation to the progressivity of interaction, moment-by-moment (Schegloff, 2007). Multimodal CA provides a

detailed understanding of how participants aim to produce and ascribe actions in an interactional setting where especially the embodied and material resources that they can rely on differ from ones in face-to-face interaction, such as SVR (see e.g., Arminen et al., 2016). As the participants also have varying access to each other's conduct in SVR, multimodal CA can reveal participants' orientations to each other, their conduct and the virtual environment (see e.g., Klowait, 2023; Klowait & Erofeeva, 2023; Kohonen-aho & Haddington, 2023).

The analysis focuses on the methods of recruitment and assistance that emerge after the participants encounter trouble with the controllers in relation to picking up or discarding a card during a 3D Charades game. In addition, the analysis contains one instance that occurs between the game rounds but where similarly to the instances that occur during a game round, the recruitment concerns performing a specific action with the controller. The collection includes altogether eight episodes; two episodes from Dataset 1 (one from Pair 1 and one from Pair 2) and six episodes from Dataset 2. The length of these episodes ranges from 20 seconds to one and a half minutes. The eight episodes include altogether 12 turns seeking help and 19 cases of advice giving as responses to them.

The episodes in the collection have been transcribed using the conversation analytic conventions for talk and audible utterances (Jefferson, 2004) and for multimodality (Mondada, 2018, 2022). This study uses the transcript made from the perspective of the participant that offers assistance (i.e., the advice-giver) as it provides a better view to see how the participant with trouble tries to solve it with the help of the advice. The transcript is supplemented with screen captures from the help-seeker's perspective, as needed, to illustrate the differences in what the participants can see.

5. Analysis: The Characteristics of Assistance in Response to Recruitment in Social VR

The analysis is divided into three sections that describe aspects of recruitment and assistance that occur repeatedly in the collection. The first section shows how verbal recruitment is required to secure assistance in SVR. The second section illustrates how participants give advice among peers and collaboratively explore the SVR space. The final section describes challenges related to asymmetry of access and different perspectives during advice giving. The analysis will feature partially the same episodes from Pair 1 and Pair 3. However, these will be used to illustrate different phenomena.

The collection includes instances where participants have trouble with picking up and releasing virtual objects as well as moving the avatar's hands and fingers. All these instances of trouble concern being able to use the physical hand-held controllers in appropriate ways. In these data, the advice includes descriptions

of the features of the controllers and what to do with them, as well as descriptions of virtual features and actions, in relation to solving the trouble that assistance is recruited for.

5.1. Verbal recruitment is required to secure assistance in social VR

In this section, it is shown how participants draw on different communicative resources in recruiting assistance, and how explicit recruitment is preceded by embodied or verbal expressions of trouble. In some game and co-operative contexts, it has been found that the participants orient to talk as a reliable, mutually accessible resource (Davidsen et al., 2022; Olbertz-Siitonen & Piirainen-Marsh, 2023; Paulsen et al., 2022; Spets, 2023a). The following extracts support this observation by illustrating how explicit recruitment, here a request for assistance, is required to mobilise a co-participant into assisting. Embodied trouble displays and implicit recruitment (examples of both, including repeated attempts at doing something) are not oriented to as recruitment by the recipient. Explicit recruitment creates a normative obligation to assist, whereas implicit recruitment and trouble displays provide an opportunity to do so (Kendrick & Drew, 2016).

The first extract illustrates how an embodied trouble display does not typically lead into assistance, and an explicit recruitment turn is required. In the extract, the explainer is just changing from Jari to Aapo. Aapo has been picking up cards from a box, discarding them when he does not know the word or cannot explain or draw them. The cards contain words that the players should draw and explain to their co-participants.

Extract 1. *How does one remove these (Pair 1, Jari's perspective)*

```
01          *(1.0)       *(3.1)
   aapo     *takes a card*

02 AAPO:    ei mää oisin kyllä osannu (.) piirtää ton yhen?
            no I could've been able to draw that one

03 AAPO:    mut se meni jo.
            but it's gone already

04          *(1.0)
   aapo     *shakes hand ((tries to discard the card))-->

05 JARI:    @joo@ se katos *#tonne-
            yeah, it disappeared there-
                        -->*shaking intensifies-->>
   fig                      #fig1a

06 AAPO:    miten nää saa po:is kädestä.
            how do you remove these from your hand
```

Figure 1a. Aapo shakes the card in his hand (left: Jari's view to Aapo in VR, middle: Aapo's view in VR, right: Aapo in his physical environment.

```
07              (1.2)
08 JARI:        ↑mmm,
09              (0.4)
10 JARI:        ↑kokkeileppa tati:-
                 try that analog sti-
```

Right before the extract begins, Aapo has successfully dropped a card and taken a new one. He backtracks, however, and says *hei mää oisin kyllä osannu piirtää tuon yhen* ("could've drawn that one") (l. 2). He then tries to drop his current card unsuccessfully: Aapo displays his trouble in using the controller by shaking his hand to remove a card (l. 4 onwards, fig. 1a). As the hand shaking intensifies, it also becomes visible in his avatar character, further highlighting his trouble and increasing its conspicuousness (see e.g., Kendrick, 2021). However, Jari does not orient to this embodied trouble display as recruitment, and he does not respond by offering advice. Aapo's first explicit request for assistance occurs on line 6 where he says *miten nää saa po:is kädestä* ("how does one remove these from one's hand"). He is asking for Jari's assistance to figure out how to drop a card, one of the central actions to progress the word explanation activity, which is now suspended due to the trouble. While Aapo does not mention Jari directly, several features of the turn increase response relevance, such as interrogative syntax, participant configuration (the recipient cannot turn away from the speaker), and its connection to the ongoing activity (Keevallik, 2018; Stivers & Rossano, 2010). Now, Jari responds by starting to give advice to Aapo. He suggests a possible course of action with his controller (l. 10). Jari's advice is examined more closely in Extract 5.

This first extract showed how implicit, embodied trouble displays did not mobilise the other to provide assistance, but an explicit question was needed to elicit advice. The next extract illustrates how verbal trouble displays are also not typically oriented to as recruitment in this data. Before this extract, Ann and Sam (Pair 3) have had trouble with picking up cards from the box and have been coming up with the words to explain themselves. However, suddenly Ann succeeds in picking up a card. Extract 2 begins a series of episodes during

which Sam continues to have trouble with picking up the card. Thus, the participants return to the same trouble at different points during the activity (i.e., during Sam's explanation turns in the game).

At the beginning of Extract 2, Sam's verbal turns indicate that he has trouble completing the card picking action. While Ann does respond to Sam's trouble indications in various ways, she does not orient to Sam's turns as requests for assistance until an explicit recruitment is heard.

Extract 2. *Can I move there? (Pair 3, Ann's perspective)*

```
01 SAM:     ok(h)ay +#come on
   sam              +reaches and grabs twd card-->
   fig               #fig2a
```

Figure 2a. Sam reaches and grabs towards the card (left: Ann's view, right: Sam's view).

```
02          (0.6)
03 ANN:     hhh
04          +(0.8)
   sam   -->+moves closer to the table, reaches-->

05 SAM:     please.
06 ANN:     kjeh ihhihhihhihhh ((bursts into laughter))
07 SAM:     kjehh HEHH EHHHHEHHH ((bursts into laughter)) I can do it.
08 ANN:     k(h)k(h)k(h)k(h)
09 SAM:     hhh no:+
   sam          -->+

10 ANN:     k(h)k(h)k(h)
11          .hhh
12 SAM:     can I move there?
13          (0.6)
14 ANN:     ah heh heh [can I  ] move +there
15 SAM:                [closer?]
                                    +reaches card with left hand-->
16          (1.2)
17 SAM:     oh my lord
18          (0.6)
19 ANN:     .hh ij:: ih ih ih ih ((giggly laughter))
20          (0.9)
```

```
21 ANN:     .hh
22 SAM:     (--) (.) oh my lord.
23          (0.5)
24 ANN:     j(h)ust #(h)ry to [reach it. +]
25 SAM:                       [I cannot   ] grab- hh.
   sam                              -->+

((omitted, see transcription in Extract 4))

32 SAM:     +how did you do it? (.) eh heh heh heh [heh.]
   sam      +reaches with left hand, grabbing movement-->>
33 ANN:                                           [I   ]
34          I just t(h)ri::ed to reach with my hand, .hhh
```

Sam's failed attempts at grabbing a card display his trouble in doing a central task for the word explanation activity (ll. 1-9, 15-25, Fig 2a). Sam goes on to use several ways to make his trouble visible to Ann, including pleading and laughing (ll. 5 & 7). He also uses several trouble alerts (no, l. 9). Both participants display a relaxed orientation to the situation via laughter (ll. 10-14). Sam asks if he could move closer to the table with the box (*can I move there?,* l. 12). It can be either understood as the first recruitment from Sam, but as it is not explicitly directed at Ann, it can also be interpreted as self-talk (Keevallik, 2018). Ann displays her orientation to Sam's question as not doing recruitment but something else, something laughable, by repeating Sam's question with a smiley voice (l. 14).

Ann's first response that orients to Sam having trouble is delayed advice, and it occurs on line 24 (*j(h)ust t(h)ry to reach it*). It is a directive that occurs without Sam explicitly requesting help. The last two words are produced in overlap with the first two words of Sam's *I cannot grab*- (l. 25, cut off at the end). Ann's turn is also produced through laughter. Her response is a directive that seems to orient to Sam being too far away to be able to reach the card (see Fig 2a). Thus, it does not align with Sam's report (inability to grab), as reaching and grabbing are two different actions. In essence, Ann's turn works as a response to seeing Sam being far away from the card, and not as a response to Sam's trouble alerts.

On line 32, Sam explicitly recruits Ann's assistance by asking *how did you do it* as he continues to reach and grab with his left hand. This elicits advice from Ann: *I just t(h)ri::ed to reach with my hand* (l. 33-34). It is a reformulation of her earlier advice turn, made to match Sam's turn, and can therefore be constituted as another advice turn.

This section has illustrated how participants recruit others' assistance through producing explicit requests for advice. The requests for assistance relate to progressing the activity, chiefly the use of the controllers in doing so, and the activity is suspended until the participants solve the trouble. The extracts also showed that co-participants do not orient to embodied trouble displays or verbalised trouble alerts as recruitment.

5.2. Advice giving among peers in social VR: collaborative explorations

In this section, it is shown how participants display their level of expertise and their hesitance when giving advice. As all participants are novice users, the advice-giving occurs between peers. The SVR environment is something they have yet to familiarise themselves with, and as they are exploring and navigating in it together, they also try to reach a solution to the instances of trouble they face together. The extracts show their growing expertise and familiarity with the environment and its features, while they visibly experiment with and explore the different functions of the controllers.

In the following Extract 3, Onni and Leo try to figure out how to control their avatars' fingers. Onni requests assistance twice, and Leo responds to both instances with varying degrees of certainty, illustrating his increasing expertise throughout the segment. The participants jointly explore the controls as peers without either of them taking an expert position.

Before the extract, Leo and Onni have just completed a round of 3D Charades and are now roaming freely in the 3D Charades space. Leo has played with the jukebox in the corner of the room, and the two are dancing, fooling around, and laughing. The extract begins when Onni asks Leo how he is moving his fingers after noticing him making a dance move with his right arm and an extended forefinger. Whereas the default hand position in Rec Room is all fingers extended, Leo now has only his right forefinger extended with the rest of the fingers curled (l. 1, Fig. 3a).

Extract 3. *Finger up (Pair 2, Leo's perspective)*

```
01 LEO:      .hhh #e he he he he he
   fig            #fig3a
```

Figure 3a. Leo's right forefinger is pointing, his left hand is in default position (Onni's view to Leo).

```
02 ONNI:  [mi- hei miten nä saa]t-
           ho- hey how do you get-
```

```
03 LEO:    [he he he tsk         ]

04 ONNI:   mite nä saat [tollee] sor:men pys*tyy#.
           how do you get your finger up like that.
05 LEO:                 [hhh    ]
   leo                                    *lifts hand, forefinger up
   fig                                        #fig3b
```

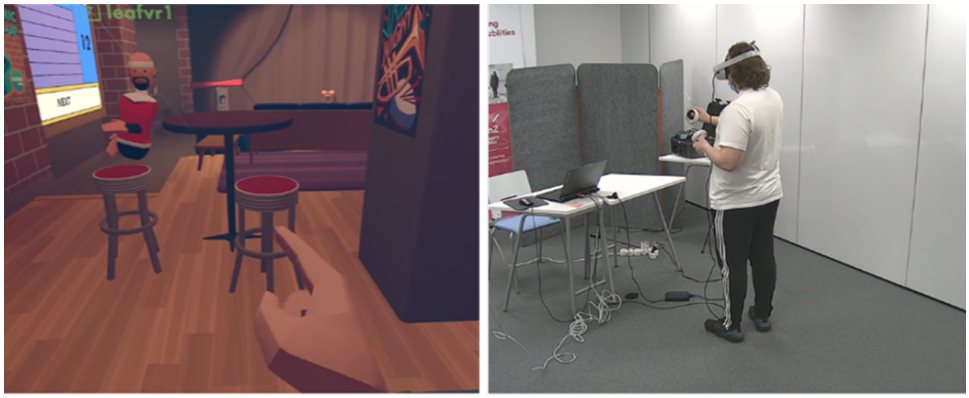


Figure 3b. Leo lifts his right hand and gazes at it, forefinger is up (left: Leo's view in VR, right: Leo in his physical environment).

```
06         *+hh
   leo     *gaze down twd hands-->1.15
            +rotates controller-->

07         (0.4)
08 LEO:    e(h)n mää tiiä,
           I don't know

09         tää on-+ mää en tiiä (.) painanko mää-
           this is- I don't know if I press-
               -->+

10         oonko mää +painanu jotaki [mutta,    ]
           have I pressed something but,
                     +rotates both controllers-->
11 GAME:                              [press the] start button on

12           the [scoreboard to play. ]
13 ONNI:         [meikällä vissii joku] lapanen käessä ku ei (.) pysty.
                  I probably have some mitten on because I can't

14 LEO:      >muttaku en< mää pysty ees laittaan tätä +kättä
            but I can't even put this {right} hand
                                                    -->+
15          nyrkkiin tällä °hetkellä°.*
            into a fist right now
                                    -->*
16          (0.2)
17 LEO:     .hhh

((lines omitted: both participants explore their controllers))

   leo       >>gazes away
30 ONNI:     tsk kato,*
             look
   leo                 *gaze twd Onni-->
```

```
31          (0.8)*(0.4)
              -->*

32 ONNI:    [^meikä sai #peukalon.]
             I got a thumb
             ^thumb up-->1.40
33 LEO:     [(                 )  ]
   fig                  #fig3c
```

Figure 3c. Onni's thumb is up (Leo's view to Onni).

```
34          (0.2)
35 LEO:     nonih:↑. hhh
            alright

36          (0.9)
37 LEO:     mitehä tuo teh°hää°. oho?
            how does one do that oh

38          (1.0)*(1.2)
   leo           *left finger appears and disappears once

39 LEO:    .hh hei nyt mei*kä tietää, pittää↑ ↑painaa (0.4) tästä (.)
               hey now I know, you must press this
                          *R finger appears/disappears svrl times-->

40         ylemmästä (0.4) napista täsä^ kämmenesä.*
           upper button on this palm
   onni                              -->^
   leo                                      -->*
41         (0.4)
42 LEO:     .hh
43         (2.0)
44 ONNI:   AA *joo.
           OH yeah
              *lifts left forefinger
```

Leo continues laughing into Onni's first recruitment turn *hei miten nä saat- mite nä saat tollee sormen pystyy* ("hey how do you get- how do you get your finger up like that") (ll. 2, 4). Having noticed that Leo has his right forefinger extended with the rest of his fingers curled (see Fig. 3a), Onni asks Leo's advice on the use of the controllers, thereby mobilising Leo to assist him. Towards the end of the recruitment, Leo turns his gaze towards his own virtual hand and lifts his right hand up, which shows orientation to the relevant next action, his advice (l. 5, fig. 3b). During a brief pause that ensues, Leo also starts to rotate the right controller

(ll. 6-9). He then moves to rotate both controllers (ll. 10-14). Leo's verbal response to Onni's recruitment ("I don't know, this is- I don't know if I press- have I pressed something but", ll. 8-10) is hesitant, explicitly stating he does not know or have expertise in this matter. The turn includes a potential solution for doing the action of lifting one finger while curling the others, by having pressed some button (l. 10). Eventually Leo manages to make a fist with his left hand (during line 13), but not with his right hand, as indicated also by his verbal turn on lines 14-15 ("but I can't even make this right hand into a fist right now").

Onni displays his trouble following the offered advice, by naming a possible trouble source of a "mitten in hand" preventing the use of the forefinger (l. 13). Leo responds with his own trouble display, further displaying his lack of expertise and the incompleteness of his exploration (ll. 14-15). Thereby Leo also frames the pointing finger as an accidental move, as he complains he cannot even curl his fingers into a fist at that time.

After some further joint exploration of the use of the controllers (omitted from transcript), Onni draws Leo's attention via a noticing, *kato* ('look') (Siitonen et al., 2019) (l. 30, fig. 3c): Onni has managed to make a thumbs up gesture with both his hands. It does not yet solve the original problem of how to get the forefinger up, however. Leo responds by orienting to Onni's success and him finding another new avatar hand feature (l. 35). Leo's gaze is lowered, aimed at an open menu, as he says "how does one do that" (l. 37) in a lowered voice with falling intonation that can be interpreted as self-talk (Keevallik, 2018). The turn also projects a longer pause where he explores his controllers, something that is not accessible to the other participant. During the turn, Leo manages to do something unexpected with his controller, as indicated by *oho* (l. 37): a menu appears and disappears in his field of vision. Leo then tries different buttons on his left-hand controller and eventually figures out which button moves the forefinger. Now, Leo displays his new-found expertise by describing the location of the correct button on the controller (ll. 39-40). Leo refers to their physical bodies and controllers in order to do give the instruction, indicating that there is a button near one's palm that makes the pointing gesture (l. 40). He also demonstrates the use of the button at the same time as the forefinger appears and disappears multiple times during the instruction. Based on the detailed instruction, Onni is now able to follow it and to lift the forefinger (l. 44). The extract shows how the 3D Charades game is suspended due to the exploration of avatars' hand features, although the game prompts Onni and Leo to continue (l. 11-12).

Next, Extract 4 returns to Pair 3 and Ann's advice turns after Sam's first recruitment *can I move there* (see line 12 in Extract 2). In contrast to Extract 3 where the advice-givers' expertise increases as a result of exploring the use of the controller, here Ann downgrades her expertise as an advice-giver throughout her turns as the extract proceeds.

Extract 4. *How did you do it (Pair 3, Ann's perspective)*

```
   >>Sam reaches towards the card with left hand-->
24 ANN:     j(h)ust *#t(h)ry to [reach it.    *]
                    *hand gesture ((reaching))*
   fig               #fig4a
25 SAM:                        [I +cannot     ] grab- hh.
   sam                         -->+
```

Figure 4a. Sam reaches towards a card. Ann makes a reaching gesture (Ann's view).

```
26          (1.3)
27 ANN:     and now I'm t(h)alking, ehh. I didn't [get] it(h) eith(h)er?
28 SAM:                                          [thh]
29          (1.4)
30 ANN:     .hh
31          +(0.9)
   sam      +reaches twd card with left hand-->

32 SAM:     +how did you do it? (.) eh heh heh heh [heh.]
33 ANN:                                            [I   ]
   sam   -->+reaching continues, grabbing movement with left hand-->

34 ANN:     I just t(h)ri::ed  [to reach with my #hand, .hhh    ]
35 SAM:                        [look (.) I can- I can do do this]
   fig                                          #fig4b
```

Figure 4b. Sam reaches and makes a grabbing movement with his left hand (Ann's view to Sam).

```
36 SAM:     [with my hand, so why can I not  ]
37 ANN:     [and then I think I pressed  like] [2one butto     2]n.
38 SAM:                                        [2take it away+.2]
   sam                                                    -->+

39 ANN:     but I don't know which one it [was]
40 SAM:                                   [the button] on the bottom?
41          (0.9)
42 ANN:     maybe that one that you used >for- okay<
```

Before this extract, Sam made trouble alerts (spoken turns such as *no* and *oh my lord*) and eventually recruits assistance with *can I move there* (see Extract 2). Ann responds with a directive and a gesture *(j(h)ust t(h)ry to reach it* l. 24, fig. 4a). Her turn and its formulation implicate that she views the suggested action as a standard or appropriate course of action in this situation (Shaw et al., 2015). Ann's advice here does not orient to needing the controller to pick up the card, but to the physical action of reaching. Ann's turn is followed by a pause (1.3) during which Sam continues his attempts to reach for a card. Sam does not respond to Ann's advice. When Sam does not respond, Ann says *and now I'm t(h)alking, ehhh. I didn't get it(h) eith(h)er?* (l. 27). This turn downgrades the epistemic status of her directive, showing the directive was too strong and her status is not that high. After a while Sam recruits Ann with *how did you do it?* (l. 32), indicating that Ann's response was not sufficient.

Ann's responding advice is a description of what she did on her previous turn as the explainer (*I just t(h)ri::ed to reach with my hand* l. 34). It is in overlap with Sam showing what he can do (l. 35, fig. 4b). It is not specified if Ann means reaching with her physical or her virtual hand, but they would appear to be treated as the same hand. Ann's advice contains no new information for Sam as he has been reaching for the card the whole time. During the rest of the round, Ann attempts to verbalise what she did to pick up a card. She begins to orient to her actions as something that combines physical action with virtual action, i.e. moving her physical hand and pressing a button on her controller to do the virtual action of picking something up. Ann's attempts become less certain as she proceeds, and she shifts from displaying expertise to hesitating and framing her advice as suggestions rather than instructions. Ann downgrades her epistemic stance with the use of *I think* (see Kärkkäinen, 2003) and *and I don't know which one* (ll. 37, 39). In general, her advice overlaps with Sam's trouble displays, explicit recruitment and requests for clarification.

The extracts in this section showed how participants avoid taking an expert position. Their advice is accompanied with delays and hesitation, and it is framed as suggestions. The form of the advice turns can show both as participants' increasing knowledge of the environment resulting from exploration and as downgrades in their epistemic stance resulting from their initial advice as not being helpful.

5.3. Asymmetry of access and different perspectives as challenges in advice giving in social VR

The participants in SVR do not have visual access to their own or their co-participant's physical bodies during interaction, and they have a sensory access only to their own physical bodies, for example the controllers in their hands. In addition, some visible virtual resources for action (e.g., highlighting of key objects) might not be shared between the participants due to choices in SVR design. In this section, it is shown how the advice-givers still orient to both physical resources (i.e., the controllers as well as their own haptic access to buttons and features in them) and visible SVR resources (i.e., visible features in the environment) as being mutually shared as they advise the recruiter. The examined advice-giving turns in Extracts 5-7 highlight two typical challenges in relation to asymmetrical access that the participants face in SVR.

The first challenge (see Extracts 5 and 7) relates to accessing the SVR environment through an HMD, which blocks visual access to one's physical surroundings and objects, such as the physical hand-held controller. Also, the lack of visual access to the co-participant's controllers makes giving advice difficult as one cannot see how the other's hands are positioned or where the buttons are for them. The second challenge (see Extracts 6 and 7) relates to the participants not having a similar access to all the details and resources rendered in the virtual environment either, most notably the virtual objects. This is due to the differences in how a participant can see features in the objects from their own perspective and how they see the same object when it is being manipulated by another user. For example, a green highlight around a word card in 3D Charades becomes visible to the explainer who is about to touch or grab the card but not the co-participants. However, participants act as if there is shared access to such features, and this is visible in the formulation of advice.

Extract 5 illustrates how Jari in Pair 1 orients to different resources in his physical controllers as he gives advice to Aapo. Tactile exploration of the controllers alongside verbal descriptions can be used for creating joint orientation to objects when lacking (shared) visual access (see e.g., Due & Lüchow, 2023).

Extract 5. *How does one remove these (Pair 1, Jari's perspective)*

```
06 AAPO:    miten nää saa po:is kädestä.
            how do you remove these from your hand

07          (1.2)
08 JARI:    ^↑mmm,#^
   jari     ^moves his left thumb on the button in the left controller^
   fig            #fig5a
```

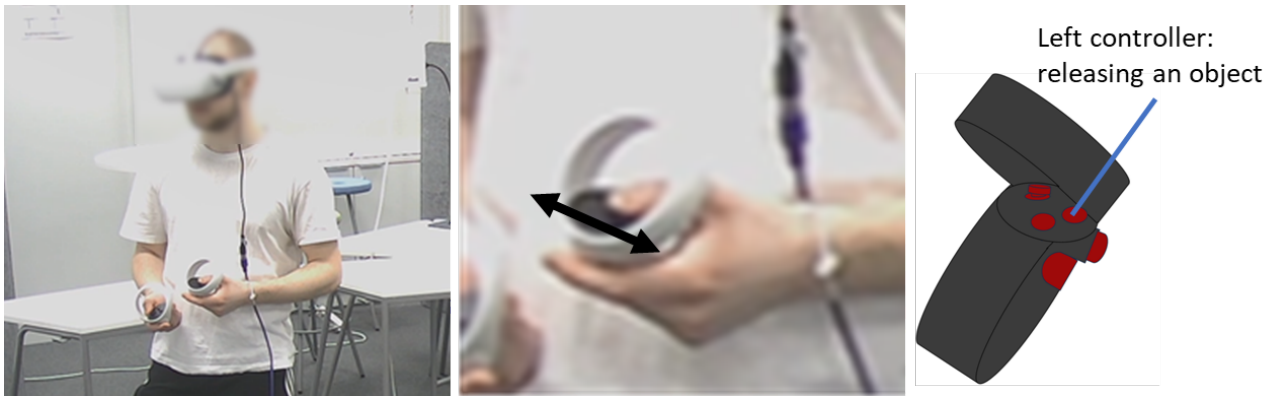


Figure 5a. Left & middle: Jari moves his thumb on the button in the left controller, right: location of object release button in the left controller.

```
09          (0.4)*
   aapo       -->*

10 JARI:    kokkeileppa *tati:-*(0.2)*#sen tati:n (.) *oikeella
                                                    puolella (o)
            try that analog sti- (0.2) on the R side of that analog
                                                          stick i-
   aapo                 *drops the card
                               *catches the card in the air
                                      *drops the card to the floor
                                                    *moves to his L
11 JARI:    (on ehkä näp-)
            (is perhaps a but-)

12          >emmää *tiiä< puottaako niistä.
            I don't know if those will release (it)
   aapo            *takes a new card from the box

13          (0.7)
14 JARI:    tai sitte vaa sillee heivaa sen.
            or then just sort of throw it

15          *(6.5)*
   aapo     *emphasized shakes of his hand, trying to discard the card*

16          *+(4.0)+*
   aapo     *drops and catches card three times*
             +moves around+

17 AAPO:    tsk. (.) ei ↑vit:si.
            tsk. (.) oh man
```

On line 6, Aapo requests assistance from Jari to tell him how to drop the card in his hand (see Extract 1). Before Jari begins giving advice to Aapo, he feels his controller with his thumb (l. 8, fig. 5a). He has no visual access to his controller and has to rely on tactile access and haptic exploration to figure out possible solutions (see e.g., Due & Lüchow, 2023). Jari's first advice is to suggest that Aapo could try a button located on the right side of the analog stick *tatti* (ll. 10-11 *kokeileppa tati:- (0.2) sen tatin oikeella puolella (o)- (on ehkä näp-)*, "try that analog sti- (0.2) on the right side of that analog stick i- (is perhaps a but-)"). The advice features the analog stick, a stick like button on the controller, which he

refers to with the word *tatti* (lit. “penny bun mushroom”). This is a colloquial word for the analog stick which is officially called *sauva* in Finnish. The formulation of Jari’s description shows his orientation to them having similar controllers that they are using with the same hand *sen tatin oikeella puolella* (“on the right side of that analog stick”, l. 10). Only the left controller has the button Jari is referring to on the right side of the stick. The left hand is the one used to interact with the cards, as the right hand is used to hold the maker pen and draw with it. *Niistä* (“with them”, l. 12) refers to the two buttons next to the stick.

After a brief pause (0.7), Jari continues by giving an alternative to his earlier advice *tai sitte vaa sillee heivaa sen* (“or then just sort of throw it”, l. 14). On lines 15-16, Aapo follows Jari’s alternate advice, using more than the controller to discard the card: first his physical wrist, then his arm. Aapo shakes his hand/arm for some time, then laughs and indicates his trouble by airing his frustration *tsk. (.) ei vit:si* (“tsk. (.) oh man”, l. 17). During the following pause, Aapo manages to drop the card and moves on to picking up a new one.

Jari uses parsing (Rauniomaa et al., 2018) as he gives advice, prefacing his advice with *tai sitte* (“or then” l. 14). He also suggests two different resources, as *heivata* (“throw” in this context) refers to a more physical movement than just pressing buttons in a controller, and *koitat nostaa uutta* (“try to pick up a new card”, not included in the extract) is a virtual action. On lines 11-12 Jari does not visibly display having noticed that Aapo has dropped the card successfully. Instead, he continues with his advice. This ‘late’ advice turn could possibly be due to the lag between when one does something and when the other sees them do it.

Extract 6 returns to Pair 3 to show how Ann orients to the differences between what she sees and what Sam sees in the SVR environment. Ann’s focus is on the virtual resources, and she expects Sam to see something specific if he succeeds in following her advice.

Extract 6. *How could you move (Pair 3, Ann's perspective)*

```
43 SAM:      oh no+#
   sam             +reaches with right hand (pen)-->
   fig              #fig6a
```

Figure 6a. Sam reaches towards the card with the right/pen hand (left: Ann's view to Sam, right: Sam's view).

```
44 ANN:     +#(1.9)
   sam   -->+reaches with left hand-->
   fig       #fig6b
```

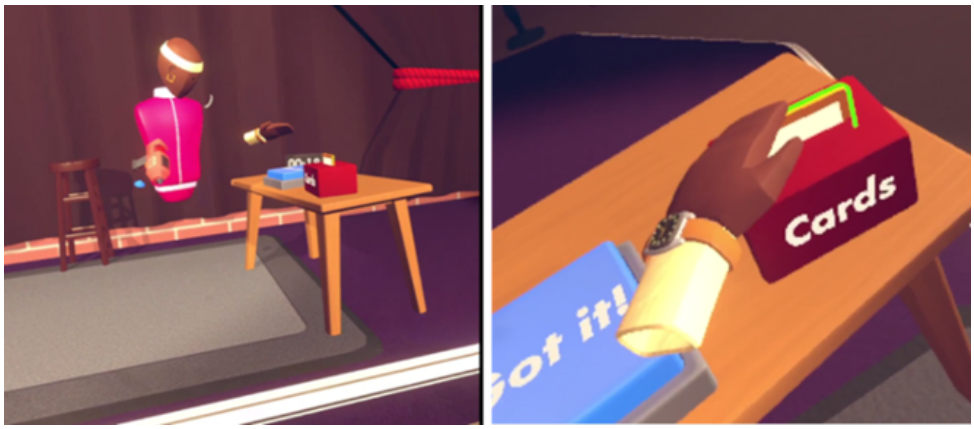


Figure 6b. Sam reaches towards the card with left hand, card edges turn green (left: Ann's view, right: Sam's view, green edges are visible only for Sam).

```
45 SAM:      hhh
46 ANN:      but *just try: to get near to it and then you +gonni you're
   ann           *lifts right hand ((points to box/sam))-->
   sam                                                  -->+wthdr
                                                           left hand-->
47           +going to see like a (.) green+*
   sam    -->+moves backwards--------------+
   ann                                     -->*
48           (0.3)
49 SAM:      hh (I) can't even move.
50           (0.6)
51           how [could you move?]
52 ANN:          [green thing.    ]
```

Sam tries to reach for the box with both of his hands. First, on line 43 and figure 6a, he reaches with his right hand that is holding the maker pen, and nothing happens. Then, Sam reaches for the box with his left hand (l. 44, fig. 6b). The card's edges are highlighted with green when his hand is close to it. In Rec Room, the highlighting appears around objects that can be interacted with when the user's hand is close to them. It is only visible to the one reaching for something, not to other users. For Ann, Sam appears to be too far from the box to reach it on both occasions, and she cannot see the green highlighting.

Ann's advice here is produced in steps. First, she suggests Sam should move closer before he tries reaching for a card (*just try: to get near to it* l. 46). The next step – signalled with *and then* (l. 46) – orients to the future and what Sam should see if he has followed Ann's advice successfully. Ann describes what Sam should be seeing if he is in the right position to draw a card (ll. 46-52) – that is, a *green thing* (l. 52). Her formulating her advice as Sam seeing it, not them both seeing it, shows her orientation to them seeing different things. Interestingly, Sam does not respond to Ann's mention of the green highlighting even though he has been able to see it most of the times he has tried to draw a card (see fig. 6b, also fig. 2a in Extract 2). However, Sam is facing another problem: how to move in the SVR space (ll. 49-51). He informs her of his trouble, and the pair moves to solving the new issue.

In the final Extract 7 that continues immediately after Extract 6, Ann attempts to advise Sam on how to move by teleporting. Ann mixes both physical and virtual resources in her advice as she orients to them both but does not differentiate in a clear manner which she is referring to at each point.

Extract 7. *How could you walk (Pair 3, Ann's perspective)*

```
53 SAM:     the thing is, wh- (.) how can you- how could you walk.
54          (0.5)
55 SAM:     u::h  [Ann (.) Ann    ]
56 ANN:           [>okay,< you can]
57 ANN:     *do that (0.3) <par- (.) taiting> (.) thing (.) m-
   ann      *lifts right hand-->

58 ANN:     partier?(0.3) parta-*(0.3) I don't know if that's a word.
   ann                        -->*
59          (1.3)
60 ANN:     nhe heh. (.) .hhh  you *use
   ann                             *lifts right hand-->

61 SAM:     tele- te[leporting?]
62 ANN:             [like your-]*
   ann                        -->*
63          *(2.0)#
   ann      *gz down to hands
   fig            #fig7a
```

Figure 7a. Ann gazes down to her hands (left: Ann's view in VR, right: Ann in her physical environment).

```
64 ANN:      *#(it's) this °thing°.*
   ann       *lifts right hand     *
   fig        #fig7b
```

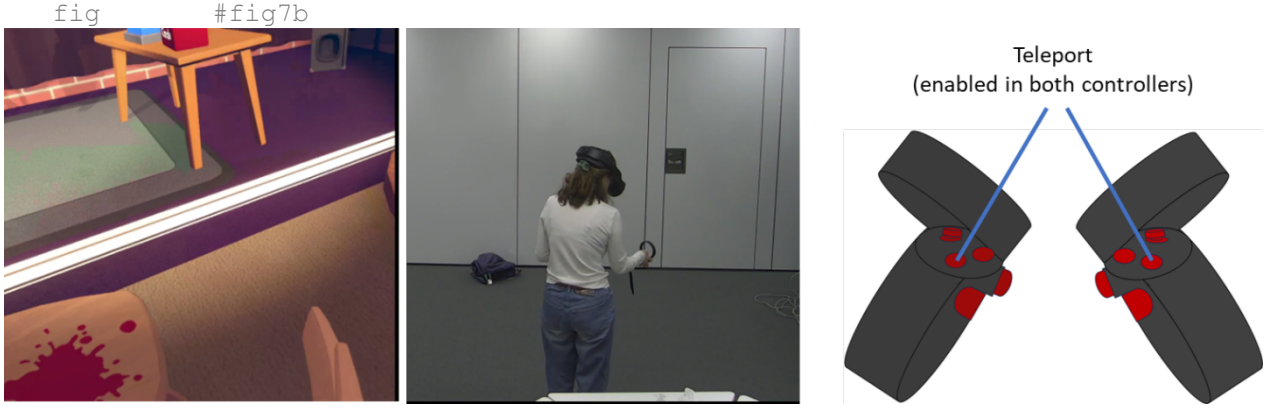


Figure 7b. Ann lifts right hand/controller (left: Ann's view in VR, middle: Ann in her physical environment), right: the location of teleportation buttons in the controllers.

```
65           *(0.3)*
    ann      *gz to sam*

66  ANN:     .hhh with the::,
67           *(2.5)*
   ann       *gz to hands
                   *gz to Sam

68 ANN:      .hh okay with the *sa:me ha:nd that(0.4) on yo-(0.5) like
   ann                          *gesture/quick point with right hand

69 ANN       (0.5) >*+your #watch is on<, (1.3) and then I [think,]
70 SAM:                                                    [yeah.+]
   ann             *taps watch (on the right hand)
   sam               +lifts left hand (watch hand)---------------+
   fig                     #fig7c
```

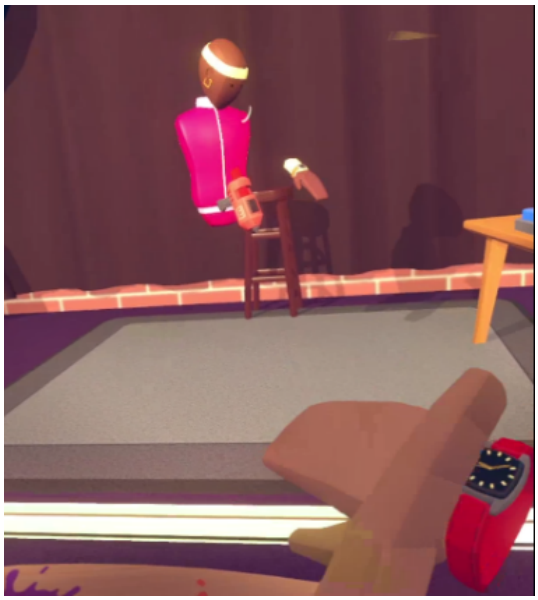


Figure 7c. Ann taps the watch on her right hand (Ann's view).

```
71 ANN:     *you have like (.) your thu:mb,
   ann      *gz to right hand ((thumb up))-->

72 ANN:     *(2.0)
   ann   -->*gz to sam-->>

73 ANN:     there is a (0.3) +#button,
   sam                      +green teleport appears from left hand-->
   fig                       #fig7d
```

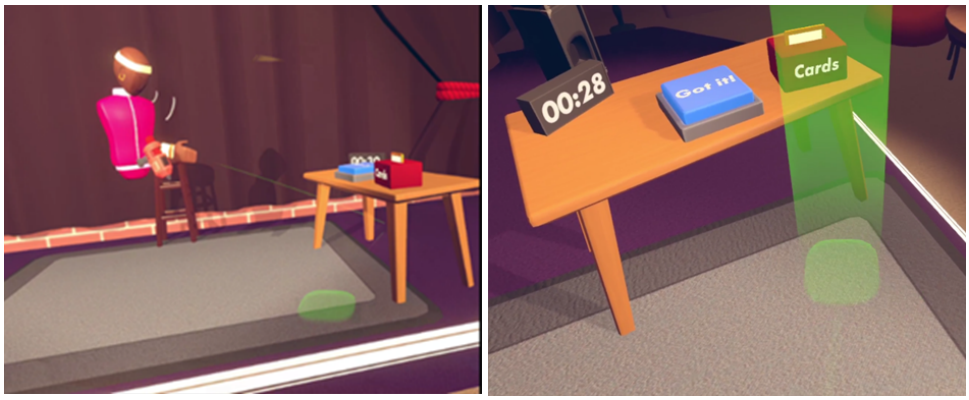


Figure 7d. Sam opens a teleport beam (left: Ann's view, right: Sam's view).

```
74 SAM:     [u:::$:h.          ]
75 ANN:     [>yeah and then you<] can ju(st) (0.6) +pre[2ss it?2]
76 SAM:                                             [2>right2]
77          right right
   sam                                          -->+teleports twd
                                                      table-->>
```

The extract starts as Sam recruits Ann's help by asking her *how can you– how could you walk* (l. 53). After a few turns of word searching and negotiation (ll. 57-61), Ann prepares for her next advice during a pause (2.0) (l. 63). During this pause, Ann gazes at her hands and likely feels the controller with her fingers (fig.

7a). One cannot be sure of the latter as her body obstructs the view of her hands and the controllers, but Ann's gaze and hand movements suggest that she is doing so. Ann's lowered gaze displays her orientation to physical resources for trouble solving, and her *it's this thing* (l. 64, fig. 7b) refers to something on her controller. However, as she cannot see it, she relies on tactile exploration.

Ann's advice on lines 66-75 utilises both virtual (watch) and physical (thumb, button) resources to guide Sam on how to teleport. On line 70, Ann taps the watch on her avatar's right hand to show Sam the location of the watch (see fig. 7c). Her advice is parsed into several steps with the use of *then:* find the watch hand in SVR, then find the button near the thumb on the controller in the physical hand. Seeing Sam is succeeding so far (teleport beam appears, l. 73, fig. 7d), Ann references the physical controller and urges Sam to press the button. The formulation of Ann's turns shows that she orients to them having similar controllers that they also hold in similar ways. Although she starts talking about her controller specifically, she later moves to describing Sam's controller and the actions he should take to find the button. With Ann's help, Sam manages to open a teleport beam and to successfully move near the table. Sam's *right right right* on line 76 signals that no more instructions are necessary (Stivers, 2004).

Notably, Ann's advice works accidentally. Ann and Sam have their watches in different avatar hands. Earlier, Ann has pressed a button that swapped the watch from her left to her right hand. Ann orients to the right hand as the teleporting hand due to having used it to teleport before during their previous activities. As she has the watch in her right hand, it becomes a point of reference to use in guiding Sam to the right hand to teleport. As Sam is the explainer at this time, his right hand is reserved for using the maker pen, meaning he cannot use it to interact with the environment, including teleporting. Luckily for Ann and Sam, both controllers have been configured to teleport, and Sam has his watch on his free left hand.

This extract shows how Ann orients to figuring out the controllers herself before instructing Sam which is shown by her feeling the controllers. The extract also shows how Ann orients to the configuration of her own controllers and, through that, assumes that Sam has controllers and fingers positioned the same way. Finally, Extract 7 illustrated the kind of parsing that can be seen in the materials. The participants describe processes and observations, parsing from bigger to smaller and more precise descriptions.

The extracts in this section showed how participants attempted to resolve challenges without having visual access to their physical surroundings and controllers as well as shared visual access to virtual objects and details in the environment. However, the advice-givers' spoken turns showed that they oriented to having this shared access, and issues of indexicality arise from this assumption. For example, even though the participants had similar controllers, there is no way of knowing if the recruiter is holding the controllers in the similar way as the adviser. There is only one exception in our materials where a

participant starts to talk about their controllers only to realise that the co-participant could not access them (“here is this, oh right you cannot see, sorry”). It was more common for the participants to not orient to their differing access in such a direct way.

6. Discussion and Conclusion

This study has examined the methods of recruitment and assistance in social virtual reality. The actions seeking assistance concern how to drop and pick up virtual objects, perform hand gestures with avatars, and move by teleporting in the SVR environment Rec Room. The study shows how the participants orient to mastering the buttons and features in the controllers as central resources for their interaction. The 3D Charades gaming activity is suspended while the participants do so, and the aim of both recruitment and assistance is to return to it as soon as possible.

More specifically, this study first showed how talk is used as a resource in problem-solving in SVR interaction through explicit requests or suggested actions. The analysis showed that while in face-to-face interaction one can alert others to one's troubles by using both verbal indications as well as different kinds of embodied displays, for example, gaze (Vänttinen, 2022) or gesture and head movements (Kendrick & Drew, 2016), linguistically explicit requests for assistance were required to elicit advice in SVR. Even trying to perform an action or task several times without succeeding was not treated as an indication of trouble (see Extract 1).

The analysis also revealed that while more implicit recruitment, such as embodied or verbalised trouble alerts, could elicit responses, these responses did not orient to the trouble as recruitment but as something to laugh at, for example (see Extract 2). As the studied participants were all novice SVR users, the novelty of the environment can mean that they might not necessarily orient to trouble displays as recruitment. In addition, ‘learning how the world works’ can interrupt or delay the task at hand in SVR. This was seen in how the game activity could be forgotten altogether as the participants shifted their attention to examining the SVR resources instead (see Extract 3). These explorations can turn from attempting to perform an action into recruitment as the participants first try to do something themselves and then recruit the other participant if they are unsuccessful.

Second, the analyses showed how novice peers resolve trouble collaboratively. New users typically explore the environment and test its features simultaneously when engaging in other activities (Locher et al., 2015). First time users can face trouble with moving in the environment or interacting with virtual objects using the controllers, for example. The examined advice turns showed how participants avoid taking an expert position, and their turns were framed as

suggestions (see Extract 3). The participants could also downgrade their epistemic stance during advice-giving (see Extract 4). As novices, the participants need to figure out 'the game within the game' to become proficient. They need to learn how to act and interact in both the physical and virtual realities simultaneously (see e.g., Olbertz-Siitonen & Piirainen-Marsh, 2023). While previous research has shown that participants rely on more experienced players when familiarising themselves with a VR space (Piirainen-Marsh & Olbertz-Siitonen, 2024), our analysis showed how novice participants used joint problem-solving in order to work out how to do what they needed to do.

Third, the analyses revealed how during advice-giving, the participants navigated between the physical and virtual resources when conveying suggested actions to the other. They used tactile exploration of the controllers and verbal descriptions as the main resources for creating joint orientation to objects (see Extract 7). Previous research has shown that in SVR, the participants may orient to different bodies and resources at the same time – physical and virtual (see Kohonen-aho & Haddington, 2023). Our analysis expands this notion by illustrating how participants, especially the advice-giver, orient to both physical and virtual resources as they give advice (see Extract 5) but how they also act as if they shared access to some interactional resources, such as holding the controllers in similar ways, even though they could not see each other's controllers (see Extract 7). The analysis also revealed orientations to sharing some visible features in the virtual environment that the co-participant in fact could not see due to their differing perspectives (see Extract 6).

The observations contribute to our understanding of the multimodal methods of recruitment and assistance, and how they are used, in SVR. Contrary to face-to-face settings, where these methods occur in a shared interactional environment, participants have asymmetric perceptual access to virtual and physical interactional resources in SVR (see e.g., Kohonen-aho & Haddington, 2023; Luff et al., 2003), which shapes the ways in which assistance can be recruited and advice given. Our study demonstrates how this asymmetry becomes visible especially during problem-solving as part of providing advice, even though it is not a trouble source itself. While mutual orientation to asymmetry has been noted in video-mediated settings and settings where participants are physically co-located but only one of them is playing a virtual reality game (e.g., Boudouraki et al., 2021; Olbertz-Siitonen & Piirainen-Marsh, 2023; Piirainen-Marsh & Olbertz-Siitonen, 2024), this type of orientation did not show in our materials, as the participants only occasionally commented on the differences in what they could see. Rather, as the analyses show, the participants act as if they share access to physical and virtual interactional resources in SVR. The asymmetries also appear to be more noticeable when participants are situated in separate physical spaces (i.e., during video-mediated encounters) compared to situations in SVR where the participants inhabit a shared space with avatar bodies.

The results of this study reveal certain implications for designing SVR environments. These implications are related to what features are visible and to who, the recognisability of embodied trouble displays, and the fragmented nature of interaction. While the design purpose of SVRs has aimed for the users to share the same space (McVeigh-Schultz et al., 2018), our analysis revealed how the participants' differing perspectives, and such features in the environment which were intentionally visible to one user only, fragmented this shared access. It is understandable that it is not purposeful for a participant in a SVR space to see what everyone else sees at all times, but as the analysis shows, not having a similar access to embodied and material resources especially during moments of trouble can affect how one can offer and formulate advice to others (see Extract 6). Avatar body language could also be developed so that embodied trouble displays are more recognisable. All in all, being aware of the fragmentation of interaction in SVR is highly relevant for designing environments that enable collaboration between users to progress smoothly. The current observations revealed that even though the participants were situated in a shared the SVR environment, their access to objects and features in it still differed. Thus, there was no single shared virtual environment for the participants but each of them was presented with their own instance, or "reality" of the environment through their individual headset.

Although fragmentation can lead to interactional trouble in SVR, this study has illustrated that participants are also skilful in overcoming them (see also Spets, 2023a). However, as the current study concerned new users in SVR, it would be beneficial to see how experienced users resolve interactional trouble while being co-present in SVR. Experienced users have likely established practices in using different features of the avatars and the environment as well as in progressing their interaction in SVR. Such analyses could potentially reveal whether there is a difference in their use of embodied conduct and its intelligibility in comparison with new users. In addition, investigating different types of SVR environments and activities in them could reveal if the functionality of avatar embodiment is tied to the specific context and activity at hand. In the case of these materials, the context of 3D Charades limited the participants' ability to assist others (e.g., the advice-giver could not join the recruiter on the stage during a game round). A context or activity that allows for more freedom in terms of assisting other participants would provide an opportunity to examine if and how recruitment and advice-giving practices might change.

References

Badem-Korkmaz, F., Ekin, S., & Balaman, U. (2022). Pre-service language teachers' resistance to teacher trainer advice on task design for video-mediated L2 interaction. *Classroom discourse, 13*(2), 212-230. https://doi.org/10.1080/19463014.2021.2020144

Boudouraki, A., Fischer, J. E., Reeves, S., & Rintel, S. (2021). "I can't get round": Recruiting assistance in Mobile Robotic Telepresence. *Proceedings of the ACM on human-computer interaction, 4*(CSCW3), 1-21. https://doi.org/10.1145/3432947

Butler, C. W., Potter, J., Danby, S., Emmison, M., & Hepburn, A. (2010). Advice-implicative interrogatives: Building "client-centered" support in a children's helpline. *Social Psychology Quarterly 73*(3), 265–287. https://doi.org/10.1177/0190272510379838

Couper-Kuhlen, E., & Thompson, S. A. (2022). Action ascription and deonticity in everyday advice-giving sequences. In A. Deppermann & M. Haugh (Eds.), *Action ascription in interaction* (pp. 183–207). Cambridge University Press. https://doi.org/DOI:10.1017/9781108673419.010

Dalmaijer, E., Pas, B., Spooren, W., & Stommel, W. (2023). How technology shapes advice: Professional–parent interaction in a digital pediatric treatment. *Frontiers in communication*, 8. https://doi.org/10.3389/fcomm.2023.1205883

Davidsen, J., Larsen, D. V., Paulsen, L., & Rasmussen, S. (2022). 360VR PBL: A new format of digital cases in clinical medicine. *Journal of Problem Based Learning in Higher Education, 10*(1), 101–112. https://doi.org/10.54337/ojs.jpblhe.v10i1.7097

Due, B. (2015). The social construction of a Glasshole: Google Glass and multiactivity in social interaction. *PsychNology Journal, 13*(2–3), 149–178.

Due, B. L., Lange, S. B., Nielsen, M. F., & Jarlskov, C. (2019). Mimicable embodied demonstration in a decomposed sequence: Two aspects of recipient design in professionals' video-mediated encounters. *Journal of pragmatics, 152*, 13-27. https://doi.org/10.1016/j.pragma.2019.07.015

Due, B., & Lüchow, L. (2023). The intelligibility of haptic perception in instructional sequences: When visually impaired people achieve object understanding. *Human Studies, 46*, 163–182. https://doi.org/10.1007/s10746-023-09664-8

Drew, P., & Kendrick, K. H. (2018). Searching for trouble: Recruiting assistance through embodied action. *Social Interaction. Video-Based Studies of Human Sociality, 1*(1). https://doi.org/10.7146/si.v1i1.105496

Goodwin, C. (2018). Why multimodality? Why co-operative action? (transcribed by J. Philipsen). Social Interaction. *Video-Based Studies of Human Sociality, 1*(2). https://doi.org/10.7146/si.v1i2.110039

Gudmundsen, J. (2023). "Can you write it": A longitudinal study of mobilizing the chat in video-mediated L2 interaction. Social Interaction. *Video-Based Studies of Human Sociality, 6*(2). https://doi.org/10.7146/si.v6i2.132542

Haddington, P., Kohonen-Aho, L., Tuncer, S., & Spets, H. (2023). Openings of interactions in immersive virtual reality: Identifying and recognising prospective participants. In P. Haddington, T. Eilitta, A. Kamunen, L. Kohonen-Aho, I. Rautiainen and A. Vatanen (Eds.), *Complexity of Interaction: Studies in Multimodal Conversation Analysis* (pp. 423–456). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-30727-0_12

Hansen, J. P. B. (2022). Recruiting repair: Making sense of interpreters' embodied actions in a video-mediated environment. *Discourse Studies, 24*(6), 719-740. https://doi.org/10.1177/14614456221112261

Heath, C., & Luff, P. (1992). Media space and communicative asymmetries: Preliminary observations of video-mediated interaction. *Human–Computer Interaction, 7*(3), 315–346. https://doi.org/10.1207/s15327051hci0703_3

Heritage, J., & Lindström, A. (2012). Advice giving – terminable and interminable: The case of British health visitors. In H. Limberg & M. A. Locher (Eds.), *Advice in discourse* (pp. 169–194). John Benjamins. http://dx.doi.org/10.1075/pbns.221.11her

Heritage, J., & Sefi, S. (1992). Dilemmas of advice: Aspects of the delivery and reception of advice in interactions between Health Visitors and first-time mothers. P. Drew & J. Heritage (Eds.), *Talk at work: Interaction in institutional settings* (pp. 359–417). Cambridge University Press.

Hindmarsh, J., Heath, C., & Fraser, M. (2006). (Im)materiality, virtual reality and interaction: Grounding the 'virtual' in studies of technology in action. *The Sociological Review 54*(4), 795–817. https://doi.org/10.1111%2Fj.1467-954X.2006.00672.x

Jefferson, G. (2004). Glossary of transcript symbols with an introduction. In G. Lerner (Ed.), *Conversation analysis: Studies from the first generation* (pp. 13–31). John Benjamins. https://doi.org/10.1075/pbns.125

Keevallik, L. (2018) Sequence initiation or self-talk? Commenting on the surroundings while mucking out a sheep stable. *Research on Language and Social Interaction, 51*(3), 313–328. https://doi.org/10.1080/08351813.2018.1485233

Kendrick, K. H. (2017). Using Conversation Analysis in the Lab. *Research on language and social interaction, 50*(1), 1-11. https://doi.org/10.1080/08351813.2017.1267911

Kendrick, K. H. (2021). The 'Other' side of recruitment: Methods of assistance in social interaction. *Journal of Pragmatics, 178*, 68–82. https://doi.org/10.1016/j.pragma.2021.02.015

Kendrick, K. H., & Drew, P. (2016). Recruitment: Offers, requests, and the organization of assistance in Interaction. *Research on Language and Social Interaction, 49*(1), 1–19. https://doi.org/10.1080/08351813.2016.1126436

Klowait, N. (2023). On the multimodal resolution of a search sequence in virtual reality. *Human Behavior and Emerging Technologies, 2023*, 1–15. https://doi.org/10.1155/2023/8417012

Klowait, N. O., & Erofeeva, M. (2023). Halting the Decay of Talk: How Atypical Interactants Adapt their Virtual Worlds. *Social Interaction. Video-Based Studies of Human Sociality, 6*(1). https://doi.org/10.7146/si.v6i1.136903

Kohonen-Aho, L. & Haddington, P. (2023). From distributed ecologies to distributed bodies in interaction: Capturing and analysing 'dual embodiment' in virtual environments. In P. Haddington, T. Eilitta, A. Kamunen, L. Kohonen-Aho, T. Oittinen, I. Rautiainen, & A. Vatanen (Eds.), *Ethnomethodological Conversation Analysis in Motion: Emerging Methods and Technologies* (pp. 111–131). Routledge. https://doi.org/10.4324/9781003424888-8

Kärkkäinen, E. (2003). *Epistemic stance in English conversation: A description of its interactional functions, with a focus on 'I think'*. Amsterdam: Benjamins.

Lindwall, O., & Ekström, A. (2012). Instruction-in-interaction: The teaching and learning of a manual skill. *Human Studies, 35*(1), 27–49. https://doi.org/10.1007/s10746-012-9213-5

Lindwall, O., Lymer, G., & Greiffenhagen, C. (2015). The sequential analysis of instruction. In N. Markee (Ed.), *The handbook of classroom discourse and interaction* (pp. 142–157). Wiley. https://doi.org/10.1002/9781118531242.ch9

Locher, M. A., Jucker, A. H., & Berger, M. (2015). Negotiation of space in Second Life newbie interaction. *Discourse, Context & Media, 9*, 34–45. https://doi.org/10.1016/j.dcm.2015.06.002

Luff, P., Heath, C., Kuzuoka, H., Hindmarsh, J., Yamazaki, K., & Oyama, S. (2003). Fractured ecologies: Creating environments for collaboration. *Human-Computer Interaction, 18*, 51–84. https://doi.org/10.1207/S15327051HCI1812_3

McVeigh-Schultz, J., Márquez Segura, E., Merrill, N., & Isbister, K. (2018). What's it mean to "be social" in VR?: Mapping the social VR design ecology. *Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems*, 289–294. https://doi.org/10.1145/3197391.3205451

Mlynář, J. (2023). Lifting the pen and the gaze: embodied recruitment in collaborative writing. *Text & Talk, 43*(1), 69-91. https://doi.org/10.1515/text-2020-0148

Mondada, L. (2014). The local constitution of multimodal resources for social interaction. *Journal of Pragmatics, 65*, 137–156. https://doi.org/10.1016/j.pragma.2014.04.004

Mondada, L. (2016). Challenges of multimodality: Language and the body in social interaction. *Journal of Sociolinguistics, 20*(3), 336–366. https://doi.org/10.1111/josl.1_12177

Mondada, L. (2018). Multiple Temporalities of Language and Body in Interaction: Challenges for Transcribing Multimodality, *Research on Language and Social Interaction, 51*(1), 85-106.

Mondada, L. (2022). Conventions for transcribing multimodality. Version 6.0.1. Available from: https://www.lorenzamondada.net/multimodal-transcription.

Olbertz-Siitonen, M., & Piirainen-Marsh, A. (2023). Bridging physical and virtual ecologies of action: giving and following instructions in co-located VR-gaming sessions. *Prologi – Journal of Communication and Social Interaction, 19*(3), 137-166. https://doi.org/10.33352/prlg.121525

Paulsen, L., Davidsen, J. G., & Steier, R. (2022). "Do you see what we see?" – Perspective-taking across realities. In A. Weinberger, W. Chen, D. Hernández-Leo, & B. Chen (Eds.), *15th International Conference on Computer-Supported Collaborative Learning (CSCL*) (pp. 300–303). International Society of the Learning Sciences (ISLS). Computer-Supported Collaborative Learning Conference, CSCL

https://www.dropbox.com/s/9mwx6t8mi75op15/CSCL2022%20Proceedings.pdf?dl=0

Piirainen-Marsh, A., & Olbertz-Siitonen, M. (2024). Instructed perception and action: The mutual accomplishment of manual know-how in using VR games. *Language & Communication, 99*, 313–332. https://doi.org/10.1016/j.langcom.2024.10.011

Rauniomaa, M., Haddington, P., Melander, H., Gazin, A., Broth, M., Cromdal, J., Levin, L., & McIlvenny, P. (2018). Parsing tasks for the mobile novice in real time: Orientation to the learner's actions and to spatial and temporal constraints in instructing-on-the-move. *Journal of Pragmatics, 128*, 30–52. https://doi.org/10.1016/j.pragma.2018.01.005

Råman, J., & Oloff, F. (2022). Mobilizing assistance through complaints in digital skills courses for adults. *AFinLAn vuosikirja* [AFinLA Yearbook], 234–260. https://doi.org/10.30661/afinlavk.114591

Sacks, H. (1992). Lectures on conversation. Blackwell Publishers.

Sacks, H., Schegloff, E. A., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking for conversation. *Language, 50*(4), 696–735. https://doi.org/10.2307/412243

Schegloff, E. A. (2007). *Sequence organization in interaction: A primer in conversation analysis*. Cambridge University Press. https://doi.org/10.1017/CBO9780511791208

Shaw, C., & Hepburn, A. (2013). Managing the moral implications of advice in informal interaction. *Research on Language and Social Interaction, 46*(4), 344–362. https://doi.org/10.1080/08351813.2013.839095

Shaw, C., Potter, J., & Hepburn, A. (2015). Advice-implicative actions: Using interrogatives and assessments to deliver advice in mundane conversation. *Discourse Studies, 17*(3), 317–342. https://doi.org/10.1177/1461445615571199

Siitonen, P, Rauniomaa, M., & Keisanen, T. (2019). ”Kato. Hulluna puolukoita.” Kato vuorovaikutuksen resurssina luontoilussa. [Kato. An insane amount of lingonberries. Kato as an interactional resource in nature-related activities.] *Virittäjä, 123*(4), 518–549. https://doi.org/10.23982/vir.71162

Slater, M. (2018). Immersion and the illusion of presence in virtual reality. *British Journal of Psychology, 109*(3), 431–433. https://doi.org/10.1111/bjop.12305

Spets, H. (2023a). Intersubjective interaction during the word explanation activity in social virtual reality. In P. Haddington, T. Eilittä, A. Kamunen, L. Kohonen-Aho, I. Rautiainen and A. Vatanen (eds.), *Complexity of Interaction: Studies in Multimodal Conversation Analysis* (pp. 145–174). Palgrave Macmillan. http://dx.doi.org/10.1007/978-3-031-30727-0_5

Spets, H. (2023b). Environmentally coupled gestures as a communicative resource in the word explanation activity: A multimodal analysis of interaction in social VR. Prologi – *Journal of Communication and Social Interaction, 20*(1), 167-192. https://doi.org/10.33352/prlg.120936

Stivers, T. (2004). “No no no” and other types of multiple sayings in social interaction. *Human Communication Research 30*(2), 260–293. https://doi-org.pc124152.oulu.fi:9443/10.1111/j.1468-2958.2004.tb00733.x

Stivers, T., & Rossano, F. (2010). Mobilizing Response*. Research on language and social interaction, 43*(1), 3-31. https://doi.org/10.1080/08351810903471258

Tuncer, S., Lindwall, O., & Brown, B. (2021). Making time: Pausing to coordinate video instructions and practical tasks. *Symbolic Interaction, 44*(3), 603–631. https://doi.org/10.1002/symb.516

Vehviläinen, S. (2012). Question-prefaced advice in feedback sequences of Finnish academic supervisions. In H. Limberg & M. A. Locher (Eds.), *Advice in discourse* (pp. 31–52). John Benjamins. https://doi.org/10.1075/pbns.221.04veh

Vänttinen, M. (2022). Eye gaze as a resource in handling trouble around mobile devices in EFL classroom interactions. In T. Seppälä, S. Lesonen & P. Iikkanen & S. D'hondt (Eds.), *Kieli, muutos ja yhteiskunta – Language, Change and Society. AFinLA yearbook 2022* (pp. 395–413). Publications of the Finnish Association of Applied Linguistics. https://doi.org/10.30661/afinlavk.114401

Waring, H. Z. (2017). Going general as a resource for doing advising in post-observation conferences in teacher training. *Journal of Pragmatics, 110*, 20–33. https://doi.org/10.1016/j.pragma.2017.01.009