Interpreters' use of environmentally coupled gestures to achieve mutual understanding of speaker identity in a deaf and hearing classroom

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Abstract

Focusing on turn-taking, this article investigates how embodiment and environmentally coupled gestures are used by a signed language interpreter to facilitate intersubjective understanding of the speaker's identity in interpreter-mediated dialogues between deaf and hearing students. The researcher draws on observations, interviews, and video-recorded data from a case study situated in a Norwegian mainstream, upper secondary school. In the classrooms, hearing students can identify different speakers' by distinguishing their voices and looking around to see who is talking. However, deaf and hard-of-hearing students can find it more difficult to identify the speaker, especially in multi-party interactions. They are often unable to hear others' voices directly, and in interpreter-mediated dialogues their gaze is mostly focused on the interpreter's mediation. This study shows how the interpreter uses several environmentally coupled gestures to mediate information about the ongoing interaction, including speaker identity. The gestures include pointing, shifts in body positions (left–right stepping while standing, and left–right orienting while sitting), shifts in gaze orientation, and shifts in face gestures. Both deaf and hearing students use the mediated resources as information cues to coordinate their interaction, and to establish an intersubjective understanding of actions within participation frameworks.
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1. INTRODUCTION

Knowing who is speaking is important information for understanding meaning in utterances, and for deciding how to respond to other participants' messages and speaking styles (Bakhtin, 1986). In classrooms, hearing students can identify the speaker by listening to the speaker's voice, and looking around to see who is talking. Deaf and hard-of-hearing students are often unable to hear others' voices directly, and their gaze is mostly focused on the interpreter's mediation. Therefore, compared to hearing classmates, it can be more difficult for them to identify the speaker, especially in multi-party interactions. The problem to be addressed in this article is how signed language interpreters use embodiment and

environmentally coupled gestures to achieve intersubjective understanding of speakership in interpreter-mediated dialogues between deaf and hearing students. Few studies have investigated signed language interpreting in educational settings, and how interpreters negotiate access to inclusion of both deaf and hearing students. In what follows, I will examine central structures in interpreter-mediated dialogues and explore links between language, meaning making and participation. The analysis will then present how the interpreter uses environmentally coupled gestures to facilitate information about the ongoing dialogue and speaker identity. I conclude with an argument that mutual understanding is more complicated in interpreter-mediated dialogues because different linguistic practices and multiple levels of intersubjectivities are at work.

1.1. Interpreting and coordinating

In interpreter-mediated discourse, the interpreter's goal is to ensure that two or more people who do not use the same language come to understand the same meaning. However, the interpreter cannot fully convey participants' meaning. He or she must co-construct meaning along with the interlocutors in the specific situation, for some specific purpose, and from knowledge from past experiences (Janzen and Shaffer, 2008:342). Therefore, the interpreter and the primary interlocutors are co-participants in the co-construction of meaning (Linell, 1997; Wadensjö, 1998). The significance of this is that the target text will not be successful if the interpreter's output does not consider the situational context, the interlocutors' interaction, and the discourse practices in each language. The point of departure to understand the interpreter's performance is therefore the concept of "coordination" (Baraldi and Gavioli 2012:3). Coordination is a fundamental characteristic of interaction in general, and of interpreter-mediated interaction in particular. In interpreting studies, the concept was first introduced by Wadensjö (1998). Her analysis distinguishes between implicit and explicit coordinating activity (p. 108–110). Implicit coordination is carried out simply by providing renditions of the utterances. Explicit coordination are mainly initiatives made by the interpreters themselves (non-renditions), when they, for instance, ask for time to translate, comment on their translation, or make invitations to start or continue talking. However, a sharp distinction between implicit and explicit coordination cannot be made, and areas of overlap are as interesting as the distinction itself. Wadensjö's (1998) analysis is based on audio-recording of spoken discourse data. This implies that her book does not address multimodal features and language practices relying on different modalities, which will be investigated in this study.

Participants in human dialogues perform embodied activities when they establish mutual attention and negotiate turn-taking. Goodwin (1980, 2000, 2007a, 2007b, 2011, 2013) has documented how participants use language, gestures, and objects in the environment to establish mutual understanding with one another. This multimodal approach to analyzing human interaction is understood as an "embodied participation framework" (Goodwin, 2000, 2007a). Central keys in the framework are talk, environmentally coupled gestures, gaze and the organization of the participants' bodies. Environmentally coupled gestures are defined as gestures that cannot be understood by the participants without reference to the physical environment to which they are tied (Goodwin, 2000:1492, 2007a; 2007b:55). For instance, Goodwin (2011) analyzes moments of intersubjectivity in the dialogue of an aphasic man and his conversation partner and how they use a range of different environmental resources, including their own and each other's bodies, to construct meaning and coordinate their talk. In another work, Goodwin (2000) analyzed how an archeologist uses her index finger to make visible drawings in the sand to explain findings to her student. By itself, the talk and the actions are too incomplete to accomplish meaning and relevant next action, but when joined together in local contextures of action, diverse semiotic resources complete each other and create a whole that is both greater than, and different from, any of its constituent parts (Streeck et al., 2011).

Environmentally coupled gestures can be a useful approach when analyzing professionals at work, as different workgroups categorize phenomena in distinctive ways. For example, archaeologists have a professional vision that makes them capable of seeing traces of past human activity in the color patterns visible in the dirt they are excavating. The ability to see these traces constitutes their work practice and helps them to function in the social life of their profession (Goodwin, 2007a:205). Environmentally coupled gestures, social calibration and professional vision can also be an approach to study educational interpreters' practice.

Only a few studies have conducted multimodal research in signed language interpreting in educational settings. Deaf students' visual access has been investigated by Berge and Thomassen (2016), showing that information is less accessible for deaf students compared to their hearing peers. Nilsson (2015) has studied how experienced interpreters use left–right body movements to highlight the turn of speakers in university lectures. Herreweghe (2002), Metzger (1999), and Roy (2000) have studied connections between processing time (time lag), overlapping talk, and barriers for deaf students to take turns in interpreter-mediated lectures and one-to-one dialogues. These scholars have concluded that part of the interpreter's responsibility is to reconstruct, time, and coordinate speaker changes. Mason (2012) and Gavioli (2012) have highlighted how features, such as gaze and minimal response signals, assume a regulatory function in interpreter-mediated interaction by helping to coordinate participation of all the parties. Berge (2018) has documented

how the signed language interpreter constructs embodied actions (pointing, gaze, body positions), which deaf and hearing students can use to establish mutual attention and coordinate their turn-taking. Multimodal studies in interpreting for deafblind persons document how interpreters use tactile and haptic signs to describe the environment, construct minimal response signals, establish mutual attention and coordinate turn-taking (Berge, 2014; Gabarró-López and Mesch, 2020; Raanes and Berge, 2017, 2021).

1.2. Interpreter-mediated education for deaf students

Inclusion for all participants is viewed as an essential aspect of quality in interpreter-mediated education. However, it cannot be taken for granted as participation for all is not easily achieved, particularly in asymmetric situations (Baraldi and Gavioli, 2012:2). In mainstream schools, quality of inclusion can be considered through the capacity of deaf and hard-of-hearing students to participate in teachers' lectures and group work activities with hearing peers (Anita, Stinson and Gaustad, 2002). Active participation in dialogues and learning activities lays the groundwork for academic learning, since 'language' develops concepts and mental schemata, and 'languaging' contributes to the exploration of content (Linell, 2009; Vygotsky, 1978; Wertsch, 1991). However, to manage interpreting of lectures and students' dialogues is a complex professional practice. As Smith (2015) explains: To work effectively in educational settings, interpreters need to master two languages, language style variations, the task of interpreting, but also how to promote teaching and learning in general and apply these principles specifically to deaf and hard-of-hearing students' needs as dual language learners.

Although there are many similarities, there are still some distinct aspects of signed language interpreting practice that diverge from spoken language interpreting norms (Napier, 2015:129). Signed language interpreters most commonly work simultaneously and between languages relying on different modalities. Signed languages are fully-fledged languages, developed in historical and cultural contexts, with their own grammatically distinct structures. They are described as visual-gestural languages, which means that they simultaneously incorporate the use of various articulators, including the head, facial features (eyes, eyebrows, mouth, lips, cheeks), shoulders, body, hands and fingers. An account of sign language can therefore include certain types of visual information which in a spoken sentence is not typically added. To these ends, signed language interpreters must continuously decide what visual information they retain, and what they omit (Napier, 2015:129), and their choice influences what information is accessible for the primary participants, how they construct meaning, and interact with one another.

Deaf students' participation in interpreter-mediated education encounters numerous challenges in respect to accessibility to information and participation. One issue is related to deaf and hard-of-hearing students' visual orientation as they capture information, mostly through their sight (Marschark et al., 2005; Winston, 2004). In signed language discourse practices, the interlocutors negotiate turn-taking by visual gestures and eye contact, and they often pause their signing so that there is time to visually adjust their bodies and process information from the object in focus. Those practices can create problems in inclusive interpreter-mediated education since teachers and hearing students organize their talk according to spoken language traditions (Berge and Thomassen, 2016; Harrington, 2005). For instance, in spoken language group dialogues, negotiation of speaker change happens rapidly and often with overlap. This can reduce deaf students' opportunity to negotiate for the other participants' attention and take a turn in the conversation. Most of the time, deaf students must look at the interpreter, and this means reduced eye contact with the other primary participants. Moreover, because one interpreter is mediating several persons' talk, deaf students have less access to information cues about who is speaking. Another barrier to accessibility relates to the time lag that is incorporated in interpreter-mediated dialogues. Due to the interpreters' work of processing the utterances, deaf students have access to the messages and the turn-taking signals later than the hearing students. The result is often that their responses are slightly out of sync with the ongoing talk (Berge, 2018; Herreweghe, 2002; Roy, 2000). All in all, deaf students encounter challenges in accessing information, exchanging minimal response signals, and negotiating turn-taking. To ensure better access, interpreters may use strategies of explicit coordination (Wadensjö, 1998). The facilitation of environmentally coupled gestures can be one such strategy, and can be used to establish temporal states of intersubjective understanding of speaker's identity in group dialogue between deaf and hearing students.

1.3. Intersubjectivity – Shared understanding

It is not always easy to achieve mutual understanding, and it is only maintained through temporal states in interaction (Rommetveit, 1985:186). One challenge to meaning making is that it takes place within a pluralistic and only partially shared social world: When entering a conversation, which aspect is in focus for each participant is determined by background, knowledge, engagement, and perspective. Therefore, in a dialogue, the participants can have different degrees of intersubjectivity. In some sequences they can have complete agreement, in others, just a partial agreement (Linell, 1997:193). To establish states of mutual understanding is therefore a continuous process where the participants mutually check their

understandings. Rommetveit (1974) claims that 'intersubjectivity' refers to the collaborative aspects in human dialogues when the participants construct shared understanding of the situation and the meaning of each other's contribution.

To establish intersubjectivity, the participants must have a mutual situation definition, which sets the focus of their attention within the activity and frames the possible meaning potential in the utterances (Wertsch, 1991). At least, there must be some mutual understanding of *when* and *where* the communication takes place, and of *the identity of the speaker* and *the listener* (Rommetveit, 1974:36). In face-to-face dialogues, the "I" and "You" are often clear. When talking about someone else or referring to past or future events, this reference must often be clarified, for instance, by highlighting the topic of the dialogue and clarifying deictic words and references. To do so, more than spoken language is used. Goodwin (1980, 2007a) found that indexical references ("you", "it", "there") are often made clear with different kinds of pointing gestures, which is understood in context and the ongoing activity. Language, gestures, and structures in the world are therefore mutually elaborated. This perspective is also relevant in analysis of interpreter-mediated interaction.

When the interpreter is viewed as a co-participant which is involved in the co-construction of meaning (Wadensjö, 1998; Roy, 2000; Wilcox and Shaffer, 2005), we can assume that the interpreter contributes to the intersubjective relationship in the interchange (Janzen and Shaffer, 2008:347). The interpreter builds his/her own discourse relationship with each of the other participants. However, they must also make sense of what they perceive to be the intersubjective relationship between the primary participants and use this information when interpreting their utterances. This means that interpreter-mediated discourse has triadic states of intersubjectivity (Janzen and Shaffer 2008:333). When it comes to explicit coordination, the interpreter must decide what should be 'filled in' based on cues from the setting. The choice will depend on interactional conventions in both languages, and on aspects for that situational context, the participants' interaction, and their need for contextualized cues (Janzen and Shaffer, 2008:334). This also indicates that interpreters must be sensitive to the interlocutors' turn-taking, and each person's access to participate in the ongoing interaction. To study these aspects, multimodal video-analysis can be a useful approach.

2. VIDEO-ETHNOGRAPHY

The empirical data in this article is from a video-ethnographic study on inclusive education in mainstream schools, where deaf and hearing students are in the same class. Video-ethnography strives to understand social interaction in everyday life, and connections between the participants' use of artefacts, embodied action, and language use (Heat et al., 2010). In total, five school classes are involved in the project. They are from three different upper secondary schools in Norway (students ages 17–19 years). Two subjects in each class were observed three to five times. In total, 40 classroom observations were conducted, of which 14 were filmed, leading to approximately 55 hours of video-recordings. Ten deaf students, ten hearing students, ten teachers and ten interpreters participated in follow-up interviews. These included individual interviews after the session, and group interviews where teacher(s) and interpreter(s), working in the same class, discussed extracts of the video recordings. Deaf and hearing students were interviewed separately. To ensure confidentially, excerpts from the video-recordings are presented as drawings, and dates for data collection, names of participants and schools are not mentioned. Before the field work, teachers, interpreters, deaf and hearing students (and their parents) were given spoken and written information about the research. All informed participants gave their consent. This project, and its ethical approval, is registered with the Norwegian Centre for Research Data.

This paper focuses on a case study demonstrating frequently observed instances of group work activity. The deaf student, Lisa (pseudonym), participated in several group work activities successfully (she was more active in turn-taking than the other deaf students in this study), the participants were informative storytellers, and the video recordings had good quality. Further, a thick data set from this case was available (see Coffey and Atkinson, 1996). Lisa was followed in two subjects (history and sociology), and there were eight observations in total, including three video-recorded sessions with three cameras, four interviews with interpreters (160 min total), seven with teachers (110 min total), and one group-interview with interpreters and teachers (90 min). There is one interview with Lisa (40 min), and one with three hearing students (25 min). In sum, Lisa's case was studied over time, from different perspectives, and through a triangulation of different data sources (see Hammersley and Atkinson, 2007).

Video-ethnography provides a micro approach to understand the interactive and embodied nature of human interaction. The method relies on detailed transcriptions of human interaction. However, a transcription alone gives a limited representation of what takes place. Signed languages are visual-gestural languages and do not have written representation. Group dialogues consist of sequences with overlap and side-talks which are difficult to illustrate in written text. The current transcription also moves from Norwegian Sign Language (NSL) and spoken Norwegian into written English, which presents some further translation problems. Therefore, my transcription key combines traditions in signed language studies, and in studies of video-ethnography. Utterances in NSL are represented in capital letters, spoken utterances in small, and descriptions of embodied actions in italics.

In ethnographic studies, one approach for analysis is to code the material according to repeatedly observed actions and repeatedly mentioned accounts (for instance, how the participants explain their professional practice and responsibility), and then collect representative excerpts into topics maps (Hammersley and Atkinson, 2007). The study that follows emerged from an inductive approach to the data. In the beginning, I focused on interpreter-mediated education practices in general. After some time, an activity type that occurred frequently in my observation notes was group work activities. The work of coding and mapping the data showed repeated patterns of actions and accounts: All ten interpreters were sensitive to deaf students' access to unfolding interaction, and they used different kind of environmentally coupled gestures to mediate information about the shifts in turn-taking and who was doing the talking.

3. ANALYSIS

This section will present nine video excerpts on how a signed language interpreter uses embodiment and environmentally coupled gestures to achieve intersubjective understandings of the speaker's identity in a group dialogue between one deaf student, Lisa, and two hearing classmates. The context is taking place in upper secondary school in Norway. The first two excerpts are from a History class where their teacher organized a question–answer sequence. Thereafter follows seven excerpts from a Sociology class where Lisa and two hearing classmates discuss which problem is to be addressed in their paper. The excerpts will illustrate the interpreter's use of embodiment and environmentally coupled gestures like pointing, left–right stepping, left–right body orientation, gaze orientation, and facial gestures. These bodily movements facilitate information about speaking styles, pauses in the speech, and most importantly, the speaker's identity.

3.1. Pointing and name signing

In the History class, there are about 25 students. In one of the question–answer sequences, the teacher wants the students to answer his question. To manage the turn-taking, the teacher looks at the students. In one sequence, he holds his gaze and establishes eye contact with a student, Jan, and he points towards the student's place in the classroom while saying "yes?" (line 03). With that spoken utterance and gesture, the teacher invites Jan to take a turn. The interpreter coordinates by pointing, but additionally she uses the boy's name sign "Jan" (line 04). This sequence of interaction is illustrated in Fig. 1:
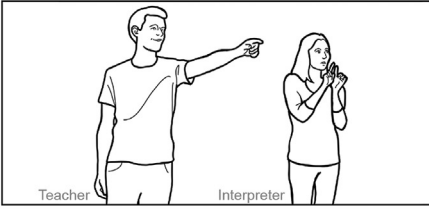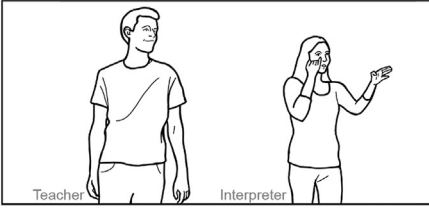

Who	Utterances and embodied gestures	
01	Teacher:	What is a federal state?
02	Interpreter:	F-E-D-E-R-A-L STATE MEANS WHAT?
03	Teacher:	"Yes?" *points with left hand at Jan*
04	Interpreter:	YES JAN? *points at Jan*
05	Lisa:	*turns her gaze towards Jan*

Fig. 1. Pointing at speaker and name signing.

Different students in the class might have different answers to the question (line 1). To have access to construct an intersubjective understanding with the other students, Lisa needs information about 'who is doing the talking' in the ongoing dialogue (Bakhtin, 1986; Rommetveit, 1974, 1985). In the large group of students, it can be hard for Lisa to get visual access to information about whose turn it is. As we can see, the teacher and the hearing students are organizing their interaction according to vocal language traditions. Their interactional timing, the establishment of gaze in turn-taking, and the classroom environment are not adjusted for interpreting and for Lisa's visual orientation. Her experiences of participation can therefore be at stake in class conversations. In this example, Lisa uses multimodal information, facilitated by the teacher and the interpreter, to follow the shift in turn-taking. Lisa moves her gaze towards Jan and identifies him as the person who is doing the talking (line 5). Accordingly, the interpreter constructs an explicit coordination in her interpreting (Wadensjö, 1998), facilitating the name sign for Jan (line 04). This can be seen as a textual information cue, facilitating information about the ongoing interaction and the next turn at talk.

3.2. Left-right steps

In the following question–answer sequence, the interpreter uses her body position for facilitating visual information for Lisa about the shift in turns and the identity of the speaker. For most shifts, the interpreter takes small right-left steps. This is illustrated in Fig. 2:
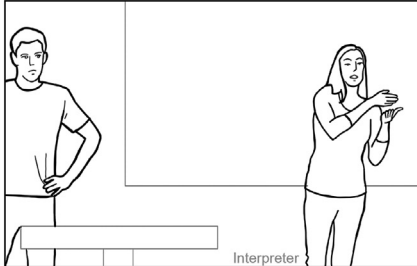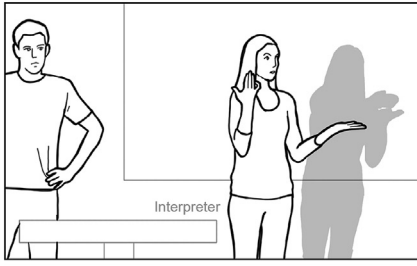

06	Jan:	The state allocates the land
07	Interpreter:	STATE ALLOCATES LAND *step to her left*
08	Teacher:	Who has the power?
09	Interpreter:	WHO HAS POWER? *step to her right*
10	--	ASK HIM *(points at Jan)*
11	Jan:	The King has the power and can allocate the land
12	Interpreter:	KING SHARE-SHARE-SHARE LAND *step to her left*
13	Teacher:	Yes. So we have the King and nobility.

Fig. 2. Coordination of identity by embodied step left/right gesture.

The hearing students can listen to the different sounds of the teacher's and Jan's voice and understand which of them has the floor. Lisa does not have access to this information directly. This excerpt illustrates that simultaneously while interpreting the utterances, the interpreter shifts her body position according to the ongoing shifts in turn. When the teacher talks, the interpreter takes a step to her right. When Jan talks, she takes a step to her left. The interpreters' left–right shift in shifts in body position can be seen as an environmentally coupled gesture which highlights the message structures and the shift in turns between the speakers. Lisa can use the visual information facilitated by her interpreter as a cue to establish an intersubjective understanding, along with the other students in her class, about who is doing the talking. Accordingly, the interpreter is explicitly coordinating her interpreting (Wadensjö, 1998). This embodied strategy has also been found by Nilsson (2015) when analyzing Swedish Sign Language interpretation of lectures.

3.3. Group dialogue between students

The following excerpts are from a Sociology class, in which Lisa is engaged in a problem-solving exercise with two hearing classmates, Anna and Betty. The students are seated on one side of the table, and the interpreter on the other, directly across from Lisa. Anna is seated across the table to the interpreter's right, while Betty is seated across the table to the interpreter's left. The students are deciding which research question they want to focus on in a classroom paper. They have developed two suggestions. Even though there are only three students, it is not always easy for Lisa, Anna, and Betty to establish eye contact with each other. In most of this triadic interaction, the two hearing students look at each other whereas Lisa looks at the interpreter. This is illustrated in Fig. 3:

Fig. 3. Gazr direction in interpreted group dialogs.

As the students have different visual orientations, there are fewer opportunities for them to establish mutual eye contact to coordinate their turn-taking. In their dialogue, there are seldom pauses which Lisa can use to visually process information about turn-taking. Lisa can therefore experience difficulties in establishing mutual intersubjectivity with Anna and Betty, recognizing speaker changes and identifying who is doing the talking. As the interpreter is sitting on a chair, the strategy of taking small steps to the right and left is not available. However, the interpreter uses several other embodied actions and environmentally coupled gestures to facilitate information about the possible message structures and the speakership. These are shifts in body orientation, shifts in gaze orientation, and shifts in facial gestures. Excerpts illustrating the strategies are presented in Fig. 4.

3.4. Shifts in body orientations

Analysis of the video-recordings shows that during the students' dialogue, the interpreter slightly shifts her body position to the left or to the right according to whether Anna or Betty is talking. The embodied shift is linked to information cues from the context, especially the students' placement around the table. The interpreter shifts her body position to her right when Anna is talking, and to her left when Betty is talking. The embodied shift is often made when the students are negotiating for attention and/or starting to talk, and is held simultaneously while interpreting their spoken utterances, at least at the start of these utterances. The location of the interpreter's signs also provides information about the addressees of the utterances. This is illustrated in the images in Fig. 4, line 04. When Betty is addressing Anna, the interpreter's body turns slightly to her left (to align with Betty), while her signs are directed to her right (toward Anna):

This excerpt illustrates that the interpreter constructs embodiment and environmentally coupled gestures which are visually accessible to Lisa, and she can use this information as cues to identify the speaker and the addressee, and construct a temporal state of intersubjective understanding with Anna and Betty according to their turn at talk. In another sequence (not presented here), when Lisa calls for the attention of the other two students (or one of them), the interpreter moves her body slightly forward towards the student Lisa is addressing. This embodied position constructs information cues that the hearing students use to identify that Lisa is seeking their attention. In this case, the interpreter's left–right and forward-back movements comprise a resource for all the students, which they can use to coordinate mutual attention and organize their turn taking shifts (see also Berge, 2018). Another embodied resource is the interpreter's shift in gaze directions.
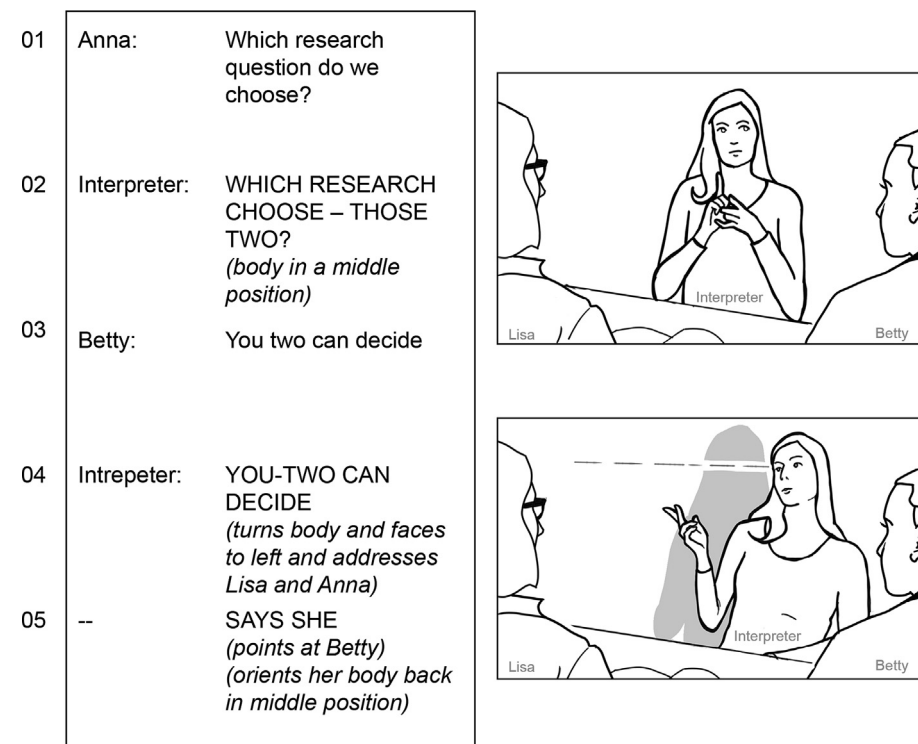
01	Anna:	Which research question do we choose?
02	Interpreter:	WHICH RESEARCH CHOOSE – THOSE TWO? *(body in a middle position)*
03	Betty:	You two can decide
04	Intrepeter:	YOU-TWO CAN DECIDE *(turns body and faces to left and addresses Lisa and Anna)*
05	--	SAYS SHE *(points at Betty)* *(orients her body back in middle position)*

Fig. 4. Shift in body position.

3.5. Shifts in gaze

Eye contact can often be taken for granted in spoken or signed interactions. This is not the case in interpreter-mediated dialogues between spoken and signed languages (Napier, 2015). Analysis of interviews with the team of interpreters at the three schools, shows that there has been a discussion about where they should orient their gaze when interpreting from NSL into spoken Norwegian. Interpreters have questioned whether they should look at the addressed person or whether should they hold their gaze on the deaf person. In the signed language interpreting field, there has been an assumption that interpreters should have a 'neutral stance' and hold it on the deaf participants (Janzen and Shaffer, 2013:63). The interpreter in this study has developed a different approach as she orients her gaze between the interlocutors. For Lisa, the interpreter's gaze orientation can function as an information cue according to which of the students is seeking a turn to talk. Fig. 5 illustrates how the interpreter introduces the shift of speakers through a shift in eye orientation:

Fig. 5, line 02, illustrates that when Betty starts to talk, the interpreter gazes in her direction. This gaze orientation can be valued as an environmentally coupled gesture since it facilitates situated information about the ongoing interaction and turn-taking (Goodwin, 2007a, 2007b). We can also notice that the interpreter highlights Betty's speaking style and expression: Betty is laying her head down at the table, saying that she is not able to concentrate on the problem they are working on (line 01). Lisa cannot directly capture Betty's intonation, but she can see a student laying forward on her table. To facilitate Betty's utterance in a visual-gestural way, the interpreter first chooses to identify Betty as the speaker by her gaze (line 02), then she frames the situation by describing Betty's speaking style with the information cues 'LAUGHS' (line 03), and next points at her placement (line 04). The interpreter finally mediates Betty's utterance, and that she cannot concentrate well (line 05). We can also notice that the interpreter makes a facial expression of smiling (line 06). In this situation, the interpreter is using a range of different resources to frame the message structure and facilitate information about the shift in genre (that the dialogue has changed from an academic to a more personal discussion). The meaning potential in Betty's embodied actions and spoken utterances can thusly become more accessible for Lisa. All in all, through information from several resources, all the students can establish an intersubjective understanding with one another.

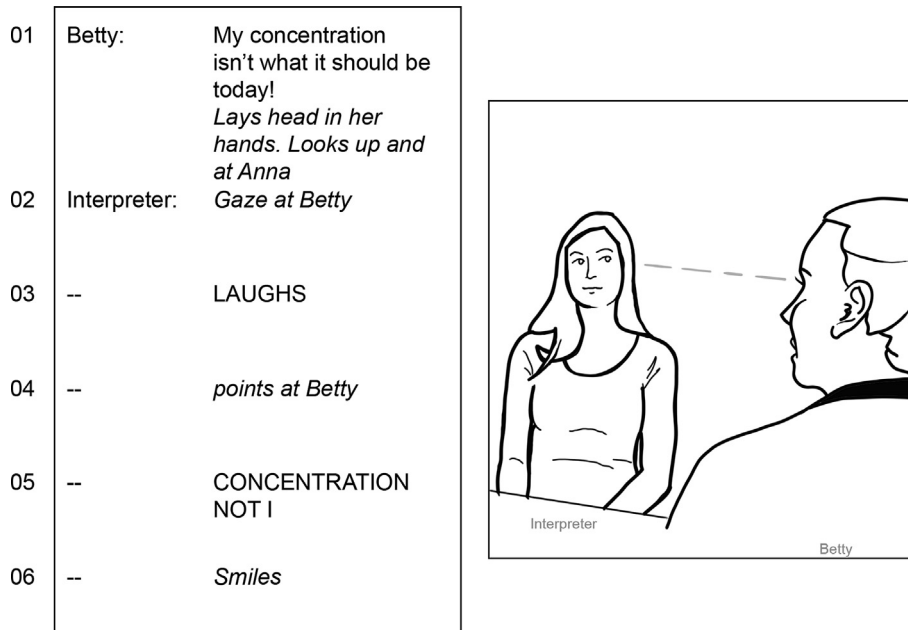| 01 | Betty: | My concentration isn't what it should be today! *Lays head in her hands. Looks up and at Anna* |
02	Interpreter:	*Gaze at Betty*
03	--	LAUGHS
04	--	*points at Betty*
05	--	CONCENTRATION NOT I
06	--	*Smiles*

Fig. 5. Introducing new speaker by shift in eye orientation.

Participation in activities is often organized around the establishment of mutual gaze (Goodwin, 1980, 2000, 2007b). The data analysis uncovers sequences where the interpreter establishes eye-to-eye contact with both deaf and hearing students, but also sequences where she uses her own gaze to coordinate states of mutual gaze between the students. These multiple levels of intersubjective eye-to-eye contact are shown in Figs. 6 and 7:

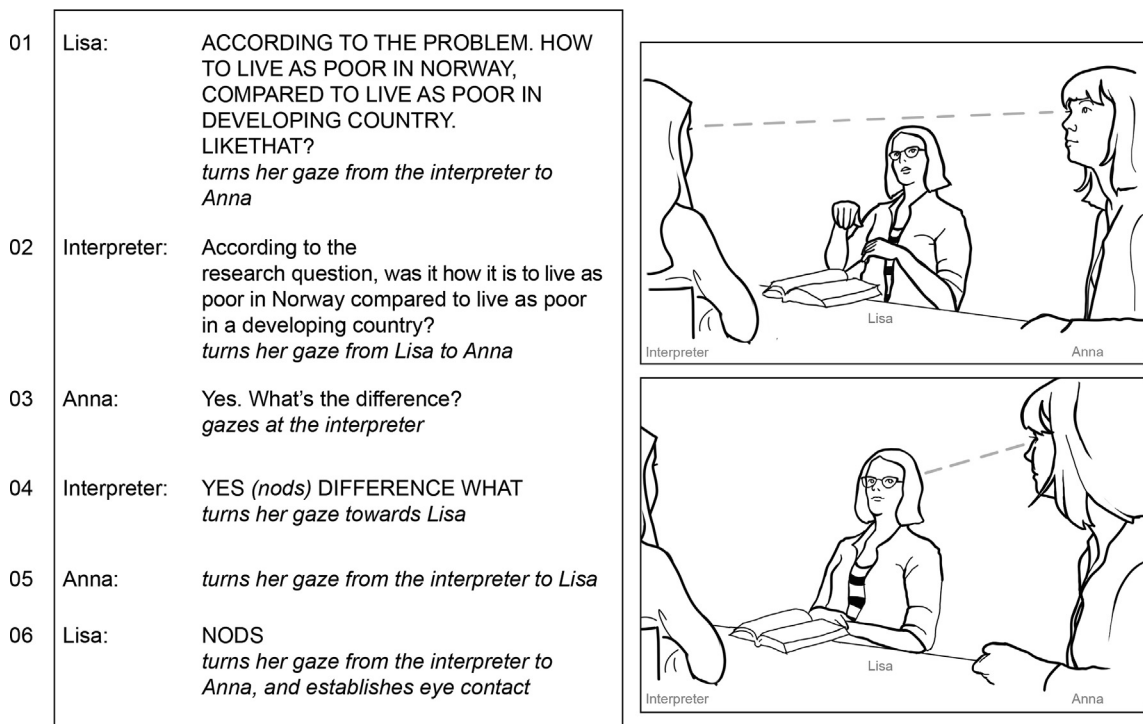| 01 | Lisa: | ACCORDING TO THE PROBLEM. HOW TO LIVE AS POOR IN NORWAY, COMPARED TO LIVE AS POOR IN DEVELOPING COUNTRY. LIKETHAT? *turns her gaze from the interpreter to Anna* |
02	Interpreter:	According to the research question, was it how it is to live as poor in Norway compared to live as poor in a developing country? *turns her gaze from Lisa to Anna*
03	Anna:	Yes. What's the difference? *gazes at the interpreter*
04	Interpreter:	YES *(nods)* DIFFERENCE WHAT *turns her gaze towards Lisa*
05	Anna:	*turns her gaze from the interpreter to Lisa*
06	Lisa:	NODS *turns her gaze from the interpreter to Anna, and establishes eye contact*

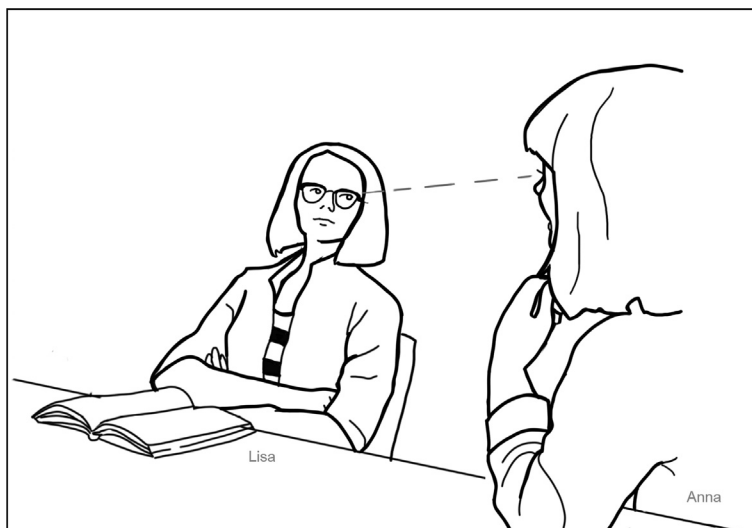Fig. 6. Eye orientation towards Deaf and hearing students.

Fig. 7. Gaze between students.

In Fig. 6, line 01, Lisa's utterance is addressed to Anna, but her gaze is on the interpreter. This interactional structure is necessary since the interpreter needs to see Lisa's face to capture her signing and mediate her utterance into spoken Norwegian (line 2). However, when Lisa has finished her utterance, and the interpreter is about to complete the mediation, they both turn their gaze towards Anna. At this point, Lisa establishes eye contact with Anna (line 06). The moment of eye contact between Lisa and Anna is highlighted in Fig. 7:

In this sequence of interaction, we can notice that the interpreter sometimes meets Lisa's gaze, or she meets Anna's gaze, and in some sequences, she navigates their respective gazes towards each other. Traditionally, it is recommended that the interpreter should hold their gaze on the deaf person, and through that embodied position, recognize them as the primary agents in the conversation (Janzen and Shaffer, 2008). However, in this situation, the interpreter is balancing her work between different languages and discourse practices. It seems like she recognizes that lack of eye contact might disturb the primary participant's interaction. For instance, when interpreting from NSL into spoken Norwegian, the voiced utterance comes from the interpreter. Anna, who is used to the spoken language tradition, might automatically gaze at the person who is voicing the utterance even though she knows that it is Lisa who is the primary participant in the dialogue. If the interpreter does not respond to Anna's gaze, she might experience it as a break of politeness. To hold a neutral stance just at Lisa may therefore not be an efficient strategy. However, the interpreter does not hold Anna's gaze. Rather, she navigates it back towards Lisa (line 04 and 05).

This analysis supports the value of cooperating. Both the interpreter and the students are adapting their talk and language practices towards a sensitivity for each other's possibilities to participate in the ongoing dialogue and learning activity (Baraldi and Gavioli, 2012). The way the interpreter shifts her gaze between the primary participants can be appreciated as an explicit coordinative action (Wadensjö, 1998), as it seems to maintain the dialogical relationship between Lisa and Anna. This coordinative action can be seen as an action of professional vision, identifying Anna's and Lisa's speaking position as the primary agents in the conversation. The excerpts above also illustrate how deaf participants can manage interpreter-mediated education. Most of the time, Lisa keeps her eyes on the interpreter. However, during their conversation, Lisa is actively searching for the moments where she can establish eye contact with Anna or Betty (illustrated in Fig. 6, line 6, and Fig. 7). Those moments might confirm Lisa's agency as one of the primary members in this learning activity. Interpreter-mediated dialogue is an atypical conversation type in this mainstream school environment. Lisa is the only NSL student in this school, and she enters into an asymmetrical speaking relationship with classmates who use spoken language. Most of them will be less familiar with deaf, sign language and interpreter discourse styles. Therefore, Lisa's participation cannot be taken for granted (Baraldi and Gavioli, 2012). The interpreter, even as qualified as she is, cannot alone establish states of mutual intersubjectivity. All participants must cooperate, and their mutual initiatives, in this case of establishing eye-to-eye contact with one another, may lay the groundwork for Lisa's access to feel included in the problem-solving activity (Antia et al., 2002).

3.6. Shifts in facial gestures

One final feature to be analyzed is how the interpreter uses facial gestures to describe the utterances' meaning potential, and the participants' speaking style. If the interpreter-mediated utterances do not reflect the speaking style of the original utterance, then temporal states of intersubjective understanding can be hard to achieve by the primary participants. In educational interpreting, deaf and hearing high school students expect the interpreter to mediate their messages correctly, and *in the same way* that they themselves are speaking or signing (Berge and Ytterhus, 2015; Napier, 2011). Working with a visual-gestural language, the interpreter can simultaneously mediate the utterances while constructing facial expressions which reflect the primary participants' speaking style. Fig. 8 illustrates how this interpreter is using her gaze orientation, the angle of her head, and the orientation of her upper body to reflect the speaking genre of a young student:

In this sequence, Betty is speaking with a loud voice, saying that her concentration isn't what it should be (line 01), and she lays her head in her hands. Betty indicates that she is tired and has lost her motivation to continue discussing which research question to include in their paper. Anna's response implies that it is only Betty who has lost her concentration (line 02), she and Lisa are still working. The sound of Anna's voice, compared to the earlier utterances, is quite loud (marked with '!' in the transcription). Her utterance can have multiple meaning potentials. One might be to tell Betty to work harder, another might be humor. From earlier experiences, it is reasonable for the interpreter to think that Anna has no intention to offend Betty. To facilitate this meaning potential, the interpreter uses several environmentally coupled gestures and facial gestures simultaneously. The interpreter leans her body position slightly to her right (line 3). That embodied movement is referring to Anna's placement at the table, and is an information cue, indicating that Anna is the speaker of the utterance. The interpreter is also gazing and pointing at Betty. That gesture is also an information cue, indicating that Betty is the addressed person. While mediating Anna's utterance, the interpreter uses large left–right head shake movements (line 03). In this situation, it seems like this mediation strategy coordinates a temporal state of mutual understanding between the students, as Betty answers (line 04), and they all laugh (line 05).

In a dialogue, there are moments of talk, but there are also moments of silence. This alternation is important in the meaning-making process between the participants. The next excerpt, Fig. 9, illustrates how the interpreter constructs an environmentally coupled gesture, a sign of silence, which is visually accessible to Lisa:

In Fig. 9, line 04, the interpreter constructs an environmentally coupled sign and a facial expression which facilitates information to Lisa that Anna and Betty are not talking, and there is a moment of silence (line 03). Her right and left hand construct a representation of Anna and Betty, and her handshapes construct a visual-gestural expression of 'lips are
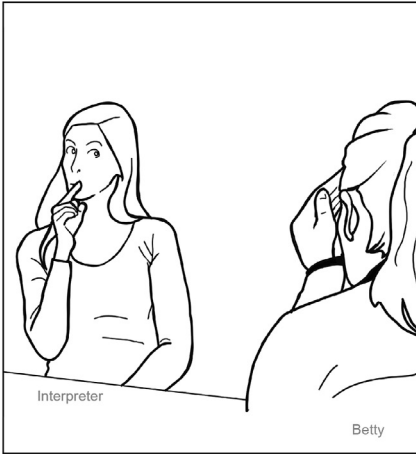
01	Betty:	My concentration isn't what it should be today!
02	Anna:	You don't have it! *(smiles, looks at Betty)*
03	Interpreter:	*Body orientation to her right* *Eyes on Betty* YOU *(points at Betty)* NOT *(headshakes left-right)*
04	Betty:	I know *(lays her head in her hands)*
05	All:	Laughter

Fig. 8. Facial gestures to reflect speaking genre.

01	Lisa:	BUT WHAT WAS THE OTHER RESEARCH QUESTION?
02	Interpreter:	But what was the other research question?
03	...	...
04	Interpreter:	SILENT *(visual - gestural for "both Anna and Betty are silent")*
05	All:	(laugh)
06	Anna:	But we said…

Fig. 9. Visual gestural sign to describe silence.

closed'. Simultaneously, the interpreter constructs a facial gesture to mediate information about the pause and the communication breakdown. In this way, the interpreter constructs a situated sign shaped by environmental factors (the students' placement around the table), and by insight in earlier utterances (students' confusion about which question they want to address). It seems like the interpreters' visual-gestural sign is not only understood by Lisa, but also by Anna and Betty. Their laugh (line 5) can be a response to how the interpreter visualizes their silence and makes them understand that they have lost sight of their topic. The facilitation strategy of describing the interaction and other participants' actions is to my knowledge not commonly used in signed language interpreting. It is more common in deafblind interpreting (Berge, 2014; Gabarró-López and Mesch, 2020; Raanes and Berge, 2017, 2021). However, it seems reasonable to think that this kind of facilitation gives access to information cues that make participation more accessible for all participants. Hopefully, there will be further studies which can contribute to analyses of this topic.

4. FINDINGS AND DISCUSSION

This study has investigated how intersubjectivity is achieved and interactionally negotiated in interpreter-mediated interaction through the interlocutors' vocal and visual perceptions of one another. The analysis has, inspired by Goodwin (2013), pointed out how the interpreter uses a range of different environmentally coupled gestures to facilitate information cues about the speakers' identities and the organization of talk. These cues included environmentally coupled gestures like pointing, shifts in body positions, shifts in gaze orientations, and shifts in facial gestures. The presented analysis has also highlighted the collaborative aspects within interpreter-mediated discourse, and that intersubjectivity is collaboratively organized between all the participants. The interpreters' contribution is essential in this process. The analysis has pointed out how the interpreter uses her professional experience as a resource to analyze and act according to the ongoing dialogue, within the given context, and to the purposes of the ongoing activity. To my knowledge, there are few studies in the field of signed language interpreting using a multimodal approach. However, as this study has shown, embodied resources are found to be effective mediation tools. More research on this topic will be valuable to grasp the complexity in signed language interpreting.

The findings in the current work support other studies of intersubjectivity in spoken discourse interaction (Iwasaki, 2011, 2015), and in interpreter-mediated dialogues between spoken and signed languages (Janzen and Shaffer, 2008, 2013; Raanes and Berge, 2021; Wilcox and Shaffer, 2005). The concept of intersubjectivity refers to the shared understanding of the immediate situation, the message structures, and the identity of the speaker (Rommetveit, 1974, 1985). It is more complicated to establish this understanding in interpreter-mediated dialogues since there are multiple levels of intersubjectivities at work, and across multiple individuals (Janzen and Shaffer, 2008). This is also demonstrated in the current study. The interpreter and the deaf student establish one level of intersubjectivity, the interpreter

and the hearing students share another, and the deaf and hearing students share yet another. However, as a group they also share moments of mutual understanding. Therefore, there are four levels of intersubjectivity at work, and at times they all align.

According to Bakhtin's (1986) question of "who is doing the talking", the answer is that all the present participants are involved in the dialogue. In this situation, the interpreter is not participating by providing her own opinions about the task or on the students' effort, but by interpreting what for her is the meaning potential in the students' utterances. Simultaneously, the interpreter is providing information cues that the students can use to establish temporal states of mutual understanding about the speakers' identity, their speaking style, and the flow (or pauses) in their communication. These information cues frame the ongoing interaction and lay the ground for how the students coordinate their interaction and turn-taking. However, the interpreter is not working alone. The students are sensitive to her mediation and to each other. As a group, they work together to chain their utterances into flowing communication, and their talk and embodied actions are made 'in concert' with each other and within the context that they are working (Goodwin, 2000, 2007, 2011).

The interpreter's contribution seems to be done with a sensitivity for deaf and hearing students access to participate in mutual interaction. It also seems like the interpreter is adapting her role and presence towards the communicative context as she contributes with smiles, eye-to-eye contact, and adding contextual descriptions (some in a humoristic way, which makes all students laugh). As youth, students' talk is expressed in a youthful speaking style. The interpreter's way of using multimodal resources, adapting her language use, and coordinating the ongoing interaction might be something that support Lisa and her classmates towards establishing an inclusive learning practice. This finding supports Smith's (2015) argument that educational interpreters must develop a professional practice where they promote deaf students' needs for information cues as bilingual learners, and that may lay the ground for better access to experiences of inclusion and participation.

Access and participation cannot be taken for granted. Inclusive education in mainstream schools for deaf students consists of daily participation in learning activities where a visual and a vocal language are used simultaneously (Berge and Thomassen, 2016). Most of the hearing students have little knowledge or experience with participating in interpreter-mediated conversations. Lack of knowledge can create interactional barriers that must be addressed. Adaptions must be made, for instance to coordinate barriers due to time lag and reduced eye-contact. Teachers and educational interpreters must work together and develop effective adaptation strategies which can lay the groundwork for access to academic learning and experiences of inclusion (Berge, 2023). We still have little research on educational interpreting, and the knowledge we have is not very accessible to the field of practice. For future work, it is important to conduct more research, and to share the findings with teachers, interpreters and students who rely on interpreter-mediated education.

Data availability

The data that has been used is confidential.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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