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Intersubjective understanding in finger braille interpreter-mediated interaction: Two case studies of other-initiated repair

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Abstract

This study analyzed data obtained from interviews with a deafblind man (DBM), mediated by Japanese finger braille interpreters (FBIs), to explore the negotiation of intersubjective understanding between participants. The DBM in this study co-invented a system of finger braille communication with his mother. He usually used two modalities to communicate with hearing and sighted others: Japanese voicing to convey what he wanted to say and finger braille letters tapped by FBIs to understand what the interlocutor was saying. Using the concept of other-initiated repair (OIR), we examined gaps in intersubjective understanding between the DBM and the interviewer (INT). OIR is a fundamental system that people use to resolve problems associated with speaking, hearing, and understanding to restore intersubjectivity during conversation. We examined two strategic uses of OIR: in the first, the DBM extends the repair segment although the INT completes the repair operation; in the second, DBM asks the FBI a question and manages the participation framework. We employed a mixed analytical method based on Conversation Analysis (CA) analyses, follow-up interviews, and multimodal interaction analysis to determine how OIR sequences coordinate intersubjective understanding in finger braille interpreter-mediated interaction. This study demonstrated some of the productive strategies and collaborative embodied efforts that facilitate deafblind communication and interpreter mediated achievement of intersubjective understandings.

Keywords: Deafblind; Finger braille; Interpreter-mediated interaction; Category-specific interrogative; Confirmation request; Multimodal resource

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1. INTRODUCTION

Deafblind individuals (who have both visual and hearing impairment) may use several modes of communication such as tactile sign language, finger braille, handwriting, and small-scale sign language for those with limited vision (Aitken, 2000; Brabyn et al., 2007; Brennan and Bally, 2007; Dammeyer, 2015; Danermark and Möller, 2008; Saunders and Echt, 2007).[1] In this study we examine the use of finger braille, which the Tokyo Association of the Deafblind defines as a method by which an interlocutor or interpreter pretends that the fingers of the deafblind person are six keys of a typewriter and directly types on the index/middle/ring fingers of his/her both hands (Tokyo Association of the Deafblind, n.d.). From sociological, anthropological, and sociolinguistic perspectives, studies have focused on how deafblind signers communicate in tactile sign languages in Sweden (Mesch, 1998, 2001), the United States (Edwards, 2012, 2014), Norway (Raanes and Berge, 2017, 2021), and Australia (Iwasaki et al., 2018; Manns et al., 2022; Willoughby et al., 2014, 2020; Willoughby et al., 2018). However, few studies have focused on finger braille, which is popular in Japan due to Satoshi Fukushima's autobiographical book (2011), but is mostly unknown elsewhere (except Bono and Fukushima, 2020; Ochiai and Bono, 2021; Sakaida and Bono, 2021). Therefore, the current study investigates finger braille interpreter-mediated interaction and explores how deafblind people understand what hearing and sighted interlocutors are saying. We examine finger braille interpreter-mediated interactions, with a focus on other-initiated repair (OIR) (Kendrick, 2015; Kitzinger, 2013; Schegloff et al., 1977), through a combined approach integrating conversation analysis (CA) (Goodwin and Heritage, 1990; Schegloff, 2007; Sidnell and Stivers, 2013), multimodal interaction analysis (Mondada, 2018; Streeck et al., 2011) and interviews. The abbreviation OIR was started to use mainly by the research group of Max Planck Institute for Psycholinguistics in Nijmegen (MPI) from the mid-2010s.

OIR is fundamental for resolving problems associated with speaking, hearing, and understanding, and for restoring intersubjectivity, during a conversation (Schegloff et al., 1977). The "hearing" part of the definition by Schegloff et al. (1977) is a matter of "reading" finger braille letters tapped on the fingers in the finger braille interaction. Regardless of whether the interaction is spoken, signed, or finger braille, the recipient initiates a *repair segment*, an interactional space to solve the problem, in the next turn following the trouble source. OIR temporarily stops the main course of the interaction and directs the participants' attention to addressing the trouble. Recently, several researchers have applied comparative and quantitative analysis to OIR sequences in several languages, arguing that repair sequences, particularly OIR, are a universal and fundamental system of human communication that transcend differences across cultures and communication modality, such as spoken and signed conversations (Byun et al., 2018; Dingemanse and Enfield, 2015; Dingemanse, Kendrick and Enfield, 2016; Dingemanse et al., 2013; Floyd et al., 2016; Hayashi et al., 2013; Kendrick, 2015; Manrique and Enfield, 2015; Manrique, 2016). OIR has also been applied to conversations with autistic preadolescents and used as a concept to extract features of their conversations (Wiklund, 2016).

Previous OIR studies have focused mainly on the trouble source (T−1) and the period from the point of the repair initiation (T0) to that of repair operation (repair solution, T+1). T# in this article is defined according to research by an MPI research team (e.g., Dingemanse and Enfield, 2015: 101; Kendrick, 2015: 166) to show the organization of repair sequence. The coding scheme for OIR has been established for a typological linguistic approach to understand a universal feature of conversational structures (Dingemanse, et al., 2016). Originally, Schegloff et al. (1977) identified the repair segment as the interactional space extending between T0 and T+1. Several studies of the extension of repair segments have been published in recent years (Dingemanse and Enfield, 2015; Haakana et al., 2021; Kendrick, 2015), but these studies only analyze the extension of repair segments between participants employing the same language and shared auditory access. When analyzing the structure of repair after a given turn, it is assumed that intersubjectivity in social interactions is supported by "common culture," "common sense," and "common and shared knowledge" (Schegloff, 1992: 1296–1299). However, in interpreter-mediated situations, it is difficult to assume "common" between the self and others because there is no common culture based on the same language and the same physical senses.

The deafblind man (DBM) who participated in this study commonly uses two modalities to communicate with hearing and sighted others: Japanese speech in his own voice to convey what he wants to say, and finger braille letters tapped on his hands by finger braille interpreters (FBIs) to understand what the interlocutor is saying. Through analyzing an interpreter-mediated interview by hearing and sighted interviewer (INT), findings reveal that the DBM used two primary repair strategies: 1) extending the repair segment and 2) managing a participation framework (Goffman, 1981) using

[1] According to a 2013 report by the Association to Support Helen Keller in Japan of the Japan Deafblind Association, commissioned by the Ministry of Health, Labor and Welfare, approximately 297,000 people across Japan have hearing and speech impairments, approximately 312,000 people have visual impairments, and approximately 14,000 people have both visual and hearing impairments (Association to Support Helen Keller in Japan, 2013). These values consider both acquired and life-long disabilities. In total, 77.4% of the deafblind population were aged > 65 years, 18.1% were aged 15–65 years, 0.8% were aged < 15 years, and 3.7% provided no response. Thus, hearing and vision impairments are more likely to affect older individuals.

semiotic recourses in embodied actions (Goodwin, 2000). The first strategy demonstrates that the repair segment can be further extended past the point at which the repair operation has been completed. The second strategy shows completion of the repair segment through the involvement of the FBI rather than the interlocutor (INT).

The following two sections introduce finger braille and interpreting for the deafblind in Japan (Section 2) and details the transcripts that will be treated in the analysis (Section 3). Therefore, we briefly explain a part of the analysis here and share one of the targeted issues in advance. The simplified transcript without FBI's finger braille tapping of the first strategy is presented below. The second strategy, on the other hand, involves more complicated multimodal and semiotic resources and will be explained later in the paper using Excerpt 2, Figs. 8, 9 and 10.

	Line #	Speaker	Contents of Utterance
	01	INT	ano, amerika de nisen-juuyonen ni *(Uh, in the United States in 2014)* [T-1]
->	02	DBM	nisen nan-nen? *(Two thousand what?)* **[Repair initiation: T0]**
	03	INT	nisen-juuyon *(2014)*
	04	DBM	nisen juuyonen hai *(2014 yes)* **[Repair operation completed: T+1]**
	05	INT	ano, ronbun ga *(Uh, a paper was)*
=>	06	DBM	kyonen desu ne? *((It was) last year, wasn't it?)* **[Repair extension: T0′]**
	07	INT	hai, deterun desu kedo *(Yeah, published)*

Note: INT = interviewer, DBM = deafblind man.

The first case will be analyzed in Excerpt 1 of Section 4.1. The DBM initiates repair by asking what year it is (as indicated by the single arrow [->]) in line 02. Then, the INT repeats the number as an attempt for repair operation, and the DBM repeats the INT's attempt in line 04 and adds "*hai*"(yes) at the end of his turn. And then, the INT returns to the main course of interaction in line 05. We can observe that the trouble was completely repaired for both parties. However, the DBM re-targets the same trouble in line 02 by asking whether it was "last year" (as indicated by the double arrow [=>]) in line 06. This is an example of the sequence being extended after the repair operation is completed.

Fig. 1 outlines the sequential structure of the repair initiation by Speaker B (the DBM). In some previous studies following Schegloff's early work on repair (e.g., Dingemanse and Enfield, 2015), their attention has probably been focused on the forward part of the repair sequence, as T# names have been assigned only from the trouble source (T-1) to the repair operation (T+1), and coding schemes have been prepared for them (Dingemanse, et al., 2016). We suspect that there is a possibility that the cases with a gap in the understanding of two parties for the completion point of repair operation, the latter part of the repair sequence, may not have been considered as much in previous studies. The two bold vertical lines in Fig. 1 show possible completion points of the repair segment for each speaker. This is analogous to the concept of "possible completion points in turn constructional unit (TCU)", which is the essential element of the turn-

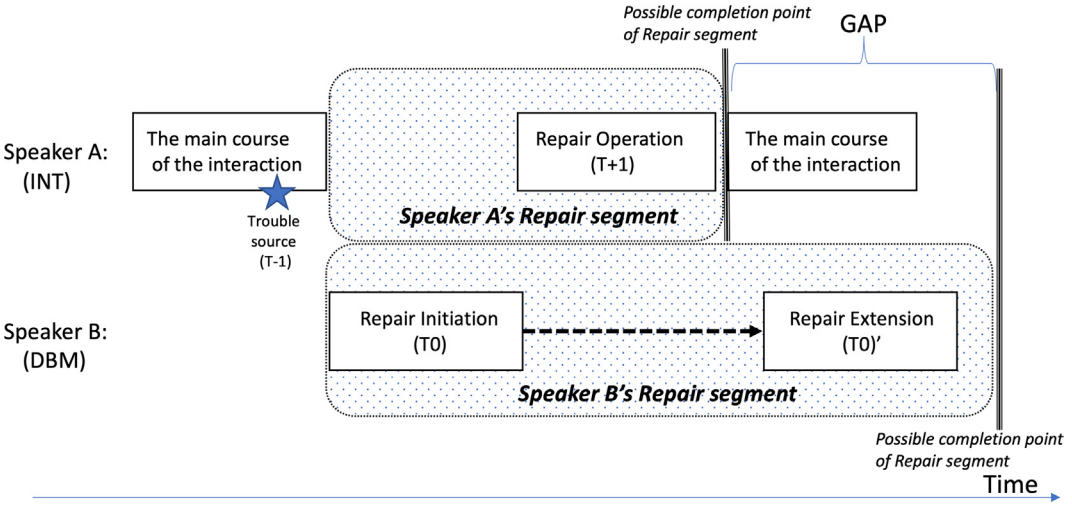

Fig. 1. Extended repair segments (the first strategy).

taking system (Sacks, et al., 1974). The space bounded by the two bold vertical lines shows a gap in the understanding of the INT and the DBM about the completion point of the repair operation. In such cases, the repair operation will not be completed simultaneously, and the repair segment will not be closed simultaneously. In a similar way that all transition relevance places (TRPs), are not actual transition places for turn-taking (Sacks, et al., 1974), possible repair segment completion points are only potential places within unfolding sequences. Therefore, a repair segment can be extended as the source of trouble is further negotiated by interlocutors. This study identifies instances where a gap in the completion of repair segments must be resolved through intersubjective understanding, and the negotiation is supported by the use of a variety of multimodal resources available within finger braille interpreter-mediated interactions.

The following section provides some background information on deafblind and finger braille communication in Japan. Then the data and methods of this study are explained, followed by data analysis and follow-up interviews that add context to the analyses. Finally, our findings are discussed and related conclusions are provided.

2. BACKGROUND: DEAFBLIND PEOPLE AND FINGER BRAILLE INTERPRETING IN JAPAN

People who identify themselves as deafblind fall into several classifications: congenitally deafblind, deaf-based deafblind, blind-based deafblind, and a posteriori deafblind.[2] The deaf-based deafblind classification refers to deafblind people who lose their hearing ability at an early age or are born deaf and lose their sight later in life. Because they were deaf signers prior to losing their sight, they have had the opportunity to acquire sign language as their first language, participate in deaf culture within the deaf community, and, in some cases, acquire a sense of deaf identity. These deaf-based deafblind people tend to transform visual sign language in a tactile manner through touching, known as tactile sign language (Willoughby et al., 2018). In contrast, blind-based deafblind people lose their sight at an early age or are born blind and lose hearing later. Some have had the opportunity to learn the braille letters of written language at blind schools, to read and write texts in documents or on Internet sites, and to communicate with others on social networking services. However, written texts are separated from real-time communication, such that the braille letters of written language are thus insufficient for blind-based deafblind people to communicate with others in real time. In response to this problem, finger braille communication was invented in March 1981 to facilitate real-time communication (Fukushima, 2011). Consequently, in Japan, many blind-based deafblind people and their families and friends currently use finger braille for their daily communication.

To facilitate a better understanding of the tapping movements used in finger braille interaction, we will explain the braille system used to represent Japanese *kana* --Japanese phonetic alphabets (script). The upper left area of Fig. 2 shows a photograph of a braille typewriter (known as the Perkins Brailler). Braille is generally produced on paper, whereby the user types on keys using six fingers: from the index finger to the ring finger of both hands. As shown in the upper center of Fig. 2, in the typical mode of tapping a Perkins Brailler, the index, middle, and ring fingers of the left hand are numbered 1, 2, and 3, respectively, while those of the right hand are numbered 4, 5, and 6, respectively (with the palms down). The formation of the numbers on paper is as shown using the circled numbers in the upper right of Fig. 2. In finger braille, an interlocutor or an FBI taps the fingers of the deafblind person in the same way that one presses the keys of a Perkins Brailler (Fig. 3). Blind-based deafblind people also use the finger braille technique for reading tapped letters.

The term ‘interpretation’ generally denotes the conversion of text or speech from one language to another (Wadensjö, 1999, 2015). However, finger braille interpretation does not involve conversion between languages but rather changes the spoken language’s production format into finger tapping. As finger braille interpreters tap letters, they hear without translating between languages, they do not require time to accumulate information themselves prior to translation. In other words, they are converting one system of communication to another. This involves less delay than other forms of language interpretation. Tactile sign language interpretation from visual language to tactile language also does not need to translation between languages (Berge and Raanes, 2013; Raanes and Berge, 2021). There is no evidence that tactile sign language interpretation takes more time compared to finger braille interpretation. However, from the aspect of scale of body parts, fingers may be able to move more quickly than hands.

[2] Individual circumstances vary with regard to the degree of deafness and blindness or the combination thereof; for example, in the case of deafness, full deafness differs from being hard-of-hearing. Some deafblind individuals also undergo cochlear implant surgery to enhance their hearing. In the case of blindness, depending on the type of disease or aging-related visual impairment, different vision conditions may occur, including central scotoma, tunnel vision, and narrow view (Brabyn et al., 2007). The ways in which deafblind people communicate with others are selected based on a combination of the degree and type of their deafness and blindness. Deafblind people in each of the above classifications encounter serious problems related to information acquisition, communication with others, and mobility (Aitken, 2000). It is not easy for fully sighted and hearing individuals to imagine the challenges that deafblind individuals face in their daily lives due to the pathological categorizations and combinations mentioned previously.

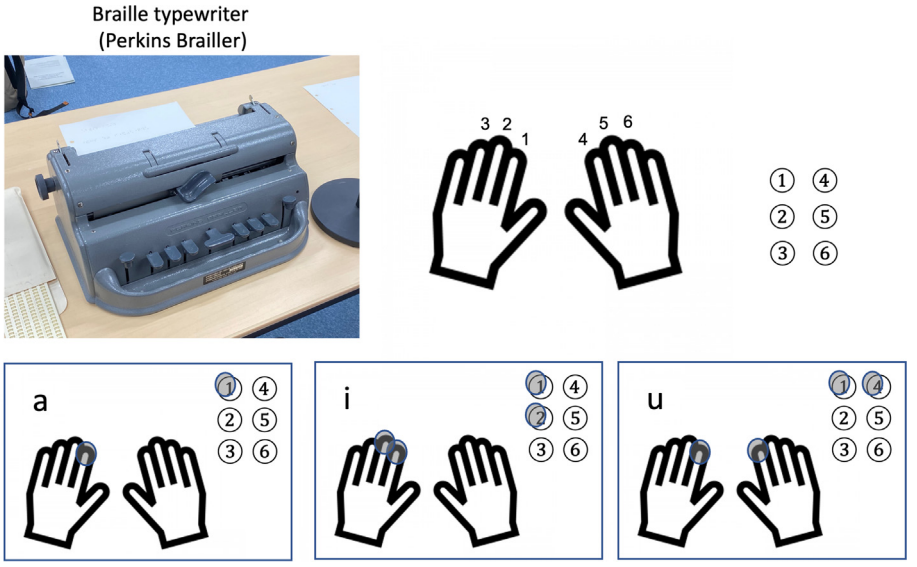

Fig. 2. Braille typewriter and typing examples.

Fig. 3. Finger braille.

3. DATA AND METHODS

3.1. Participant and data collection

The DBM who participated in this study lost his sight at the age of nine years, and his hearing at the age of 18 years, and is thus a blind-based deafblind person. The DBM in this study co-invented a system of finger braille communication with his mother and established the interpretation system with his colleagues. Documenting his communication style is essential to support the deafblind community in Japan because his style has been one of the standards followed by the Japanese deafblind community, especially blind-based deafblind people, for a long time.

In January 2015, we initially interviewed him in his office with the help of two experienced FBIs (Fig. 4). The FBIs sat on either side of the DBM, and when he wanted the FBIs to switch, he changed his hand position from right to left and from left to right, and the FBIs alternated. The nearly 150-minute interview was video-recorded by a professional cameraman from the best angles to record quick hand and finger movements without using a tripod. The interview began with reciprocal introductions and covered topics that included the deafblind man's autobiographical books and research articles on tactile sign language and deafblindness worldwide. Almost five years later, in December 2019, we invited the DBM to our laboratory for a follow-up interview to discuss the preliminary results of the CA analyses of our previous

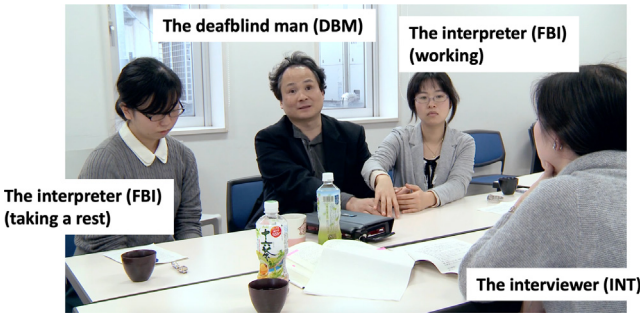

Fig. 4. Interview mediated by finger braille interpreters (FBIs).

interview with him.[3] A professional cameraman recorded the discussion and follow-up interviews using a tripod. Deafblind people cannot access CA transcripts or video data; thus, we used follow-up interviews based on general questions and solicited opinions about the previous interactions and our analyses. Generally, in CA studies, asking participants for their opinions on their interactions has the risk of being interpreted as coercion and/or of creating a situation in which participants find it difficult to give critical opinions. Follow-up interviews, on the other hand, are a very standard method in linguistic anthropology and a component of interactive sociolinguistics. Obviously, using this method requires well-developed questions and an academically legitimate stance of looking critically at the answers. In addition, in the present study which treats CA issues such as repair sequence, feedback was sought from the DBM because he had different physical senses and perceptions from the CA researchers and we could benefit from further first-hand insights into the interactions and their analyses.

3.2. Transcription method

The analytical transcripts were developed using CA transcription conventions (Schegloff, 2007; Sidnell and Stivers, 2013). The use of these transcription methods, which capture timing in minute detail, allows us to clarify who is exposed to what type of information and when. We first annotated the precise timing of speech and finger braille tapping using the annotation tool, ELAN (2021). Then, we transferred the annotated data into the CA transcripts. In Fig. 5, we explain the transcript notations using the first line of Excerpt 2, which is analyzed in Section 4.2. Fig. 5 presents (1) vocal speech, (2) word-for-word translation for speech and tapping with the grammatical gloss (GG) (for more detail, see Appendix B), (3) the English translation of the vocal speech, and (4) the timing and content of the tapping by the finger braille interpreter who tapped out the interviewer's speech on the fingers of DBM, which are aligned with utterances made by the DBM and the INT. From the finger-tapping motions of the FBI, the DBM received the content of the INT's utterances character by character (mora by mora). They were transcribed in capitalized *kana* characters, basically composed by consonant–vowel combinations, segmented by spaces. TIER is a technical line break method used in this article and consists of multiple lines. The vertical relations of these lines in TIER01, separated from the next tier by equal signs "===," show the temporal relationship between the participants' vocal speeches and the FBI's tapping. In the sample transcript (Fig. 5), the INT's utterance displays a terminal overlap with the DBM's utterance. Additionally, the FBI begins interpreting following a slight delay after the INT's original utterance. Numbers in pointed brackets, such as <0.2>, in the FBI's lines represent the duration of silent periods. The transcriber used both <0.2> (with 0) and <.2> (without 0), to get more space or to reduce space, to align the interpretation vertically with the concurrent vocal utterance.

For vocal speech lines, following CA conventions, numbers within parentheses () represent a pause in the turn (e.g., (0.3) in line 01 of Excerpt 1 in Fig. 6) and between turns (e.g., (0.9) in line 2 of Excerpt 1 in Fig. 6). Other symbols of CA transcription conventions are also used to denote the phonetic features of the spoken utterances of the INT and the DBM (see Appendix C). When an utterance is ongoing and the FBI is still tapping on the DBM's fingers or the FBI's fingers have stopped while lightly touching his fingers, an arrow, "- -->," is rendered using pointed brackets to indicate continuance (e.g., after "*AMERIKA`TE*" (in the United States) in the FBI's line aligning with vocal speech line 01 in TIER

[3] The long period between data collection and the follow-up interview could be considered a weakness in this article. However, for some particular phenomena, the period of data analysis may inevitably be extended due to the careful preparation of the follow-up interviews. Nevertheless, we were surprised to find that the deafblind man in this study clearly remembered what he had said in the data collection several years before. From this, we concluded that the follow-up interview were suitable for inclusion in this article.

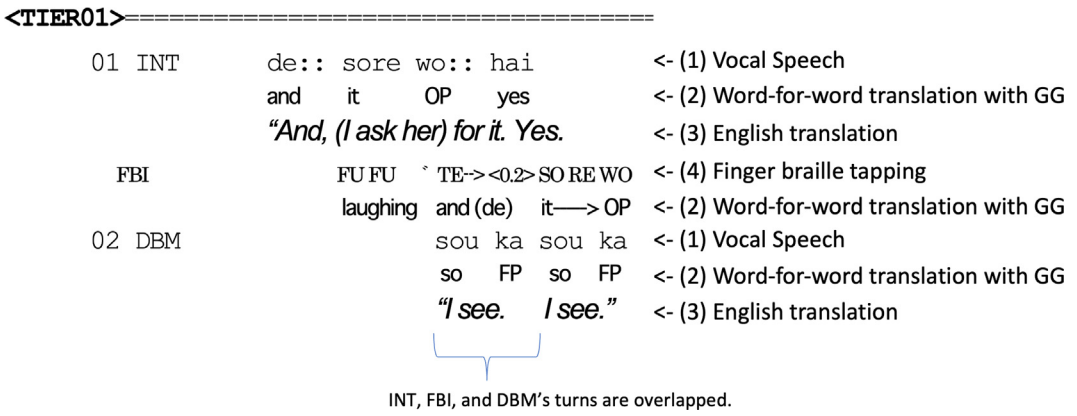

Fig. 5. Basic structure of a tier and lines from the transcript (from Excerpt 2).

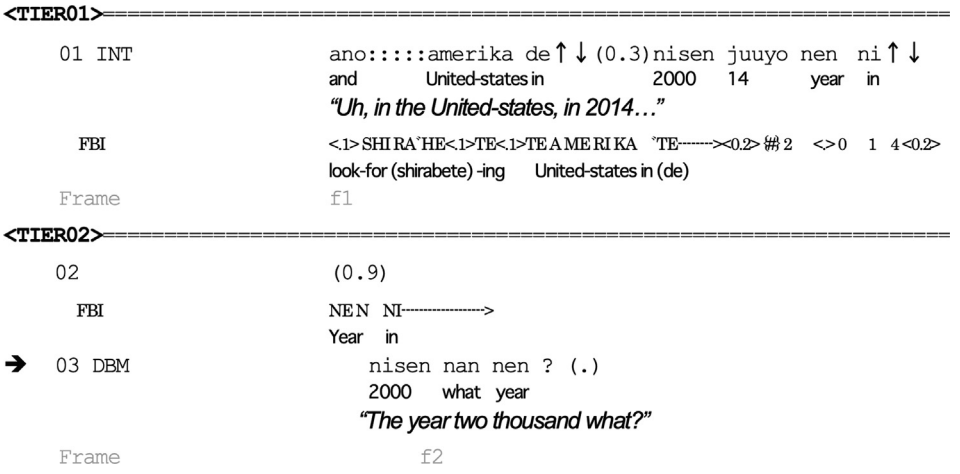

Fig. 6. Example of basic notations from CA and multimodal interaction analysis (from Excerpt 1).

01 of Fig. 6. This symbol is based on Mondada's (2018) convention of representing the continuance of multimodal resources. The arrow is used not only in the FBI's tapping lines but also in the FBI's grammatical gloss of tapping (e.g., 'IT -->' shows that the period of the grammatical gloss aligns with '*SO RE*' (it) in the tapping line in TIER 01 of Fig. 5). In Fig. 6, there is a frame line in gray font at the bottom of TIER 01 and TIER 02. 'f1' means frame 1, which was an image frame extracted from video clips (for actual image frames, see Excerpt 1 in Section 4.1), the position of which shows the timing of the video frames accompanied by speeches and the FBI's tapping lines.

Symbols specific to finger braille are also used. In TIER 01 of Fig. 5, the FBI's tapping sequence of `*TE SO RE WO*" (And, (I ask her) for it) is the interpretation of the INT's utterance, "*de:: sore wo:: hai*" (And, (I ask her) for it. Yes) in line 01. The presence of '˝' (a Japanese font for double grave accent marks) means that a voiced consonant follows it. For voiced Japanese letters in the braille form, the marker for voiced '˝' is placed before the letters, such as in the combination of '˝' and '*TE*' for the voiced kana '*de*' (and). Voiced sounds are typically expressed as "kana + voiced consonant mark" [e.g., て + ˝= で (te + ˝= de)]. However, in finger braille, the order of the components is reversed to "voiced consonant mark + kana", i.e., ˝+ て = で (˝+ te = de). Deafblind people can anticipate the letter of the upcoming utterance is voiced based on the presentation of the voiced consonant mark in advance. In grammatical gloss for voiced sound, we indicate the phonetic representation with parentheses such as (*de*). {#} has a similar anticipating function with the voiced sound, which indicates that the interpreter is signaling that numbers are going to be tapped (for more details, see the FBI's lines in TIER 01 of Excerpt 1 in Fig. 6). In the FBI's lines, brackets '{ }' are added to indicate finger braille-specific

abbreviations (See also Appendix A), which are specific words that are frequently used when communicating with the DBM, and were invented by him and his FBIs in advance to minimize interpretation delays for frequently used words. These abbreviations are not used by the general deafblind population, but are frequently used only in for the DBM who prefers rapid interpretation when talking with hearing and sighed people.

4. ANALYSIS

Observations and analyses revealed the two strategic uses of OIR. We found that repair initiated by the DBM can be further extended after the repair operation has been completed (Excerpt 1), and can be curtailed by managing the participation framework before the OIR (Excerpt 2). We expanded the analyses by incorporating relevant insights from the 2019 follow-up interview for Excerpt 1 and incorporating multimodal interaction analysis for Excerpt 2.

4.1. Excerpt 1

4.1.1. CA observation: Extending the repair segment

Excerpt 1 is a transcript of an FBI's tapping behaviors added to the simplified transcript, introduced in Section 1. Prior to Excerpt 1, the INT says, "Recently I did a literature review on tactile sign language," and she continues in Excerpt 1: "*ano::::: amerika de nisen juuyonen ni nisen juuyon ano:::: ronbun ga ha:i deterun desu kedo*" (Uh, in the United States in 2014 2014 uhhh, a paper was published). During this INT's turn, two other-initiations for repair (OIRs) by the DBM are inserted, which are indicated by arrows in the transcript of Excerpt 1.

The first initiation uses a category-specific interrogative (Kendrick, 2015; Kitzinger, 2013; Schegloff et al., 1977) with a partial repeat of the INT's previous turn with rising intonation, "*nisen nan nen?*" (The year two thousand what?) in line 03. The subsequent repair initiation is a confirmation request, "*kyonen desu ne?*" ((It was) last year, wasn't it?) in line 08. During the first OIR, when the DBM received a reply from the INT (line 04), he repeated it and added "*hai*" (yes) at the end of his utterance in line 05, indicating a closing procedure for the repair segment. Nevertheless, the DBM added a confirmation request to the INT's ongoing talk in the main course of interaction. This is the second OIR and an extension of the repair segment.

Now we consider the temporal relationship to understand how INT's speech had been delivered to the DBM through finger braille interpretation when the DBM initiated repair. In lines 02 and 03 of TIER 02, the DBM initiated repair (OIR) when the FBI finished tapping "*2014 NEN*" (the year 2014). This was a trouble source (TS) for him. Fig. 7 shows the temporal relationships among the INT, FBI, and DBM, including ELAN annotations and white rectangles highlighting utterances. The OIR overlapped with the FBI's holding taps of the last letter of INT's phrasal boundary, particle '*NI*' (in). There was a long gap of about 0.9 seconds between the INT's words and the OIR by the DBM, as shown in Fig. 7. Although it is too long for a phrasal boundary, it is visually rather obvious that this is not a silence between

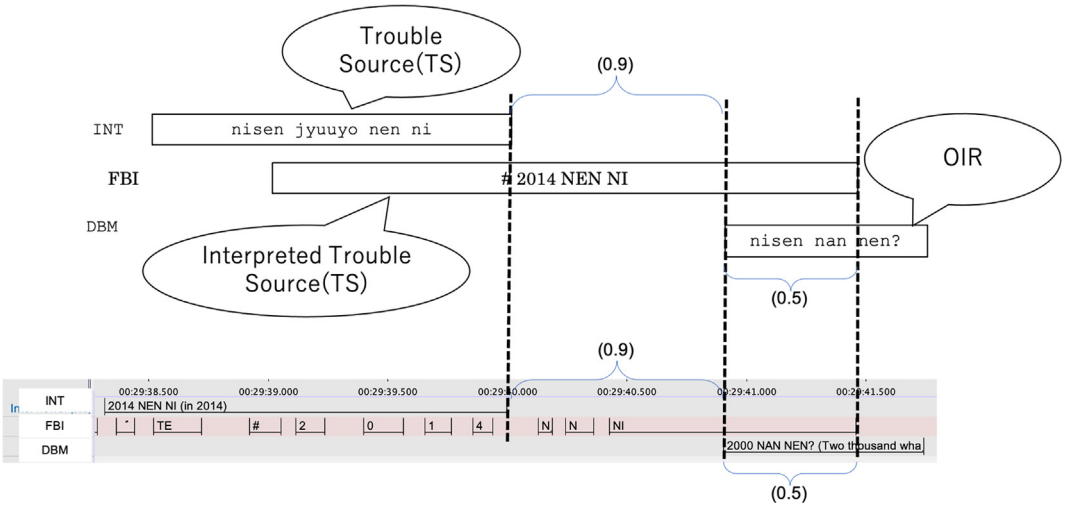

Fig. 7. OIR in last letter of INT's phrasal boundary '*NI* (in)' tapped by FBI.

<TIER01>==========

01 INT ano:::::amerika de↑↓ (0.3) nisen juuyo nen ni↑↓
and United-states in 2000 14 year in
"Uh, in the United-states, in 2014…"

FBI <.1> SHI RA˚HE<.1>TE<.1>TE A ME RI KA ˚TE------><0.2> ## 2 <>0 1 4<0.2>
look-for (shirabete) -ing United-states in (de)

Frame f1

<TIER02>==========

02 (0.9)

FBI NE N NI---------->
Year in

➔ 03 DBM nisen nan nen ? (.)
2000 what year
"The year two thousand what?"

Frame f2

<TIER03>==========

04 INT nisen juuyon (.)
2000 14
"2014."

FBI ## <.1> 1 4----------> <0.2>----->{123tap}

05 DBM >nisen juuyo nen< hai
2000 14 year yes
"2014. Yeah."

<TIER04>==========

06 (0.2) ->

FBI --><0.6--->

<TIER05>==========

07 INT ano::::ronbun ga
and paper TC
"Uhhh, a paper has…"

FBI ---------->A NO----------> <0.2>--------->RO <.1> {abb.235+
F pa- {paper

➔ 08 DBM kyo nen desu ne ?
last year COP FP
"(It's) last year, isn't it?"

<TIER06>==========

09 INT ha:i deterun desu kedo↑↓
yeah been-published COP but
"Yeah, (it has) been-published."

FBI RO} ˚ KA--------><.1> ˚TE TE RU N------>
(ronbun)} TC (ga) been-published (deterun)

f1

f2

Excerpt 1. "*Nisen nan nen?*" (The year two thousand what?)

the INT and the DBM, but a time delay in the interpretation, because the FBI is proceeding with finger braille tapping to the DBM in front of the INT. This temporal relationship shows that the DBM initiates the repair at the phrasal boundary of the INT. This is the earliest position for inserting the question.

Next, we examine the question type of DBM's repair initiation. At this point, the DBM initiated a category-specific interrogative with his body oriented toward the INT (f2 in Excerpt 1). Then, the INT answered immediately in line 04, using only the year number "*nisen juuyon*" (2014) without the classifier (*nen* 'year'), which is the repair operation. The FBI tapped the number signal {#} and "14" a part of the year number "2014," at the same time as the INT's repair operation. As described above, the troubles that DBM made explicit using category-specific interrogative succeeded in eliciting answers specific to the trouble part from the INT, leading to the FBI tapping the trouble part again without waiting for the interlocutor INT's answer. And then, the DBM repeated the year number with the classifier (*nen*) and added the response marker '*hai*' (yes) at the end of his speech in line 05, which looks like the DBM closed the repair segment with his enhanced understanding.

Finally, we discuss the gap at the repair completion point in Excerpt 1. After a repair segment initiated by the DBM, in line 07, the INT returned to the main course of the interaction with the lengthened filler "*ano:::*" (uhhh), indicating that she would continue to talk. '*Ano*' in Japanese functions as an indicator that the speaker is going to talk in the next turn and is searching for a potential next word (Sadanobu and Takubo, 1995). The DBM received the filler '*ano*' tapped by the FBI before starting his confirmation request, so it is possible that he could anticipate that the INT's talk would return to the main course of the interaction. Nevertheless, the DBM initiates repair again by using a confirmation request, "*kyonen desu ne?*" ((It was) last year, wasn't it?), which overlapped with the talk returning to the main course of interaction by INT in line 07. Here, the DBM does not repeat the exact number but rephrases the year number to a relative representation of the timeframe ('*kyonen*' (last year)). We speculate that line 08 is essential for the DBM as the last possible position to insert a confirmation request to confirm his understanding of the year the paper was published. This confirmation request was designed to show his candidate understanding, such as a *Y'mean plus a candidate understanding of the prior turn* called in Schegloff's early work on repair (Schegloff et al., 1977; Kushida, 2011), combined with a relative representation of the number. Thus, the subsequent repair initiation, rephrasing by the DBM, retargets the same trouble source as the prior repair initiation. It shows that the DBM participates in the interaction and understands it by showing the time frame of the word (in this case, the last year) and understanding of the INT's utterance.

4.1.2. Follow-up interview

The follow-up interview was conducted in 2019 to obtain the opinion of the DBM regarding the observations discussed in Excerpt 1. This section presents two of DBM's narratives on numbers. Willoughby et al. (2020) also pointed out that numbers are less predictable for deafblind people who use tactile Australian Sign Language (Auslan) and that experienced tactile Auslan signers will hold their number signs to allow the recipient to touch them (p.241). In the interview responses the DBM mentioned his impression of numbers in finger braille interpreter-mediated interaction describing:

> *I can read conversation by analogizing in context or words used before and after a point in time. I value the context to make uncertain information more certain. However, some types of information cannot be read from the context. One example is numbers. I recognize numbers as fragile words—words that can easily collapse and break.*

In finger braille, numbers are communicated by tapping combinations using six fingers. If deafblind people make a mistake when reading tapping combinations, the numbers will be completely different. From this narrative, we noticed that numbers would be a trouble source for deafblind people, which could require frequent repair in conversations. He commented on the case in which he had difficulty understanding, e.g., numbers, explaining:

> *In a one-on-one dialogue, I cannot proceed by leaving behind something I don't understand. Sometimes I might believe wrong information if I have made a reading mistake, or the interpreter has made a mistake. Therefore, I confirm my understanding by repeating or rephrasing what the interlocutor said. For example, I can rephrase a year expressed by a number as "last year" or "the year before last year."*

In general, reference to numbers is considered a precise and easy way to share information. Especially, in the academic context, researchers generally mention authors and the publication year when referring to an article. However, this practice may not be "common" for everybody. In Excerpt 1, the INT continued talking and did not adjust her talk to enhance the DBM's understanding about the number. Because the INT, who has an academic background, was not aware that the mention of numbers posed difficulties for deafblind people. As a result, the INT proceeded assuming

that the repair segment was closed. This analysis suggests that it is important to take into account that each participant will have a different view of the resolution and that there will be discrepancies in judging whether the repair operation has been completed and an intersubjective understanding has been achieved.

4.2. Excerpt 2

We introduce the second strategic use of OIR, such as managing the participation framework (Goffman, 1981, Goodwin, 1986, 2007; Goodwin and Goodwin, 2004; Rae, 2001). Goffman (1981) proposed the idea of *participation framework* in communication. First, he defined the difference between focused and unfocused interactions depending on the difference whether there is the one purpose to communicate or not. Next, he defined the difference between ratified and unfocused participants, that is, between participants who are allowed to participate in communication and those who are not. And he further defined the role of the participant as speaker and the role of the participant as listener. The finger braille interpreter-mediated interview addressed in this study is a focused interaction, and all participants, including interpreters, are also ratified participants. On that basis, we observe here how the utterances related to the OIR produced by the DBM are designed in the interaction and how all participants rapidly understand his recipient design such as addressing pattern. Fig. 8 shows the two OIR addressing patterns, from the DBM to the INT and to the FBI. We observed 34 instances of OIR in our dataset; 23 involved the addressing pattern (1), to the INT, and 11 the addressing pattern (2), to the FBI.

4.2.1. CA observation: Managing the participation framework before OIR

Excerpt 2a illustrates how the DBM manages the participation framework before initiating repair to prevent misunderstanding caused by finger braille interpretation. The repair sequence initiated by the DBM "*n::sore wa nani? sore wa?*" (Ummm, what is it? It's?) (line 06 of Excerpt 2a) is the target line.

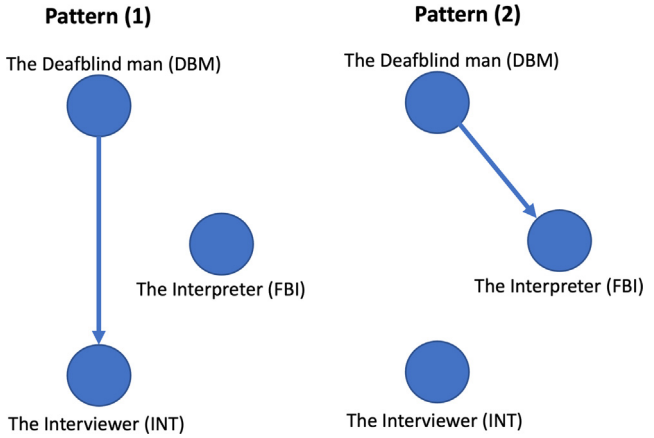

Fig. 8. OIR addressing patterns.

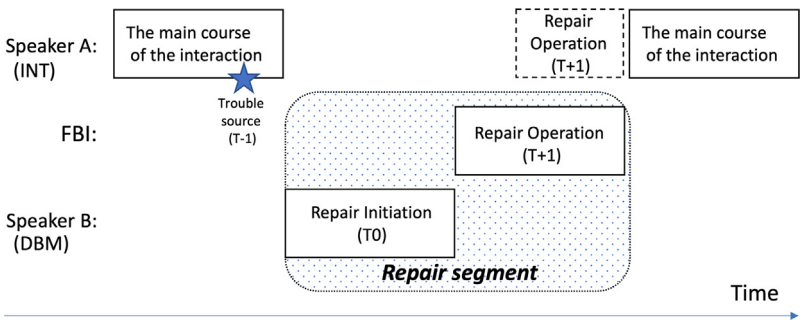

Fig. 9. Managing the participation framework before OIR (the second strategy).

Before line 01, the INT was trying to explain what their mutual friend had been doing in her laboratory. When the INT completes her turn: "*kanji desu ne*" (It's like) in line 04, the DBM initiates repair in line 06, "*n::sore wa nani? sore wa?*" (Ummm, what is it? It's?). "*Sore* (it)" in his question arises from the INT's speech in line 01, which was the trouble source for the DBM. After the DBM asked the question, "*n::sore wa nani? sore wa?*" (Ummm, what is it? It's?) in line 06, the FBI immediately provides a repair solution by tapping the source "SHI ˋKO TO IRAI" (request to work). At the end of the FBI's repair operation, the DBM displays his understanding by an oh-prefaced utterance, which changes the information state in mind (Endo, 2018; Heritage, 1984,1998, 2002) through "*a:::naruhodo::: naruhodo hai*" (Oh, I see I see. Yes) in the latter half of line 06. The repair operation was accomplished between the DBM (Speaker B) and the FBI, which is illustrated in Fig. 9. Although the INT also attempted a repair operation, "*shigoto wo onegai shiteiru*" ((I) asked (her) to

<TIER01>==========
01 INT de:: sore wo:: hai
and it OP yes
"And, (I ask her) for it. Yes.
FBI FU FU ˚ TE--> <0.2> SO RE WO
laughing and (de) it——> OP
02 DBM sou ka sou ka
so FP so FP
"I see. I see."
<TIER02>==========
03 (7.0)
<TIER03>==========
04 INT kyou ano::shigoto irai shiteru kanji desu ne
today and work request -ing kind-of COP FP
"Today, well, (It's) like I request (her) to do some work."
FBI SO RE WO <0.4>·····>y <0.1>>SHI--><>ˋKO TO <0.1> I RA I SHI--->
it———>OP work (shigoto)-> request
<TIER04>==========
05 (2.0)
FBI TE RU KA N ˚SHI {abb.46+NE} <0.6>
ing—>kind-of (kanji) {COP+FP (desune)}
<TIER05>==========
➔ 06 DBM n::sore wa nani? sore wa? >shigoto (i)< a:::naruhodo:::ºnaruhodoº(.)hai
F it TC what it TC work (re-) oh I-see I-see yes
"Unnn, what is it? it's? work-re - Oh, I see, I see, yes."
FBI ----------->SHI ˚KO TO I RA I----------->
work (shigoto)—> request———————>
07 INT shigoto wo onegai shiteiru hai
work OP ask -ing yes
"I ask (her) to work (for me)." "yes."
<TIER06>==========
08 (0.4) -------->
FBI {123tap} {123tap}-->
<TIER07>==========
09 DBM un <breathy voice>
uhn
"Yeah."
FBI -->
<TIER08>==========
10 (0.2)
<TIER09>==========
11 INT de nanka ano:::
and F F
"And, well, uhnnn"
FBI ˚TE NA N KA

Excerpt 2a. "*Sore wa nani?*" (What is it?)

Excerpt 2b. Part of "*Sore wa nani?*" (What is it?)

work (for me)) in line 07, the repair operation by FBI was accomplished earlier than the INT's attempt of the repair operation. As a result, the INT's repair operation in line 07 was not taken up and not interpreted. After that, the INT moved on to the next topic in line 11 without repeating her repair operation again. It shows that, in the side sequence, all participants understand the DBM selected the FBI as a next speaker (Clark and Carlson, 1982; Garfinkel, 1967). To illustrate this, Fig. 9 shows the repair operation of the INT (speaker A) in the dotted square. At the TIER 05, the DBM organized a side sequence for the repair with FBI rather than INT.

4.2.2. Multimodal interaction analysis

To reveal how the DBM organizes the side sequence with the FBI, we analyzed the multimodal actions of the DBM and the FBI using the method of multimodal interaction analysis. We build on Berge (2018) who analyzed multimodal actions by the sign language interpreters in group work between deaf and hearing upper secondary school students. The multimodal action in finger braille interpreting is used in the space where their bodies touch each other and in the hand space of the FBI and DBM. Excerpt 2b presents the DBM's multimodal actions and the FBI's hand-tapping movements (in gray) to line 06 and 07 of Excerpt 2a. The DBM turned to the FBI while initiating the repair sequence, "*n::sore wa nani? sore wa?*" (Ummm, what is it? It's?) in line 06. The tilting in his upper body is clearly seen in the difference between frame 1 (f1: Just before the start of repair initiation) and frame 2 (f2: while producing repair initiation). The tilting behavior of the upper body is related to the concept of *body torque* (Schegloff, 1998; Kamunen, 2019) in the sense that the DBM temporarily changes his involvement to the FBI's interpretation using his upper body. In addition, the DBM leans his body toward the FBI in frame 3 (f3) to receive repair operation by FBI. After that, the DBM looks back to the INT in frame 4 (f4) when the repair operation was completed. The multimodal actions of "questioning" occur within a short duration, as a temporary *interactional space* (Mondada, 2009). The FBI reacted to the multimodal actions for repair initiation (f2) by the DBM by tapping the back of the DBM's right hand twice with the palm of her right hand, close to her wrist (Excerpt 2b and Fig. 10). This is similar to the technique in tactile sign language interaction called *haptic signs* (Gabarró-López and Mesch, 2020; Raanes and Berge, 2017). Raanes and Berge (2017) explained:

> "Haptic signs are conventional signals produced on a deafblind person's body providing contextualizing information about the environment where the interaction is taking place. They also work to convey other participants' nonverbal expressions, such as turn-taking, minimal-response signals and emotional expressions" (p. 91).

The FBI's tapping-back movement appeared to be acknowledged as a *backstage utterance* (Raanes and Berge, 2017: 97), like "I am receiving your question," before starting the repair operation.

Fig. 10. The FBI's tapping movement (the FBI tapped the back of the deafblind man's right hand twice with her right hand).

The DBM's multimodal actions and FBI's tapping-back movement in Excerpt 2b illustrate that the DBM's question was addressed to the FBI. In addition, the DBM's multimodal actions could also be visual resource to the INT. So, it was obvious to all participants that the DBM selected the FBI as the addressed next speaker, while the INT had become a peripheral participant, such as a *side-participant* or *bystander* in the participation framework (Goffman, 1981, Goodwin, 1986, 2007; Goodwin and Goodwin, 2004; Rae, 2001). The INT identifies herself as a peripheral participant by closing her turn using "*hai*" (yes) in line 07 and returning to the main course of interaction in line 11. In this light, it was acceptable for all participants in the framework that the INT's repair operation—"*shigoto wo onegai shiteiru*" ((I) asked (her) to work (for me)) in line 07 —was left out, and furthermore was not interpreted and relayed to the DBM.

In general, interpreters are not often seen as active participants in an interpreter-mediated interaction. There is a recurring debate among interpreters about determining the appropriate level of involvement in the interaction. This level of involvement is determined by the interpreter's ability, the orientation of the other participants, and the level of interaction (Wadensjö, 2015). The FBI in this study was a highly experienced interpreter. She immediately sensed that the DBM was asking for information from her and thus performed the repair operation without waiting for the INT's repair operation. In the follow-up interview, the DBM mentions managing mistakes. He explained: "*Sometimes I might believe wrong information if I have made a reading mistake, or if the interpreter has made a mistake.*" His comment shows that he is aware of the possibility that reading problems may occur between the DBM and FBIs, and he also needs to ask back to the FBI to maintain intersubjective understanding in interactions.

5. DISCUSSION

The follow-up interview regarding the first strategy, which is the repair segment can be further extended by DBM past the point at which the repair operation has been completed, reinforced that it may be a useful strategy deafblind can employ for clarification. Although category-specific interrogatives and reformulation of confirmation requests may not be the only methods available for knowing others, but they are common strategies for understanding others in a conversation based on previous studies (Kendrick, 2015; Kitzinger, 2013; Schegloff, 2007; Schegloff et al., 1977). When the DBM subsequently shared his thoughts on numbers in finger braille interpretation in the follow-up interview, he described numbers as fragile items that can easily collapse. His sense differed from that of hearing and sighted people, indicating the high potentials for an unshared experience that requires negotiation to reach mutual intersubjective understanding. This example and analysis challenge the simple expectation that certain concepts (e.g., numbers) can be understood through shared knowledge and common culture. We suggest that an intersubjective understanding of num-

bers represents a trouble source for deafblind people interacting with hearing and sighted people and greater awareness of the difficulties could assist with facilitating smoother interactions.

In the multimodal interaction analysis of Excerpt 2, we observed the multimodal actions by the DBM to solve the possible interpreting trouble or the trouble that had resulted from faulty reading. To maintain the intersubjective understanding with the INT, the DBM conducted a short side sequence to organize the repair segment with the FBI. The DBM turned his body toward the FBI when he asked her a question in the side sequence. This multimodal action, which the DBM spontaneously performed, indicates that there is a possibility that he understands the common physical and visual behaviors that indicate intentions to perform an OIR with a specific person (in this case, FBI). Since DBM was not born deaf-blind, but became blind at age 9 and deaf at age 18, he may be using his memory of the visual world up to age 9 for the recipient design of addressing his utterance to someone in particular (Clark and Carlson, 1982; Garfinkel, 1967). Or, he may have realized the recipient design of addressing his utterance to someone in particular by placing himself at a distance where he can feel the skin sensation and temperature of the other person. The results of this analysis were not available at the time of the interview in 2019, and all of these points are beyond the author's estimation. However, within this complex finger braille interpreter-mediated interaction, these multimodal actions were successfully employed to reinforce and clarify participation frameworks.

Complementing CA analyses, the follow-up interviews offered valuable insights and information. Without the follow-up interviews, it would have been difficult to understand the reason for his OIR extension through repeated confirmation questions and to understand that the DBM sometimes doubts and seeks clarification regarding a tapping mistake by the FBI. Incorporating the multimodal interaction analysis also helped illuminate why the INT's repair operation was floated but mutual understanding still achieved. Using CA to understand the sequential organization of the interaction, combined with follow-up interviews, was crucial to understanding how the deafblind man maintains intersubjectivity in social interactions. Although this study demonstrated usefulness for mixed methodologies, further refinement and improvements are needed to help capture and understand complex interactions involving people who have different physical senses.

This study also raises several limitations regarding generalization of practices and application of methodologies. For instance, it is unclear if the strategies found in this study are used consciously by deafblind people in general or highly specific to the DBM studied. It is vital to analyze additional conversations to determine the range of related strategies used. In addition, beyond the fragility of understanding numbers in finger braille, there are likely other phenomena that deafblind people experience in other ways (e.g. *number holds*, Willoughby et al. 2020).

6. CONCLUSION

In the follow-up interview, the DBM talked about his feeling on encountering troubles and how they affected his daily life explaining:

> *Well-organized writing is not what I use to grasp the world around me; rather, I use noise, redundancy, or things like that—in other words, clatter, chat, and mistakes. This means that a conversation in which troubles arise makes it easier to understand the world. Without trouble, noise, or something scratchy, my daily life and entire life seem too smooth. In fact, I am living in an unstimulating place, so I sometimes feel like I am drifting in space or feel lonely. I feel alive when something new happens, not in routine situations. I even have this tendency toward information and conversation.*

It is precisely because of the discrepancies that interactants can feel a sense of being alive. The smooth closure of the OIR side sequence for both parties is ensured by their intersubjective understanding of things in common. Extending the repair segment to confirm understanding is a valuable means to achieve commonality in social interactions. The halting of the main topic and extending of the interaction provide an opportunity for deafblind to ensure they understand. The DBM elaborated:

> *As I see how the interviewer responds or answers this type of question when trouble arises, I can imagine how flexible she is or how tolerant she is of others' mistakes. When I met her for the first time, or during the interview in 2015, I had some empathy with her through dialogue and thought that she was a person with whom I could connect. Getting that kind of feeling is the purpose of communication.*

This reflection reinforces that the negotiation of trouble sources and working through OIR sequences is a key aspect of communication. This study demonstrated some of the productive strategies and collaborative embodied efforts that facilitate deafblind communication and interpreter mediated achievement of intersubjective understandings.

Sighted people inhabit a visible world, so they have opportunities to learn visually about their interlocutor's personality through their physical distance from the interlocutor and occasional smiles and gestures. Hearing people inhabit an auditory world, so they have opportunities to learn aurally about their interlocutor's personality from their tone of voice, the speed at which they speak, and their breathing. Without such opportunities, deafblind people must connect more deeply with their interlocutors using other methods to maintain intersubjectivity in interaction. We found that category-specific interrogatives, reformulating confirmation requests, and multimodal resources for organizing participation framework, which are the focus of this article, provided the DBM with crucial opportunities to enhance his connection with his interlocutors and the world around him.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Mayumi Bono: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Rui Sakaida:** Data curation, Formal analysis, Investigation, Methodology, Validation. **Kanato Ochiai:** Data curation, Methodology, Resources, Software. **Satoshi Fukushima:** Resources, Supervision.

Data availability

Data will be made available on request.

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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APPENDIX A. FINGER BRAILLE SYMBOLS AND ABBREVIATIONS (IN ORDER OF APPEARANCE IN THE EXCERPTS)

{#}: Signals that numbers are going to be tapped
{123 tap}: Tapping with the left hand (interlocutor's nodding)
Double underline: Tapping error
{Abb. 235+RO}: Paper (*ronbun*)
{Abb. 46+KE}: COP+but (*desu kedo*)
{Abb. 46+NE}: COP+FP (*desu ne*)

APPENDIX B. GLOSSARY (GRAMMATICAL GLOSSES: GGS)

CL: classifier
COP: copula

F: filler
FP: final particle
OP: objective particle
TC: topic case

APPENDIX C. CA TRANSCRIPTION CONVENTIONS

(.)	micropause for 0.1 seconds or less
=	Latching. Connected lines, however, it was described in two lines due to the space.
::::	Prolonged vowel or consonant
↑↓	Rising intonation (↑) or Falling intonation (↓). Their combination shows rise and fall in one prolonged vowel at the end of utterance or phrasal boundary (Japanese-specific speech pattern).
>WORD<	Produced at fast speed compared to around.
°WORD°	Produced with a small voice compared to around.
--->	Indicates that the multimodal element is still continuing. It shows the position where it is continued to other body movements or where utterances temporarily co-occur.

APPENDIX D. SUPPLEMENTARY MATERIAL

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