

## Interpreters' gestural profiles across settings: A corpus-based analysis of healthcare, educational and police interactions

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### Abstract

Embodied semiotic resources, such as hand gestures, are increasingly recognised as essential tools in interpreter-mediated communication. Most multimodal studies on public service interpreting (PSI) rely on microanalytic frameworks, providing fine-grained analyses of excerpts of authentic interactions. However, such case-oriented approaches are based on data sets that are too limited in size to reveal overarching patterns governing multimodal activity in PSI. This study addresses the gap by investigating dominant trends in interpreters' gesture production across healthcare, educational, and police settings. A corpus of video recordings featuring 24 interpreters is annotated in ELAN. Statistical analysis reveals minimal variation in the distribution of gesture types across contexts, with pragmatic and deictic gestures dominating. Interpreters' gestural profiles closely align with those of primary speakers, suggesting that interpreters adapt their gestural production to match speakers' multimodal activity. A qualitative analysis of 45 cases of gestural mimicry suggests that it is used as a cognitive-aid strategy, as well as a means to disambiguate lexical items and support conceptual grounding and participatory sense-making among interactants. Further research is needed to explore the cognitive mechanisms behind the recurrent patterns of interpreters' gesture production and to evaluate the impact of gestural mimicry on users' perceptions of interpreter performance.

### Keywords

Public service interpreting, co-speech gestures, gestural profile, gestural landscape, mimicry, triangular mirroring

## 1. Introducing multimodal studies in PSI

For over a decade, scholars in interpreting studies have increasingly examined interpreter-mediated interactions through the lens of *multimodality* (Pöchhacker, 2021), capturing the interplay of verbal, vocal and spatio-visual cues in creating meaning (Kress, 2010; Mondada, 2016). This framework has been particularly fruitful in *public service interpreting* (PSI), where both onsite and video-remote encounters (Davitti, 2019) showcase a range of functions supported by embodied semiotic resources, such as gestures, posture, or gaze. The goal of this paper is to contribute to this *multimodal turn* (Davitti & Pasquandrea, 2016) by examining the common gestural patterns observed in healthcare, educational and police interactions.

Most existing research investigates the functions of spatio-visual cues focusing on one specific setting. The following paragraphs overview recent studies pertaining to the fields of medical, pedagogical and judiciary interactions, to probe whether similar multimodal phenomena appear across different PSI contexts.

Doctor-patient encounters seem particularly relevant to multimodal studies, as they elicit gestures involved in pain descriptions (Rowbotham et al., 2016) and terminology-rich explanations of medical procedures (Quasinowski et al., 2023). In this vein, Gerwing and Li (2019) investigate body-oriented gestures in general practice, focusing on information transfer delivered through verbal and spatio-visual channels in interpreter's renditions. Krystallidou (2014, 2016) adopts a broader approach analysing posture, gesture and gaze in fostering patient inclusion in interpreted consultations. Gaze is also investigated from the perspective of training physicians to work with interpreters (Li et al., 2017), negotiating transition points between source speech and target renditions in medical interpreting (Pasquandrea, 2011) and optimising turn-taking in psychotherapeutic consultations (Vranjes et al., 2019, 2021).

Pedagogical interactions, typically portraying parent-teacher conferences, are studied for: the use of artefacts, such as school reports, through pointing; the influence of participants' spatial positioning on visibility and inclusion; as well as the coordination of interactions through embodied resources (Davitti, 2013; Davitti & Pasquandrea, 2017). Additionally, some multimodal accounts compare the use of gaze, gesture and body orientation in educational contexts with other PSI settings such as medical and legal interactions (Davitti, 2016, 2019; Davitti & Pasquandrea, 2013).

Interpreter-mediated police interrogations and court hearings attract studies focusing on the *spatial and visual ecology of actions* (Davitti, 2019), including spatial arrangements and object affordances. Recent studies investigate these factors in relation to visual cue access and chunking challenges in courtroom video-remote interpreting (Licoppe, & Veyrier, 2020). To date, few publications account for gestures of injured parties (Määttä & Kinnunen, 2024) and suspects (Monteoliva Garcia, 2017).

Despite differing PSI contexts and focal embodied resources, the studies reviewed share two main features: their methodology and analytical framework. First, they all use *multimodal corpora*—collections of audiovisual recordings enabling fine-grained analysis of speech and adjacent visual signals (Allwood, 2008; Knight, 2011). Second, due to the time-consuming nature of multimodal studies, the cited works predominantly rely on microanalysis of selected excerpts of larger corpora. Drawing on Conversation and Discourse Analysis (Davitti, 2019), they lead to descriptive, qualitative studies, tracing in great detail how interactions in PSI unfold. Nevertheless, despite providing invaluable insights into PSI fieldwork, such accounts present an important shortcoming. Notably, the case-study data do not enable drawing general conclusions as to recurrent patterns guiding the use of embodied resources in PSI. In other words, microanalysis shows what is *possible*, highlights what is *particularly interesting*, but

does not permit to see what is *typical*. Additionally, the variability in cues analysed (e.g. gaze, gestures, artefact manipulation) and research questions across studies makes it challenging to compare results and try to cross-examine the emerging collections of highlighted examples to build a global view of multimodal phenomena in PSI. Moreover, the reliance on short excerpts limits the ability to generate quantitative findings that indicate which of the wide range of the documented gestural patterns are the most frequently observed in interpreter-mediated interactions.

This paper aims to address this gap by (1) investigating corpora of substantial length, helping to paint a 'bigger picture' through quantitative analyses of the embodied resources used; (2) providing a contrastive multimodal analysis, focusing on the commonalities among healthcare, educational and police interactions; (3) and examining data featuring different interpreters working into various target languages within each setting to identify overarching multimodal patterns shared beyond cultural and linguistic dissimilarities. With a view to work with a sufficient amount of comparable data to support quantitative analysis, we conduct this exploratory study based on a corpus of video recordings presenting elicited interactions created for training purposes. The audiovisual materials showcase gestural production of interactants and professional interpreters performing *dialogue interpreting* (Mason, 1999) in onsite communicative events.

The novel contribution of this research lies in the fact that it reaches beyond qualitative descriptions of case-studies and attempts to provide statistical data helping to colour the white spots on the map of the use of gestures in a range of PSI settings. The added value of this approach is the possibility of determining which gestural patterns are the most frequently used, as opposed to the multimodal behaviours that might be particularly interesting for an in-depth microanalysis, but do not occur regularly. This leads to introducing the notion of interpreter's gestural profile in PSI, encompassing the dominant trends observed in interpreter-mediated interactions.

## 2. Focus on co-speech gestures

To ensure a common benchmark guiding the analysis of the embodied resources in PSI, we limit the scope of this research to the use of manual *co-speech gestures*, i.e. hand movements that accompany speech (for a review, see Hostetter, 2011). Gestures annotated in our corpora span representational, deictic, pragmatic, and interactive gestures, beats and emblems (see Leonteva et al., 2023 or Iriskhanova et al., 2023 for a similar choice of gesture types analysed in simultaneous interpreting).

*Representational* gestures convey semantic information through handshapes, movements or embodied actions illustrating referent's formal properties (Müller, 2014). *Deictic* gestures involve pointing to designate objects, locations or directions (Fricke, 2002). *Beats* denote rhythmic movements emphasising speech elements. *Pragmatic* gestures, also known as *recurrent gestures*, support stance-taking, structure discourse units, and enhance word search (Ladewig, 2014). They are recruited to facilitate parsing and fluent speech production, or express attitude towards the content of speech, rather than to convey semantic meaning (Ladewig, 2014). Given the conversational nature of our data, we coded *interactive* gestures as a separate type and following Bavelas (1992), we defined them as those performing phatic functions and coordinating turn-taking, thus regulating the interaction flow. Finally, given the inherently multicultural character of PSI corpora, we enrich the scope of annotated gestures with *emblems* – conventional, culturally-specific gestures that can replace verbal expressions like "OK" or "peace" (Matsumoto & Hwang, 2013).

### 3. Research questions and hypotheses

This paper investigates the use of gestures in consecutive dialogue interpreting within public service interactions, focusing on the gestures of speakers and interpreters and their similarities. We aim to answer the following research questions: Firstly, we investigate what gestural types dominate PSI interactions and if *gestural landscapes*, accounting for gesture production of all involved participants, differ across healthcare, educational and police settings. Drawing on the microanalytical studies cited above, we hypothesise that each context will present its own *gestural landscape*, with representational gestures most abundant in medical communication due to their use in pain descriptions, the dominant role of interactional and pragmatic gestures in educational settings focusing on administrative procedures, and deictic gestures most salient in police interactions given the common use of pointing towards documents and objects such as pictures or exhibits.

Secondly, we focus on interpreters' *gestural profiles* – average percentage distributions of different gesture types, calculated for all interpreters examined in a given setting. Rather than exploring individual differences among interpreters, our goal is to study if their gestural activity presents particular recurrent features typical of the *role* of the interpreter, and if their unique position in tripartite interactions leads to a distinctive multimodal performance compared to speakers. In other words, we aim to verify if the special role of the interpreters in communicative exchanges translates into a special use of gestures. We anticipate that interpreters will use more interactive gestures than other participants due to their potential for coordinating turn-taking (Davitti & Pasquandrea, 2017; Licoppe & Veyrier, 2020); and that they will show abundant production of pragmatic gestures known to play a role in facilitating speech production and word search (Ladewig, 2014).

Thirdly, the comparison between interpreters' and speakers' gesture production is also intended to shed light on instances of gestural *alignment* (Oben & Brône, 2016) or gestural *mimicry* (Kimbara, 2006) referring to copying gestures of the speakers in the interpreters' renditions. It is foreseen that interpreters will gesturally align with speakers but only when gestures are particularly salient due to the fact that a) the information conveyed in gesture is not represented in speech (i.e. deictic gestures disambiguating pronouns) or b) gesture conveys non-redundant information adding more complex meanings (i.e. representational gesture showing the size / shape of an object that is not fully described in speech; gestures illustrating motion in action descriptions).

### 4. Corpus collection and structure

The methodology involves analysing a multimodal corpus annotated in ELAN software (Sloetjes & Wittenburg, 2008). The recordings showcase simulated interpreter-mediated encounters prepared as training materials for future interpreters and public servants. The choice of elicited instead of naturalistic interactions was dictated by major difficulties in accessing and recording authentic PSI sessions due to ethical concerns (Davitti, 2019), as well as the aim of gathering a sufficient amount of data for statistical comparisons across settings. The raw footage totalled 4:40:51 hours, which was trimmed by removing side interactions involved in setting up encounters, commentary, and segments where participants' hands were out of frame. After such pre-processing, 68 video clips, totalling 128 minutes, were selected for analysis (see Table 1).

Settings	N Int	Languages	Original videos' duration	Selected segments' duration
Medical	8	Arabic, English, Spanish, Panjabi, Portuguese	1:30:48	34:22
Administrative	7	Bengali, English, Indonesian, Spanish	0:53:19	28:15
Police	9	Arabic, Polish, Czech, Dutch, English, French, German, Hungarian, Italian, Mandarin	2:16:44	66:06

**Table 1.** Features of the analysed corpora

The corpus showcases healthcare, education and police interactions, illustrating sessions in 15 languages from 8 families: Arabic, Bengali, Czech, Dutch, English, French, German, Hungarian, Indonesian, Italian, Mandarin, Panjabi, Polish, Portuguese, Spanish. All interactions used English or French as the A languages, fully comprehended by the author. As for B languages, their choice was based on accessibility of the recordings. Any reference to the utterances' semantic content in these languages is based on translation.

The audiovisual materials were sourced from open-access interpreters' training videos and recordings intended for public servants or migrant users, showcasing efficient ways of working with interpreters in Europe, the U.S., and Latin America. The videos were grouped by settings and a baseline of ecological validity was established by discarding recordings where interpreter's utterances seemed learnt by heart and recited. The remaining videos presented role-plays with genuine interpreting containing spontaneous co-speech gestures, all mediated in consecutive dialogue interpreting mode.

#### 4.1. Healthcare settings

Medical interactions with eight interpreters included general practice, neurological, orthopaedic and surgical consultations conducted in English in combination with Arabic, Spanish, Panjabi, and Portuguese. Four conversations presented classical triangular sitting arrangements and other four occurred at a hospital patient's bedside. The participants were typically a doctor, a patient and an interpreter. Only one video additionally included a patient's family member.

#### 4.2. Educational settings

Educational settings covered parent-teacher conferences, parents' interviews with school principals, interventions of school child welfare services, and foreign students' enrolment at university. Though children's performance and wellbeing at school were discussed in several role-plays, no minor participants were filmed. The recordings showed seven interpreters working in language combinations including Bengali, Indonesian and Spanish, always coupled with English. Typical spatial arrangements presented a parent, a teacher and an interpreter seated at a table. Two interactions showcased additional participants such as the second parent or other members of the school staff.

#### 4.3. Police settings

Encounters with police spanned: victims' testimonies, witness statements and interrogations of suspects. Most recordings were staged at police stations, except three victims' testimonies arranged in hospitals. Besides typical three-party interactions, some included a lawyer or a clerk taking minutes. The videos illustrated work of nine interpreters working between Arabic, Polish, Czech, Dutch, German, Hungarian, Italian, or Mandarin and English or French.

### 5. Multimodal corpora analysis in ELAN

The corpora were manually annotated in ELAN for speech and hand gestures of all participants, yielding 5250 annotations – 3713 verbal utterances and 1537 gesture phrases. Participants' speech was segmented based on silent pauses, and a *gesture phrase* was considered as a unit of hand(s) movements containing a stroke accompanied by any other gesture phases, such as preparation, hold or recovery (Graziano & Gullberg, 2018). Even though gestures are often multifunctional, we strived to identify the primary function of each gesture phrase, resulting in assigning it to one of the categories: representational, deictic, pragmatic, interactive, beat, emblem. To test the validity of the annotation scheme, a 10% excerpt of the corpus was coded by two independent annotators according to the coding manual defining the six hand gesture types selected for the analysis. The modified Cohen's Kappa (Holle & Rein, 2013) reached 0.80, which corresponds to a substantial agreement (Landis & Koch, 1977), therefore validating the annotation scheme's reliability.

#### 5.1. Gestural landscapes across settings

The first research question explored the distribution of gesture types across settings, using the notion of *gestural landscape* (GL) encompassing the gesture production of all participants in a given type of interaction (medical, pedagogical, judicial). Contrary to our predictions, the GL was surprisingly consistent across contexts. Pragmatic gestures occurred as the dominant type in all corpora, accounting for 34% in healthcare, 30% in education, and 42% in police interactions.

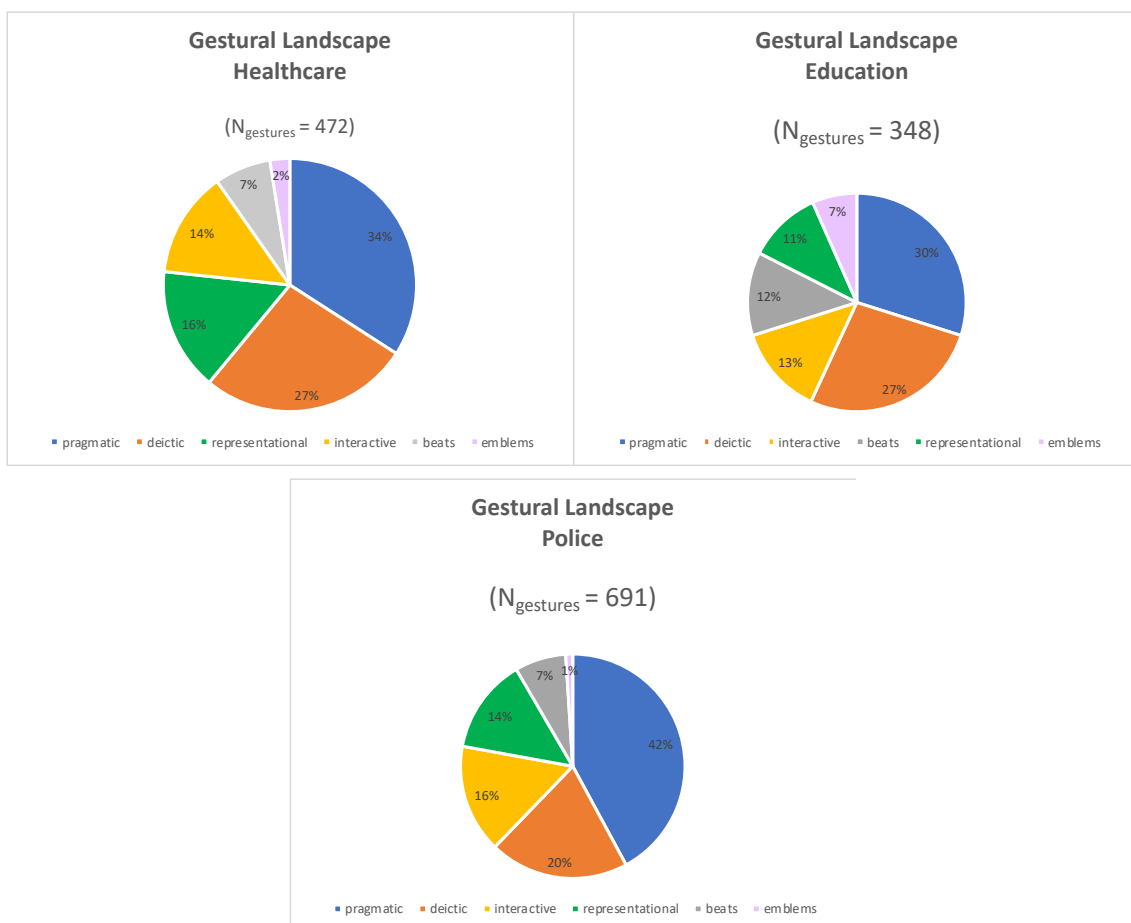


Figure 1. Gestural landscape across settings

Deictic gestures ranked second, comprising 27% in healthcare, 27%, in education, and 20% in police interactions. They served slightly different purposes depending on the context: (1) pointing towards present participants in multiparty interactions (education), (2) giving directions (education, healthcare), (3) spotlighting a discussed document, such as a report or a statement that has to be signed (education, police), (4) designating body parts in descriptions of pain or injuries (healthcare, police). Similarly to its functions documented by Vranjes and Brône (2021), pointing was recruited as a crucial semiotic resource helping to clearly distribute roles of the participants and foster housekeeping in interpreter-mediated communication.

Interactive gestures were also consistent across settings, comprising 14% in healthcare, 13% in education and 16% in police interactions. Despite their undeniable role in coordinating distribution of speech turns and visually performing floor-giving, they turned out to be far less frequent than pragmatic gestures serving internal regulation of participants' speech flow.

Representational gestures received similar scores in healthcare (16%) and police encounters (14%) but dropped down to the second-last position with 11% in educational settings. This might be explained by more imagistic content in the first two, including descriptions of accidents and pain in the first context, and recollections of physical experiences such as a robbery or an assault in the second one. Nevertheless, the percentage differences between contexts remain small, suggesting that all the examined settings present a comparable potential for iconicity.

Beats covered from 7 to 12 % of the overall gesture production, leaving them as one of the least prominent categories in the examined corpora. The exception here are pedagogical encounters where a feeble presence of imagistic content resulted in a more prominent use of gestures underscoring discourse structure (pragmatics, beats) and distribution of speech turns (interactive gestures).

Finally, to no surprise, emblems appeared as the least used type in all settings, their presence ranging from 1 to 7% of the total gesture production. Almost all their occurrences represented either different versions of a finger count or various greeting gestures, such as a formal handshake. The latter explains their increased score in educational settings in role-plays, as some video recordings spotlighted this symbolic gesture behaviour as an essential tool of establishing social relations at the beginning of interpreter-mediated interactions.

Importantly, the same tendencies were found when we excluded the interpreters' gestures from the overall gestural landscape and recalculated gesture distribution for all other participants except the interpreter (e.g. doctor and patient). Thus, the analysis showed that the effect of settings on the gestural landscape was less significant than expected. Regardless of the context, pragmatic gestures represented the lion's share of all embodied semiotic resources, followed in various combinations by deictic, interactive, and representational gestures. The settings seemed to have the most visible impact on the latter type, as healthcare consultations and police interrogations correlated with an increased use of representational gestures in comparison with educational interactions; however, the differences remained subtle. Detailed scores for each gesture type used by interactants in a given role are represented in Table 2.

Corpus	Actor	Gesture functions							Total N gestures	
		Settings	Role	N <sup>a</sup>	Pragm	Dei	Rep	Inter		Beats
Healthcare	Interpreter		8 <sup>b</sup>	64	52	20	27	13	3	179
Healthcare	Doctor		8	61	46	22	23	19	4	175
Healthcare	Patient		8	36	29	32	14	2	5	118
Education	Interpreter		7	47	44	13	19	13	3	139
Education	Teacher		7	30	39	15	22	25	12	143
Education	Parent		7	27	11	10	5	5	8	66
Police	Interpreter		9	112	60	25	35	19	4	255
Police	Police		9	33	68	10	49	20	3	183
Police	Suspect		5	34	12	16	16	1	1	80
Police	Witness		5	47	13	22	1	8	0	91
Police	Victim		7	65	11	22	7	3	0	108

**Table 2.** Gesture distribution across sub-corpora

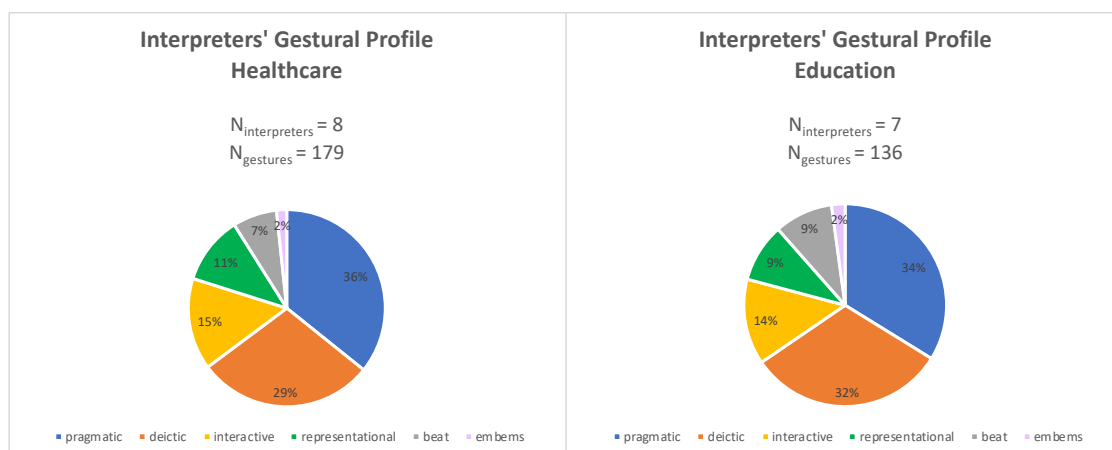
*Note.* Gesture types abbreviations: Pragm = pragmatic, Dei = deictic, Rep = representational, Inter = Interactive, Embl = emblem.

<sup>a</sup> Number of different actors observed in the same role.

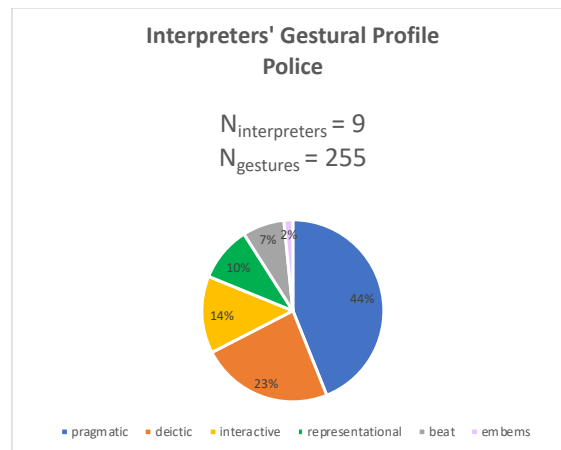
<sup>b</sup> Data in each row represents a set of participants in the same role. For instance, the numbers describing the interpreter in healthcare settings present findings calculated on the basis of the performance of 8 different interpreters.

### 5.2. Interpreter's gestural profile in PSI

Next, we focused specifically on the distribution of gesture types presented in interpreters' renditions, referred to as their *gestural profile* (GP). Surprisingly, the effect of settings on interpreters' GP was minimal, with almost identical proportions of gesture types in healthcare, educational and police encounters. GPs calculated based on respectively 8, 7 and 9 interpreters' performance in each context, showed consistent distribution of 1) pragmatic, 2) deictic, 3) interactive, 4) representational, 5) beat and 6) emblem gestures, presented in order of frequency (Figure 2).







**Figure 2.** Interpreter's gestural profile across settings

Pragmatic gestures emerged as understandably prominent in interpreting as they support structuring the text that has to be repackaged by the interpreter in the target language. Interestingly, these gestures, used meta-communicatively to serve discursive and modal functions, appeared to be more common than interactive gestures, which are often emphasised as a key semiotic resource used by dialogue interpreters to coordinate interactions. In terms of frequency, pragmatic gestures were also far more prominent than gestures directly linked to message transfer, such as deictic and representational gestures conveying information that might not be contained in speech. The dominant presence of pragmatic gestures observed in the data corroborates findings from a study by Cienki (2024), discussing their role in performing multimodal stance-taking in interpreter's renditions. Additionally, another sub-type of pragmatic gestures observed in the data were recurrent cyclic gestures (Ladewig, 2014) that accompanied word-search, which is one of the fundamental processes involved in interpreting (Iriskhanova et al., 2023). Used as a turn-holding device, they may also support maintaining multimodal fluency by indicating that the process of searching for the right term or formulating ideas in the target language is ongoing. Specific applications of deictic and representational gestures in interpreters' renditions will be discussed in Sections 6.1–6.3.

Another pattern that emerged from a comparison between GPs of interpreters and GLs accounting for gestural activity of all participants was a strong correlation between the gesture type distribution remarked in interpreters and in all other speakers (see Figures 1 and 2). This observation grounded the next hypothesis of the study. If interpreters' profile is quite an accurate replica of the overarching gestural landscape, does it mean that interpreters systematically perform gestural alignment with the speakers?

## 6. Gestural alignment

To test the hypothesis regarding gestural alignment (GA), we visually inspected the corpus for instances of similar gestures produced by both speakers and interpreters. On a case-by-case basis, we determined occurrences of mimicry according to three criteria. First, paired gestures referred to (nearly) identical semantic content conveyed in speech (e.g. *to hug* and *to take somebody in one's arms*). Second, both gestures shared the same function (e.g. deictic). Third, they presented common formal features (e.g. movement direction, hand shape, tracing similar shapes, embodying similar actions). These parameters enabled reliable identification of 45 cases of mirrored representational and deictic gestures, detailed in Table 3.

Pragmatic gestures were excluded from the mirroring analysis due to their extreme variability in form (e.g. used gesture space, articulators). Since dialogue interpreters need to re-structure discourse in the second language and pragmatic gestures are recruited to support this process,

the high variability of language pairs in our data made such analysis too challenging for the scope of the present study. Furthermore, given that interpreters' pragmatic gestures can reflect stances of the source speakers or the interpreters themselves (Cienki, 2024), it would be difficult to determine which instances of similar pragmatic gestures produced by different interactants actually resulted from mirroring; this would require a more nuanced annotation scheme, too time-consuming for the size of the analysed corpus.

Settings	Representational	Deictic	Total per settings
Healthcare		7	10
Education		1	1
Police		12	14
<b>Total per type</b>		<b>20</b>	<b>25</b>

**Table 3.** Cases of gestural alignment in the analysed corpora

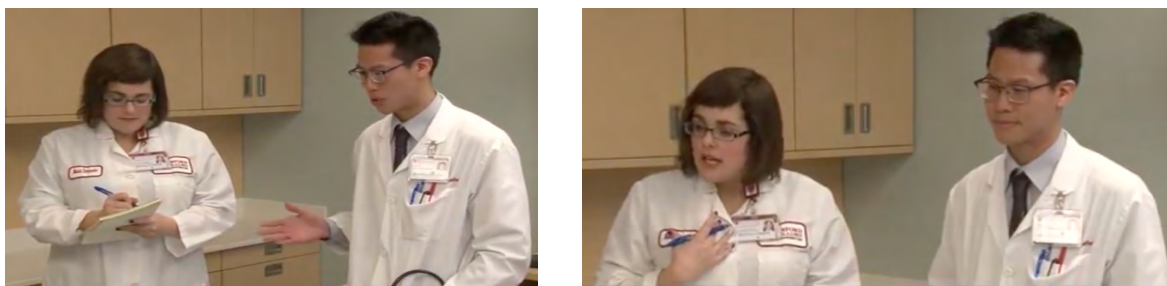
All examined corpora showed examples of gestural mimicry, nevertheless educational settings revealed only isolated cases of this phenomenon (N=2), in comparison with healthcare (N=17) and police interactions (N=26). Regarding representational gestures, this might be explained by the conversation topics generating more descriptive, imagistic content in the latter two. Consequently, contexts with a higher number of representational gestures in general correlated with more instances of their reproduction. This trend is not confirmed for deictic gestures though, as their frequent usage by both the original speakers and the interpreters in educational videos did not translate into a larger number of mirrored gestures. To shed light on the communicational contexts of engaging in gestural alignment we provide qualitative analysis of examples showcasing particular gesture types.

### 6.1. Disambiguation of pronouns through deictic gestures

Deictic gestures are mostly mirrored while pointing to objects and locations in a shared space. This involves bodily parts (e.g. /*pain in the knee*/, /*my head hurts*/), documents (e.g. /*please sign here*/, /*available on this website*/) or directions (e.g. /*lay down here, with your head up here*/). Much like in monolingual settings, they help to map speech content onto physical referents, following the principle of contiguity (Fricke, 2002). In PSI, it is however the use of deictic gestures for designating people that seems an essential asset to the interpreter, as they aid disambiguation of personal pronouns (e.g. you, your, yours). These might become sources of confusion in PSI, as professional interpreters are trained to use the first person to recreate speakers' utterances, and the third person singular to refer to themselves as interpreters. This laminated nature of interpreter's utterances (Vranjes & Brône, 2021) becomes apparent in repairs such as /*excuse me doctor*/ /*the interpreter does not understand one of the terms that [the patient] she's using*/ /*and I would like to ask for clarification*/ performed with a deictic gesture towards the interpreter accompanying the first-person pronoun 'I'.

Moreover, the direction of mirrored pointing gestures is adjusted to refer to same *participant* but not the same *speaker*. For instance, Figure 3<sup>1</sup> shows deictic gestures respectively used by the doctor while introducing the interpreter, and by the interpreter herself when rendering the same utterance.

<sup>1</sup> Still images stem from an educational video produced by dr Charles Liao at the Stanford School of Medicine. The materials are available on YouTube: <https://www.youtube.com/watch?v=Uhzcl2JDi48>. Written consent of the copyright holders was obtained to use the screenshots in the present paper.



**Figure 3.** Disambiguation of personal pronouns using deictic gestures

In both cases gestures refer to the interpreter, even though they are produced by different speakers. In this particular example, since the interpreter is wearing a gown, she could easily be mistaken for medical staff. The use of visual resources clarifies participants' roles, and helps to structure interpreter's utterances that can embody discrepant voices of different people (cf. Vranjes & Brône, 2021).

### 6.2. Mirroring representational gestures – reflection of embodied cognition

As hypothesised, recurrent contexts of mirroring representational gestures mostly involved: introducing unfamiliar terminology, such as medical procedures in doctor's consultations, or referring to physical experiences, especially pain or violence in police and healthcare settings. Apart from typical dyadic mimicking of a speaker's gesture by an interpreter, we documented instances where this scheme was extended to several gestures or multiple participants. Figure 4<sup>2</sup>, presenting screenshots selected from a simulated police interaction in German-French, displays a case of reproduction involving a short sequence composed of multiple representational gestures accompanying a description of an assault. The upper-panel pictures present victim's gestures recalling actions of the attacker: */he grabbed the hood of my coat/ /he turned me around/ /and he just slapped me in the face/.*

Each picture stands for one of the key actions named by the speaker, [GRAB], [TURN AROUND], [SLAP]. The lower panel shows the interpreter recreating these gestures with minimum delay, as if she was embodying the actions of the speaker. It is worth mentioning that in this moment, the source speech accelerated causing the interpreter to drop note-taking and switch to quasi-simultaneous renditions to cope with an uninterrupted information flow coming from the victim. This change of dynamics might have resulted in an instinctive adjustment of the interpreter's memory-supporting strategy. Spatio-visual information that could have been previously stored in notation as symbols or drawings needed to be allocated to a different pool of semiotic resources, hence its embodied representation, possibly supporting the lexical retrieval of the target words (Leonteva et al. 2023, cf. Morsella & Krauss, 2004).

<sup>2</sup> Still images stem from an educational video produced by ESIT within the framework of the IMPLI project (*Improving Police and Legal Interpreting*). The materials are available on the website of the project coordinated by the University of Bologna: <https://site.unibo.it/interpretazione-giuridica-impli/en/educational-videos>. Written consent of the copyright holders was obtained to use the screenshots in the present paper.



Figure 4. Reproduction of a sequence of representational gestures

### 6.3. Triangular gesture mirroring in participatory sense-making

Further analysis revealed that gestural alignment can be extended beyond the nuclear speaker-interpreter pair. The data contained cases of *triangular mirroring* where a key gesture introduced by a participant was mimicked not only by the interpreter, but also incorporated into user's responses. The term *triangular mirroring* is meant to capture the gesture spreading network going beyond the basic initiator-imitator pair and involving at least three different interlocutors recycling a similar gesture referring to the same semantic content. The sequence can be initiated by either leader roles (e.g. doctor) or follower roles (e.g. patient), though no interpreter-initiated patterns were found.

In most cases, triangular mirroring involved deictic gestures referring to (1) participants in the interactions, especially if their role needed to be explained (e.g. lawyer), (2) objects that the lead speakers wanted to focus attention on (e.g. a knife, a photograph presented as evidence during a police interrogation), (3) or locations in the same room (e.g. the couch where the patient was to be examined). Such use of gestural alignment confirms its role in establishing common ground by mapping the content of speech onto the physical environment (Barsalou, 2008; Beinborn et al., 2018).

As for representational gestures, triangular mirroring mostly occurred in the medical field where it accompanied introducing new concepts (e.g. terminology of medical procedures) and/or challenging explanations (e.g. pain descriptions). The latter is presented in Figure 5<sup>3</sup> where gestures of the patient illustrating her stomach-ache were picked up on by the doctor who used them to solicitate a more accurate description of the type of pain: [CRAMPY], as opposed to a constant pain, represented by a different iconic gesture.

<sup>3</sup> Still images come from the educational video produced by the University of Nottingham, available on YouTube: <https://www.youtube.com/watch?v=N8iqH9qwIAQ>.



**Figure 5.** Triangular mirroring: gesture [CRAMPY PAIN]

Embodiment appears here as an essential technique of visually illustrating physical experience that lay patients might struggle to name (Rowbotham *et al.*, 2016). In discordant language communication, the handshape and intensity of representational gestures not only offer diagnostic clues, but also help to pass bits of information directly between the doctor and the patient. Gerwing and Li (2019, p. 177) report that 70% of body-oriented gestures produced by doctors and patients convey information not included in speech. Furthermore, Rivera Baldassari (2024) points out that migrant patients often struggle to accurately describe pain, even in their mother tongues, leading to additional challenges for interpreting. From this point of view, representational gestures grant a more reliable means of communicating bodily experiences, as they help to by-pass the linguistic and terminological barrier by adding embodied representations that clarify the meaning of new and unclear concepts. Reproduction of such gestures by the interpreter reassures the interactants (Gerwing & Li, 2019), confirming that their contributions to the *participatory meaning-making process* (De Jeagher & Di Paolo, 2007) have been received correctly, thus creating of a shared repertoire of word-gesture entities.

## 7. Discussion

The findings suggest that the variation in the use of co-speech gestures across healthcare, educational and police PSI interactions is less pronounced than expected. Firstly, the comparison of gestural landscapes encompassing all participants reveals similar frequency distributions, characterised by a dominant use of pragmatic and deictic gestures. The latter appear as an inherent tool for establishing multimodal mappings connecting abstract linguistic items with referents present in a shared interactional space, be there objects, places or people. The crucial role of pointing in language-discordant communication is confirmed through its presence in gestural mimicry and triangular mirroring, underscoring its usefulness both for primary speakers and interpreters. Thus, our quantitative data corroborates findings from earlier microanalytical studies examining medical (Gerwing and Li, 2019), pedagogical (Davitti & Pasquandrea, 2017) and police interactions (Monteoliva Garcia, 2017).

The effect of settings is most noticeable in representational gestures, which cover a larger percentage of the gestural landscape in healthcare and police interactions in comparison with educational settings, though the differences remain subtle. The analysis reveals that even though each of the examined settings involves its own conversation topics and communicative goals, the overall gestural landscape presents far more similarities than differences across settings.

Secondly, zooming in on the gestural profiles of the interpreters, we observe that they remain consistent regardless of interactional settings, suggesting that the universal challenges of onsite

dialogue interpreting have a stronger impact on the interpreter's gesture production than local difficulties related to particular conversation topics. We note that the overall gestural profile of the public service interpreter is composed mainly of pragmatic and deictic gestures, followed by interactive and referential ones. The predominant role of pragmatic gestures, outnumbering any other kind, is consistent with findings from simultaneous interpreting (Iriskhanova et al., 2023) where this gesture type prevailed both in salient and non-salient occurrences; hence we observe that their position among other co-speech gestures is insensitive not only to settings, but also to modes of interpreting.

Furthermore, comparisons of gestures used by primary speakers and interpreters reveal only minor dissimilarities. This indicates that interpreters' renditions follow very similar patterns to those characterising spontaneous speech productions by other participants, hence the special role of the interpreter does not necessarily lead to a distinct use of gestures. Though certain gesture types might be particularly helpful in resolving turn-taking or disambiguation difficulties in interpreting (Vranjes & Brône, 2021), they are not applied frequently enough to shift the proportions of gestures composing interpreters' GP.

Similarities between the interpreters' gestural profiles and the overall gestural landscapes support the view that the way interpreters gesture is highly influenced by the gestural production of primary speakers. Nevertheless, though instances of gestural alignment have indeed been identified in all the settings examined here, they merely accounted for a small portion of all interpreters' gestures. This finding is consistent with Gerwing and Li (2019, p. 174) reporting that in medical encounters only 42% of speaker's body-oriented gestures were incorporated in interpreters' renditions.

Qualitative analysis of gestural alignment cases suggests that mimicry involving representational gestures seems to be deployed as a cognitive-aid strategy when interpreters deal with rich information units related to speakers' bodily experience. A possible explanation is that switching from an embodied representation of an action in the original utterance to its purely verbal description in the target speech would create additional cognitive load resulting from passing from one modality to another. Since interpreters are known to work on the verge of exhausting their mental processing space while juggling with two languages (Gile, 1995; Seeber & Arbona, 2020), it is plausible that maintaining information within one modality helps to regulate instant cognitive effort. Tapping into bodily experience seems an efficient way of connecting embodied meanings across languages, by virtue of activating the process of *conceptual grounding* (Barsalou, 2008) or *multimodal grounding* (Beinborn et al., 2018). Both terms convey the idea that *language is grounded in perceptual experience and sensorimotor interactions with the environment* (Beinborn et al., 2018, p. 2326). Its reflection on the human cognition is that during language comprehension and production the brain simulates perceptual and motor activities associated with the described situation. For instance, neuroimaging studies show that hearing action verbs associated with movement provokes activity in the motor cortex as if the hearer was performing the action themselves (Beinborn et al., 2018; Garagnani & Pulvermüller, 2016; Marstaller & Burianová, 2014). Findings from neurocognitive research help to explain how mirroring representational gestures may serve self-regulating functions for the interpreters themselves, grounding their processes of comprehension of the source and production of the target message in embodied resources that are not encoded in any language but rooted in sensorimotor experience (cf. Janzen et al., *this volume*). In a similar vein, gesture studies report that the use of representational gestures supports lexical retrieval (Morsella & Krauss, 2004), accompanies fluent speech production (Graziano & Gullberg, 2018) and facilitates speech production in L2 (Morett et al., 2012). Hence, given strong evidence that gesturing enhances a number of cognitive-linguistic operations involved in spontaneous

speech, there is no reason why their facilitatory functions would not extend to interpreters' renditions. Moreover, alignment and triangular mirroring of deictic gestures emerge as effective means of disambiguating personal pronouns referring to interpreters and speakers. Hence, our data confirms that pointing helps to maintain clarity given the laminated nature of interpreters embodying different voices (Vranjes & Brône, 2021).

Finally, from an interactional perspective, gestural mimicry contributes to multimodal *participatory sense-making* (De Jeagher & Di Paolo, 2007), where visible and spoken components of speakers' utterances are coordinated in the process of creating and negotiating meaning. Thanks to embodied resources, users who do not master the host country's language can share partial information directly with civil servants, bypassing the delay of interpreting. These observations align with Chwalczuk (2021, p. 356) who documented cases where in child psychiatry users mimicked therapist's gestures as part of backchannelling, performed without producing full speech turns, or signalling self-selecting for floor-taking as a way to manifest understanding of the source speech before interpreting was delivered. Such cases present an important alteration to the typical interpreter-mediated interactional dynamics as the interpreter is temporarily omitted in the communicational chain (Gerwing & Li, 2019). Regarding patients with limited language proficiency, visual access to key information units can prompt them to seek more active and independent participation in the interactions, performed through *mimicry*, that is reported to provide (Kimbara, 2006, p. 59):

a resource for organizing co-participation (...) through the display of the shared form–meaning mapping, and thus, by making one's own representational action in coordination with the other's. Once associated with meaning, the form of a speaker's gesture, together with the meaning, is added to the common ground. That is, the unit of gesture and speech becomes shared by the speakers.

From the point of view of public service interpreting, the elaboration of these shared gesture-speech units may help migrants to gain a sense of agency, as embodied cues grant a possibility to communicate, even to a limited extent, directly with the public servant who represents the host country (Chwalczuk, 2021; Gerwing & Li, 2019). Moreover, sociolinguistic research on mimicry shows that it facilitates mutual understanding, fosters bonding and enhances empathy among participants, overall making interaction feel smoother (Stel & Vonk, 2009). Thus, gestural mimicry involving migrant participants may be viewed as a first step to becoming not only increasingly independent users of the dominant language (Morett et al., 2012), but also more socially integrated participants in the system of public institutions. Consequently, gestural alignment appears to play not only self-regulatory functions, activating interpreter's resources of embodied cognition, but also interactive functions fostering social inclusion and increased participation of migrants.

## 8. Conclusions, limitations and future directions

The findings suggest that gestural activity of the interpreter presents similar multimodal patterns across different settings. However, an obvious limitation to the study is that it uses elicited data and does not rely on authentic interpreter-mediated events. As PSI typically features sensitive and ethically challenging content, the access to ecologically valid video recordings remains to date highly restricted. Moreover, given laborious, time-consuming manual annotation of the visual content, it is only natural that corpus-based research of multiparty interactions remains a trade-off between the quantity of analysed material and the depth of the analysis. In this vein, we recognize that the corpora investigated in this paper presented a great variability of languages and geographical-cultural contexts, which may be perceived both as a weakness

or strength of the study. On the one hand, the number of videos within the same language pairs were not large enough to produce any general conclusions about the use of gestures in interpreting for/from a particular culture. However, one may claim that if despite such variability of cultural contexts, we still observe strong overarching multimodal patterns, they are more likely to be generalisable to all PSI.

The corpus offers insights in the workings of embodied cognition and conceptual grounding. However, even though the present study enables us to confirm the general tendency for gestural mimicry documented in all examined PSI settings, not only does it not explain most interpreter's gestures, but also, it does not allow to determine *what* stimulates this phenomenon in interpreting and *how it affects* the communicative efficiency of interpreter-mediated interactions. Hence, more experimental studies are required to disentangle the causes and effects of interpreter's gestural production in PSI. To this end, psychophysiological studies are needed to further investigate the links between the use of gestures in interpreting and the underlying cognitive operations, looking at the process in controlled, laboratory settings to separate self-regulatory gestural activity from its social covariates. In parallel, given that gestural alignment is observed not only in authentic, but also role-played interactions without genuine social stakes, it would be enriching to measure the impact of the interpreter's gestural style on how users of the interpreting services perceive the interpreter's professional performance depending on the gestural profile they exhibit.

All in all, multimodal corpora analyses offer valuable insights in how embodied semiotic resources are recruited in interpreter-mediated interactions. Findings of such studies ascribed to the *multimodal turn* should find their way to interpreting pedagogy and training of public servants involved in PSI interactions, as they help to shift the focus from the language barrier to a shared point of reference: the physical experience of human bodies.

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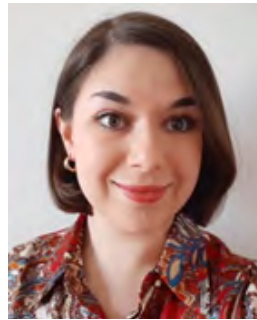
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