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Body-oriented gestures as a practitioner's window into interpreted communication

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Body-oriented gestures as a practitioner's window into interpreted communication

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Abstract

With increasing global migration, health care providers and patients may lack a shared language. Interpreters help to secure understanding. Doctors and patients cannot evaluate how the interpreter translates their utterances; however, they can see hand movements, which can provide a window into the interpretation process. While research on natural language use has acknowledged the semiotic contribution of *co-speech gestures* (i.e., spontaneous hand and arm movements that are tightly synchronized with speech), their role in interpreted interactions is unstudied. We aimed to reveal whether gestures could shed light on the interpreting process and to develop a systematic methodology for investigating gesture-use in interpreted encounters. Using data from authentic, interpreted clinical interactions, we identified and analyzed gestures referring to the body (i.e., *body-oriented gestures*). Data were 76 minutes of video-recorded doctor-patient consultations at two UK inner-city general practices in 2009. Using microanalysis of face-to-face dialogue, we revealed how participants used body-oriented gestures and how interpreters transmitted them. Participants used 264 body-oriented gestures (doctors=113, patients=54, interpreters=97). Gestures served an important semiotic function: On average, 70% of the doctors' and patients' gestures provided information not conveyed in speech. When interpreters repeated the primary participants' body-oriented gestures, they were highly likely to accompany the gesture with speech that retained the overall utterance meaning. Conversely, when interpreters did not repeat the gesture, their speech tended to lack that information as well. A qualitative investigation into the local effect of gesture transmission suggested a means for quality control: visible discrepancies in interpretation generated opportunities to check understanding. The findings suggest that clinical communication training could benefit from

including skills to understand and attend to gestures. The analysis developed here provides a promising schema and method for future research informing clinical guidelines and training.

Keywords: United Kingdom, Interpreter-mediated consultation; Interactional analysis; Gesture study; Clinical communication; Medical education

Body-oriented gestures as a practitioner's window into interpreted communication

Due to increased global migration and multilingualism, health care consultations can no longer be assumed to be conventional two-party interactions between a health care professional and a patient (Swinglehurst, Roberts, Li, Weber, & Singy, 2014). These changes have generated considerable challenges for health care service: Language and cultural discordance between clinicians and patients decreases patient satisfaction (Jacobs, Sadowski, & Rathouz, 2007), compromises patient centered-care (Hasnain, Connell, Menon, & Tranmer, 2011; Roberts 2006), and risks patient safety and quality of care (Davies, Dodd, Tu, Zucchi, Zen, & Hill, 2016; Flores, 2005). Involving professional interpreters is the recommended strategy for mitigating problems in understanding and misaligned expectations (Bolden, 2000; Hsieh, Ju, & Kong, 2010; Li, 2013; Meeuwesen, 2012; Schouten & Schinkel, 2014). Thus two-party interactions become three-party, encompassing a patient who speaks one language, a health care professional who speaks a different one, and a trained medical interpreter who is fluent in both.

When the doctor and patient lack a common language, they rely on interpreters to secure mutual understanding. Interpreters play an active role, judging the quantity and quality of the content to be interpreted (Bolden, 2000). However, the moment-by-moment outcomes of interpreters' judgements are inaccessible to doctors and patients, who can neither control nor evaluate utterances in the unknown language. Doctors thus "yield part of their interactional power and share responsibilities for the management of the interaction; they may not retain control on extended parts of the conversation with the patient" (Pasquandrea, 2011, p. 456).

Health care interactions that include interpreters require new policies and practice guidelines underpinned by research evidence (Li, Gerwing, Krystallidou, Rowlands, Cox, &

Pype, 2017). Two major developments in the study of natural language as a social science are particularly germane. First, since the 1980's, an accumulation of evidence from a variety of disciplines has demonstrated that dialogue is a *collaborative*, coordinated activity. Interpreter studies from interactional linguistics reflect this development, demonstrating interpreters' active participation and often providing evidence of positive outcomes (e.g., Gavioli & Baraldi, 2011). A second development is recognizing that dialogue is a *multimodal* activity: Speakers integrate their speech with visible bodily action. Guidelines prioritizing speech and inhibiting the potential of visible action (e.g., the interpreter should sit behind the patient) may be unwittingly removing a valuable communicative resource from all parties in the interaction. Although speech in the unknown language may not be open to evaluation, visible aspects of communication can be observed by all parties (Li, 2015).

In the present study, we focused our lens on conversational hand gestures that accompany speech, analyzing gestures' role in triadic exchanges comprised of general practitioners (GPs), patients, and interpreters. Methodologically, we aimed to develop a feasible method for linking interactionist and multimodal perspectives. Clinically, we aimed to show how attention to hand gestures could mitigate clinical challenges health care professionals face, opening a window for interlocutors to observe interpreters' judgements more directly.

Gesture and speech in interaction

Since the 1970's, the topic of gesture has experienced a resurgence of interest from the social sciences, including anthropology, linguistics, and psychology (Kendon, 2004, p. 73). *Co-speech hand gestures* are spontaneous hand and arm movements that interlocutors use while speaking (McNeill, 1985) and are distinguishable from conventionalized, culturally-specific *emblems* (e.g., thumbs up), which convey meanings that do not require speech (Ekman & Friesen, 1969).

Speakers from all cultural and linguistic backgrounds produce co-speech gestures (Feyereisen & de Lannoy, 1991), and despite some cross-cultural variation, there is no report of a culture that lacks speech-accompanying gestures (Kita, 2009). A meta-analysis showed that gestures benefit communication especially when they depict spatial or motor topics and when they provide information that is not provided by the accompanying speech (Hostetter, 2011). While gesture studies have elucidated many topics, we focus on the *semiotics* of gesture and its relationship to speech in interaction, that is, how gestures contribute to meaning-making in conversation.

Co-speech gestures are integral to the speaking process (Iverson & Goldin-Meadow, 1998, p. 228) and are “often regarded as part of the speaker’s total expression” (Kendon, 1980, p. 207), cooperating to express the speaker’s meaning (McNeill, 1992, p. 11). For example, when referring to a liver biopsy the patient had undergone, a physician said “you remember that? You got a needle in you” while pointing to his own right side, just below his ribcage (Gerwing & Dalby, 2014). The physician depicted on his own body where the needle had entered the patient’s body. Utterances that include visible bodily action are “constructed out of spoken and gestural materials” (Kendon, 2004, p. 158), and gestures’ meaning is intimately interrelated with speech on a moment-by-moment basis (Ekman & Friesen, 1969), the two forming *integrated messages* (Bavelas & Chovil, 2000). The physician’s speech was necessary for understanding the meaning of his pointing gesture, and the gesture disambiguated his speech (showing *where* the patient got a needle in him). Studies of the temporal and semantic relationship between speech and gesture reveal that each supplies complementary, yet unique information (e.g., Gerwing & Allison, 2009; Beattie & Shovelton, 2002; Holler & Wilkin, 2009).

Gestures (such as the one above) can serve a deictic function, indicating an “object or event in the concrete world” (McNeill, 1992, p. 18). Gestures can also serve a representational

function, demonstrating aspects of a particular action, object, or event. Representational gestures are “directly tied to speech, serving to illustrate what is being said verbally” (Ekman & Friesen, 1969 p. 68). For example, a physician described various strategies for how the patient could deal with his muscle tension; he said, “And also with some movements of your shoulders” while rotating both of his shoulders backwards (Gerwing & Dalby, 2014). The shoulder movements represented and specified the type of movements the physician suggested, allowing the patient to observe directly the most relevant aspects of the actions he should do.

Gesture studies in clinical encounters

In clinical communication research, co-speech hand gestures have largely been subsumed into the larger domain of *nonverbal communication*, which includes gaze, body posture, proxemics, and kinetics. Such research has focused on how nonverbal behaviors convey emotion and relationship (e.g., Hall, Harrigan, & Rosenthal, 1995; Roter, Frankel, Hall, & Sluyter, 2006). A focus on the semiotics of co-speech gesture in clinical settings falls outside this domain, constituting a much smaller body of research, which we review below.

Clinically relevant gestures filmed outside actual consultations

Participants describing their pain experiences to researchers have provided clinically-relevant material collected outside a clinical setting. Pain-focused talk tends to be accompanied by gesture (Rowbotham, Holler, Lloyd, & Wearden, 2012), such as (1) pointing gestures around the body, (2) gestures miming movements or body positions, and (3) abstract (or metaphorical) gestures for describing particular aspects of the pain experience (Hydén & Peolsson, 2002). Gestures are thus a way to externalize pain, which can be “made visible in the gesture both for the sufferer and other participants” (ibid, p. 341). Speakers use gesture to convey information

about the location and size of pain sensations and speech for conveying pain intensity, effects, duration, cause, and awareness (Rowbotham et al., 2012). Even when both modalities conveyed similar information, gestures still contribute unique information missing from the accompanying speech (Rowbotham, Holler, Lloyd, & Wearden, 2014). In line with Hotstetter's (2011) meta-analysis, non-redundant gestures about pain do benefit communication: When observing clips of pain descriptions, recipients who viewed video obtained significantly more information than those who listened only to the audio (Rowbotham, Holler, Wearden, & Lloyd, 2016). The ability to glean information from gesture can be improved: Participants who had watched a 5 min 28 sec instructional video about gesture-speech integration noted significantly more information from the clips of pain descriptions than those who had not (ibid).

Gesture and speech in clinical interaction

In his analysis of body movement in hundreds of general practice consultations filmed in the UK, Heath (1986) described numerous gestures, such as patients re-enacting painful movements or pointing to (or displaying) areas of the body for the physician to inspect. Patients used gestures to demonstrate the position, scale, and character of their suffering, providing the sense and significance of the illness and symptoms (Heath, 2002). In another UK study of clinical interactions, pharmacists and patients with a language barrier could bypass the interpreter and briefly communicate directly with each other "across a linguistic divide" (Stevenson, 2014, p. 768), using demonstrations (e.g., using medical devices or indicating the body part under discussion) or actions (e.g., reaching for objects). In an analysis of physician gestures from hospital encounters videorecorded in Norway, physicians' gestures indicated parts of the body, demonstrated both recommended and inadvisable actions, and even depicted abstract concepts like timelines, continuity, and regularity; these gestures, however, conveyed

ambiguous meaning if the patient had not heard or understood the speech that provided context and meaning (Gerwing & Dalby, 2014).

In an analysis of patient and physician gestures in general practice consultations filmed in the UK, Gerwing (2017) found that patients gestured at a rate of 11.42 gestures per 100 words; physicians at 6.37 gestures per 100 words. Approximately 44% of patients' gestures and 17% of physicians' gestures were oriented towards their body. Gerwing found that these *body-oriented gestures* accomplished far more than conveying information about symptom location; patients and physicians used them to perform complex clinical communication tasks, such as establishing mutual understanding, foreshadowing information that would be contributed later, providing cohesion between topics, and contrasting past and present emotions or attitudes. Notably, when using deictic gestures to indicate body regions, patients and physicians tended not to name that region using speech (e.g., one physician pointed to an area on his chest while saying "pressing on these muscles here these bones"). Patients used gesture but not speech to identify parts of the body in 49 of the 66 deictic gestures (.74); physicians did so in 21 of the 24 deictic gestures (0.88).

Multi-modality in interpreted interaction

The semiotics of co-speech gesture is, as yet, an unexplored area in an interpreted medical context. Even more generally, Pasquandrea pointed out that "multimodality in interpreter-mediated medical encounters has received scant attention" (2011, p. 455). This author analyzed the interactive function of gaze direction and body orientation, revealing that doctors used these visible resources to regain control when interpreters and patients engaged in extended dyadic interaction. When doctors oriented towards the interpreter, the interpreter ceased dyadic interaction with the patient and began to translate. Conversely, when doctors oriented to other

activities (e.g., the computer screen, papers), the interpreter sustained dyadic interaction with the patient. Pasquandrea pointed out that a purely verbal analysis would suggest “spontaneous” translation and “missed” opportunities for involvement, yet analysis of video provided an explanation rooted in the doctors’ visible bodily actions. Doctors also “often gazed at the current speaker in order to monitor the ongoing interaction, to look for the completion of the sequences, to seek gaze contact or to use multimodal clues (gestures, facial expressions) in order to try and follow the conversation” (Pasquandrea, 2012, p. 150).

The present study and research questions

In clinical interactions, the patient’s body is often the focus of attention. Numerous scholars working in non-clinical settings have noted gestures in which the body plays an integral role. For example, Calbris (2011) discussed the deictic function of gestures that “touch, focus on, draw or sculpt forms in front of *a particular part* of the speaker’s body” (2011, emphasis added). Feyereisen and deLannoy (1992) pointed out that such gestures could serve illustrative or deictic functions in medical examination. More recently, in an analysis of television interviews, Cooperrider (2014) described body-directed gestures, or gestures directed “inward, towards the body”, which speakers used to reference the self (as a whole) or a particular body part, or to anchor experiential notions to the body. Gerwing (2017) was the first to examine these gestures in clinical interactions. For the present study, we extended this focus, analyzing gestures that were oriented towards the body to explore their role in interpreted interactions.

Introduction to research questions

To contextualize our research questions and unpack interpreters’ choices when primary participants gesture, we transplant the earlier shoulder-movement example (from Gerwing &

Dalby, 2014) into a hypothetical interpreted setting. The original language of the example was Norwegian, and we will imagine that the physician was talking to an English patient with the help of an interpreter. The physician's multimodal utterance incorporated speech ("asså med sånn bevegelse på skuldrene") and gesture (rotating his shoulders in a backwards motion).

The interpreter could capture the full meaning of the doctor's utterance, translating his speech ("sort of with movements of the shoulders") and repeating his gesture. Or, the interpreter could translate the speech but not repeat the gesture, rendering the message incomplete (unspecified movements). Finally, if the interpreter did not gesture, the interpreter could add speech to compensate (e.g., "sort of with movements of the shoulders... lift them up simultaneously and then move them back, repeat several times").

Research questions

RQ1. How frequently do physicians, patients, and interpreters use body-oriented gestures, and how frequently do the gestures convey information missing from speech?

RQ2. Do interpreters incorporate patient and physician body-oriented gestures into their translations?

RQ3. If interpreters do incorporate patient and physician body-oriented gestures, do they preserve the same meaning of that gesture, taking into account the context of speech?

RQ4. If interpreters do not incorporate patient and physician body-oriented gestures, do they convey the gesture's meaning in speech instead?

RQ5. What is the observable local impact of various combinations on how participants demonstrate mutual understanding or misunderstandings?

Method

Participants

Data were collected from two UK inner-city general practices in 2009. There were three types of participants—the GP, patient and interpreter. Once willing GPs were identified, fulfilling additional criteria about the other participants was necessary before videotaping. Namely, the patient had to be over 16 years of age, have insufficient English to meet with the doctor, need an interpreter, and be able to provide written consent. The interpreter had to be affiliated with an organization that received payment for providing interpreting services.

Six consultations were video-recorded, yielding approximately 76 minutes of material. Participants included two English speaking GPs (one female, one male)—one from each site, six patients (five females, one male), and two female interpreters, who spoke either Urdu or Czech.

Ethical approval was granted by NHS Bradford Research Ethics Committee (09/H1302/106). Written consent was obtained from the general practitioners, first. The participating GPs then attended a one-hour training session led by the second author (SL) on how to obtain informed consent from interpreters and patients according to the approved protocol. The GP sought verbal consent from the accompanying interpreter first, who then helped the GP to discuss the project with the patient to ask whether the patient would be willing to participate. A written information sheet and a consent form were available in the chosen non-English languages. If a patient's understanding could not be established, the consultation would not be videotaped. All participants, including the doctors, were able to withdraw their data any time before analysis started. The first author (JG) conducted analysis on videotapes stored on an encrypted hard disk, using a laptop that was disconnected from the internet.

Transcription and translation

The consultations were first transcribed according to conversation analysis conventions (Jefferson, 2004) by trained, independent translators. They then translated the non-English scripts into English. All non-English scripts were ‘double translated’ by an additional professional translator. The two translations were compared and discrepancies were discussed between translators before finalising for analysis.

Analysis

The analysis system was developed using *microanalysis of face-to-face dialogue* (MFD), which is a meta-method for starting inductively and then constructing quantitative, systematic analysis systems that maintain the qualitative features of the data (e.g., Bavelas, Gerwing, Healing, & Tomori, 2016). It is built on two theoretical assumptions. First, utterances are multimodal, including tightly integrated components that are audible (speech, intonation, etc.) and visible (e.g., hand and facial gestures). Second, conversation is a collaborative, coordinated activity: the actions of interlocutors must be understood as mutually influential. JG, an experienced gesture and interaction analyst, designed and conducted all analysis. Formal reliability was not conducted; however, JG had numerous in-person meetings with SL to review analytical decisions together. SL is an experienced interpreter, interaction analyst, and someone who works closely with doctors as his profession. Besides checking decisions about individual gestures, he provided expertise necessary for contextualising the microanalysis.

Locating body-oriented gestures. First we located all body-oriented gestures. *Body-oriented gestures* were operationalized as (1) purposive movements synchronized with the timing and content of speech that (2) used the body as an integral component of meaning. These

could be deictic gestures directed towards the self (e.g., the patient indicating the location of pain on his own body) or the other (e.g., the physician requesting information while indicating a part of the patient's body) or demonstrations of actions (e.g., the patient re-enacting a painful movement). The gestures and accompanying speech were the *gesture-speech composites*.

We used ELAN (Wittenburg, Brugman, Russel, Klassmann, & Sloetjes, 2006), which allows analysts to link observations (annotations) precisely to what is being observed (relevant phenomena in the video). Annotations can be made on multiple, overlapping tiers (e.g., different tiers for each participant's gestures and concurrent speech). We assigned each body-oriented gesture a three-part code: its position in the order of body-oriented gestures in the consultation, its referent's position in the order of referents, and its producer (patient, physician, or interpreter). For example, if the patient did the first body-oriented gesture by pointing to his knee, it would be coded as G1-1-PT (the first body-oriented gesture in consultation, the first body part referent, and it was done by the patient). If the next gesture was the interpreter pointing to her knee, it would be coded G2-1-INT. We also noted the location of gestures on the transcripts, facilitating a broader view of the consultation.

After locating all gesture-speech composites, we noted whether each body-oriented gesture supplied information that was missing from the accompanying speech. For example, one doctor said, "the reason you have the pains" while touching her shoulders, thereby providing the location of the pains in her gesture but not in the accompanying speech. Sometimes speech provided general information about a body region or action that was specified in gesture. For example, a patient said, "last year my hands were so weak here" while rotating her wrists. Her speech referred to her hands, but the gesture specified a particular area (the wrist joints). In these cases, the gestures were considered as supplying unique information. In contrast, gestures could

be semantically redundant with speech. For example, one patient said, “all my teeth have been taken out” while motioning towards her mouth. The gesture did not provide unique information over and above what speech had.

Comparing utterances in the source and target language. The gesture codes provided a systematic means for pairing the patient and physician gesture-speech composites with the relevant interpreted utterance, which could follow the source utterance directly or be several utterances later. For comparing the source and interpreted utterances, we first considered the mere presence of gesture (whether the interpreter repeated the source gesture or not). We then considered the level of meaning (whether the interpreter contextualized the gesture accurately, thereby preserving the meaning of the source utterance). If the interpreter did not repeat a gesture, we checked whether the gestured information was present in the interpreter’s speech instead. For the comparison analysis, we excluded gestures from sequences of direct dyadic exchanges between doctor and patient.

Results

We present the results in the same order as the research questions originally proposed.

RQ1. How frequently do physicians, patients, and interpreters use body-oriented gestures, and how frequently do the gestures convey information missing from speech?

We identified 264 body-oriented gestures in these six interactions; patients used a total of 54 ($M=9.00$; $SD=6.54$), doctors used 113 ($M=18.83$; $SD=10.44$), and interpreters used 97 ($M=16.17$; $SD=14.22$). Table 1 presents the raw gesture frequency in each of the consultations and the duration of each consultation. Of the 167 doctor and patient gestures, 138 were deictic gestures indicating body parts or regions, and 29 were demonstrations of actions. Besides

straightforward indications referencing particular body parts, patients and doctors combined metaphorical concepts and demonstrations in their body-oriented gestures; Table 2 provides additional examples.

To measure gesture-speech redundancy, we calculated proportions of the number of body-oriented gestures that supplied unique information over the total number of body-oriented gestures. The proportion of body-oriented gestures that supplied unique information was the following: For each consultation overall ($M = .71$, $SD = .12$), for triadic exchanges that included the interpreter ($M = .70$, $SD = .11$), for dyadic exchanges ($M = .84$, $SD = .10$), for physicians ($M = .62$, $SD = .19$), and for patients ($M = .83$, $SD = .20$).

RQ2. Do interpreters incorporate patient and physician body-oriented gestures into their translations?

For each consultation, we calculated a proportion in which the total number of patient and physician body-oriented gestures was the denominator and the number of times the interpreter repeated the gesture was the numerator. For example, if there were 10 body-oriented gestures in source utterances and the interpreter repeated gestures 7 times, the proportion would be 0.7. After deriving a proportion for each consultation, we calculated the mean proportion across all six consultations. When patients or physicians used body-oriented gestures as part of their utterances, interpreters incorporated those gestures into their translation less than half the time ($M = 0.42$, $SD = .21$).

RQ3. If interpreters do incorporate patient and physician body-oriented gestures, do they preserve the same meaning of that gesture, taking into account the context of speech?

When interpreters incorporated the source gesture into their translation, they usually preserved meaning of that gesture ($M=.92$, $SD=.14$). Two excerpts illustrate preserved gesture form and utterance meaning.

In excerpt 1, the doctor used a body-oriented gesture (pointing to her throat) as part of her source utterance (line 2). In line 4, the interpreter pointed to her own throat as part of her target utterance. Her speech preserved the function of this gesture (the purpose of the medication and referring to the discomfort). Like the doctor, she did not use speech to refer specifically to the thyroid or throat. [For all excerpts, the underlined speech indicates the timing of the gestures, which are described underneath the accompanying speech. English translation is provided in italics.]

Excerpt 1. (Thyroid function: G1-1-DR, G2-1-INT)

- 1 Dr. WE STARTED YOU ON SOME MORE THYROXIN (0.41) to try to
 2 improve the way you're feeling, didn't we
 [points to throat]
- 3 Int. dobara jo notice leia kio k wo ye jo hota hai, yea jo
 4 aap ko de rahe hain dawa aap ko jo tuklifian hain thyroxin eis ko behter kerne k leie
 [points to throat]
- (3-4) *again when they noticed and you know what it is, they are giving you medicines to get rid of pains, thyroxin to make it better*

In Excerpt 2 (a direct continuation of Excerpt 1), in lines 5 and 6, the patient used two body-oriented gestures. In lines 7 and 8, the interpreter repeated and incorporated those gestures into her utterances. As above, the interpreter preserved the meaning of the patient's gestures: the first gesture referred to the locus of the patient's continuing discomfort, and the second referred to pain in the shoulders.

Excerpt 2. (Thyroid function: G3-1-PT, G4-2-PT, G5-1-INT, G6-2-INT)

- 5 Pt. liken muje behter nahi feel ho rah raat ko muje same problem howi hota hai
[points to throat]
- 6 or muje shoulder main or yea back pain waise hi same hai
[points to shoulders]
- (5,6) *but I am not feeling better at night same problem happens and I still have shoulder and back pain*
- 7 Int. she just saying I haven't got any better at night it hur- her throat hurts as well
[points to own throat]
- 8 and she has pain in her shoulders as well
[points to own shoulders]

Note that in this excerpt, the interpreter transferred additional information contained in the patient's gesture (i.e. that the pain is in the throat) into her speech ("her throat hurts as well").

The patient's gesture may have served to elevate the importance of a particular issue, which the interpreter attended to and highlighted in her own speech.

RQ4. If interpreters do not incorporate patient and physician body-oriented gestures, do they convey the gesture's meaning in speech instead?

When interpreters did not incorporate the primary participants' body-oriented gestures, , the interpreter conveyed that information in speech instead approximately a third of the time ($M=.30$; $SD=.18$). In the remaining cases, the interpreter did not convey the information supplied by gesture at all.

Excerpt 3 illustrates the interpreter conveying previously gestured information in speech. In line 1, the physician demonstrated pumping a small spray bottle in front of his mouth. In line 2, the interpreter mentions the spray, but she does not repeat the physician's gesture.

Excerpt 3. (Chest pain: G12-2-DR, G13-2-DR)

- 1 Dr. Does anything he does help take it away, does the spray help take it away?
 [spray action in front of the mouth] [spray action in front of the mouth]
- 2 Int. Eh, čo sa týka bolesti keď máte alebo takto, pomáha Vám sprej alebo tabletky?
 (2) *Eh, regarding the pain when you have it, or to put it this way, does the spray or tablets help?*
- 3 Pt. Pomôže mi ten sprej ale na pár hodín. Potom ho musím znovu užiť?
 (3) *The spray helps me but only for a couple of hours. Then I have to use it again.*

Note that in Excerpt 3, the doctor's gesture demonstrating the spray action was redundant with his speech ("does the spray..."). Although the interpreter did not reproduce this gesture, her speech still included "the spray" (just as the doctor's speech had). We became curious regarding these redundant source gestures: Were interpreters more likely to not gesture (while maintaining information in speech)? Interpreters dropped 27 source gestures from their utterances while maintaining the source gesture's semantics in speech (as in Excerpt 3). In these cases, 14/27 (.52) of the source gestures were redundant and 13/27 (.48) were non-redundant with speech (supplying unique information). In contrast, in the 44/60 (.73) cases in which interpreters reproduced the primary participants' gestures, the source gestures had conveyed non-redundant information (as in Excerpt 1), and in the remaining 16/60 (.27), the gestures were redundant with speech. While it is not possible to test these differences statistically in our sample (given the non-independence of our gesture results), the two proportions suggest an interesting (and intuitive) pattern.

Sometimes interpreters dropped the gestured information entirely. For example, in Excerpt 4, the interpreter did not incorporate any aspect of the patient's gesture into her utterance. Immediately prior to this excerpt, the physician had asked the patient whether she would like something stronger than paracetamol for her pain. In lines 1-3 the patient answers,

describing the intense pain in her legs (as though they were breaking), a previous medication she had tried, her fear for her teeth, and the fact that she had tried ibuprofen. In line 1, she points towards her left calf, specifying where the pain was particularly bad. In lines 4 and 6, the interpreter mentioned the two drugs, but she neither gestured nor mentioned the pain in the patient's legs.

Excerpt 4. Pain in calves (G75-3-PT)

- 1 Pt. Niečo také, čo láme. Mne láme nohy.
[points to the back of left calf]
- (1) *Something like that, as if it breaks. As if my legs were breaking.*
- 2 Lebo som veľa popila cocodamol a ja už mám strach na tie zuby.
- (2) *Because I had drunk lots of cocodamol and I am scared because of my teeth.*
- 3 Aj ibrufen som veľa pila.
- (3) *I have also taken lots of ibuprofen.*
- 4 Int. She definitely not want cocodamol. She definitely not want ibuprofen.
- 5 Dr. OK
- 6 Int. Something different. She just don't know what she wants.
- 7 Dr. And that's that's why we want to do some blood test.

The interpreter's lack of gesturing was potentially an indication to the doctor that something the patient had said was not conveyed by the interpreter, and if the doctor chose, he could have followed up by asking what the patient had said about her legs. Speculating as to why the interpreter chose to skip over this in favor of explaining the patient's wishes about pain killers is beyond the scope of this microanalysis, but it may have to do with her particular style of

interpreting. (For an in depth discussion of this topic, see Penn & Watermeyer, 2018, p. 182-200.)

RQ5. What is the observable local impact of various combinations on how participants demonstrate mutual understanding or misunderstandings?

Examining the local impact of whether interpreters gestured or not requires a more macro view. The local impact is exemplified in Excerpt 4: The patient initiates the topic of the intense pain in her legs, the interpreter does not repeat this information (neither in speech nor gesture), and, in line 7, the physician begins a new topic, explaining the reason for suggested blood tests. That is, after the interpreter deletes information about the patient's pain, the local impact is that the patient's pain is not followed up as a relevant topic. In contrast, in the two following excerpts, the gestures become a resource for the primary participants, who attend to and notice the interpreter's activities.

Before Excerpt 5, the patient had requested stronger pain killers to deal with the intense pain in her injured legs. While discussing options, she explained she had taken dihydrocodeine, which had caused such severe weight loss that the doctors had advised her to avoid it in the future. Earlier in the consultation, the patient had mentioned concerns about weight loss, but the interpreter did not translate these concerns for the doctor. The physician, unaware of this problem, begins to prescribe the drug. In line 1, the patient explains a preference for Tramadol, while rubbing her stomach, a gesture that she holds through the line 6. (Note: the patient's relative participated as well, in line 3.)

Excerpt 5. Leg injury pain (G9-4-PT, G10-4-INT)

1 Pt. Tak radšej asi tento tramadol, on je taký [silnej(h)š(h)í. ((laughing))

[slow back and forth
movements over stomach, holds
end of gesture through line 6]

So, I'd rather take the tramadol, it is stronger (laughing)

- 2 Int. [Ooh. Ok.
- 3 Rel. [Še bojí.
She's worried
- 4 Int. [Could you ()? (1.3) She is a scared dah?
- 5 Dr.
[looks at patient, interpreter, looks very confused]
- 6 Pt. °hehe° Sorry.
[continues holding end position of previous gesture]
- 7 Int. Because before she was lose too much weight
[points to patient's stomach]
- 8 an::d she just saying if this time you will give me [tramadol.
- 9 Dr. [Tramadol OK↑ I can also
- 10 give her I can give her the long-lasting tramadol if she prefers

The patient's gesture in line 1 appears to be inexplicable to the doctor, as the interpreter had said nothing about the patient's stomach. The unexpected gesture appeared to alert the doctor of a problem, whose look of confusion prompted the interpreter to convey the patient's concern for the first time, in line 7.

In Excerpt 6, a different patient also described pain in her legs. She sat with her purse in her lap, holding it with one hand while gesturing towards her right leg. When the interpreter translated (lines 5 and 6), she gestured towards both legs, thus changing the gesture form from indicating one leg to indicating both. In line 7, the physician interrupts.

Excerpt 6. Pain in calves (G1-1-PT, G2-1-PT, G3-2-INT, G4-2-DR, G5-1-DR)

- 1 Pt. Neviem. Niečo také nohy, láme, bolí. Ja neviem. Také do ľava nohy mám,
[touches the back of the right calf]
- (1) *I don't know. Something with legs, pains that hurts as if it will break, pain. I don't know. I can't walk properly,*
- 2 ja neviem, či to je z toho že po pôrode,
[rubs the back of the right calf]
- (2) *I don't know, whether it is because after,*
- 3 po 35 rokov, ja neviem nejaké nejaké
- (3) *delivery, since 35 years ago, I don't know some some*
- 4 problémy mám s nohama. Spat' nemôžem v noci.
- (4) *problems I have with my legs. I can't sleep at night.*
- 5 Int. She just saying, she had a really bad pain of leg but of half them down,
[touches the back of both calves]
- 6 yeah ?.hhh Sometimes [she might
- 7 Dr. [e::m
- 8 Is it both legs
[touches both calves]
- 9 or just one of them?
[touches right calf]

The physician noticed the discrepancy between the patient's and interpreter's gestures, and he interrupted the interpreter in order to clarify his understanding. Immediately following this excerpt, the interpreter asked the patient the doctor's question, and they came to a mutual understanding that she was referring to pain in both legs. This excerpt exemplifies both the local effect of the interpreter transforming the gesture and the potential resource that noticing discrepancies can bring as a window into the interpretation process.

Discussion

When patients and physicians lack a common language, interpreters can mediate the communication, becoming responsible for a myriad of micro-judgements concerning the substance of what should be interpreted and how it should be. The outcomes of these judgements, while largely inaccessible to the primary participants, are amenable to empirical study. In the present study, we used a multimodal lens to examine whether interpreters' speech and visible bodily actions matched what the patient or physician had said and done. First, we analyzed how patients and physicians used *body-oriented gestures* to mobilize their bodies as a semiotic resource. Second, comparing these multimodal utterances to the interpreters' utterances indicated whether the interpreter included similar gestural components in the same context.

In our material, the GP's, the patients, and the interpreters all used body-oriented gestures frequently. Approximately 70% of the primary participants' gestures provided information that was missing from their speech, highlighting gestures' importance as a semiotic resource. Although interpreters repeated the primary participants' gestures less than half the time, the gestures provided an observable and potentially powerful resource for quality control. When interpreters repeated the primary participant's gestures, the meaning of that gesture (both its referent and context) was highly likely to be maintained. When interpreters did not repeat the gesture, they were unlikely to contribute the gestured information in speech instead. Our examples of local effects showed that GPs were able to use unexpected gestures (Excerpt 5) and discrepancies in gesture form (Excerpt 6) to bring the topic of the translation process to the fore.

The conceptualization of co-speech gesture in face-to-face dialogue

In his seminal paper “So you think gestures are nonverbal?”, David McNeill (1985) argued that co-speech gesture possesses qualities of referential symbols, in that speech and gesture cooperate to present a single, complex meaning. McNeill posited that spontaneously produced, co-speech gesture, though not encoded in conventional or arbitrary ways, is “analyzable as paired signifiers and signifieds” (ibid, p. 352), thus exhibiting linguistic properties. To illustrate, a physician asked a question about medication that incorporated a gesture in which he used his hand to perform the movement involved in spraying medication into the mouth. The *signifier* was the location of his hand in front of his mouth and the quick up and down movement of his index finger; the *signified* was the action one uses to administer the drug orally. To paraphrase McNeill, considering just the location of the hand and the index finger's movement in isolation from the physician's knowledge of how the medication is administered would destroy the symbol (ibid, p. 352). McNeill further argued that gesture performs a variety of semantic and pragmatic functions in tight synchrony with the linguistic units of the accompanying speech. Seeking linguistic-like features in non-speech aspects of communication was not entirely new, having roots to the 1960's (Duncan, 1969). However, McNeill's proposal focused on and explicated co-speech gesture specifically. Entire research programs have emerged from this foundation, exploring implications for cognition (e.g., McNeill, 1992, Kita, Alibali, & Chu, 2017) and social processes (e.g., Gerwing & Bavelas, 2004, Holler & Wilkin, 2009).

In contrast, researchers of clinical communication have largely embraced the notion of “nonverbal” communication, which incorporates all non-speech behavior: “facial expressivity, smiling, eye contact, head nodding, hand gestures, postural positions (open or closed body

posture and forward to backward body lean); paralinguistic speech characteristics such as speech rate, loudness, pitch, pauses, and speech dysfluencies; and dialogic behaviors such as interruptions” (Hall, Harrigan, & Rosenthal, 1995, p. 2). Rather than analyzing the semantic and pragmatic function of these behaviors, the nonverbal approach specifies their role in conveying primarily affect and emotions, leaving speech to convey the propositional and linguistic content. Underlying this approach is the theory that verbal and nonverbal aspects of communication constitute two distinct channels, operating in parallel (Robinson & Stivers, 2001).

The research conducted in the present study was built on the contrasting theoretical assumption that speech and gesture are integrated and holistic; their relationship is “neither additive nor multiplicative” (Robertson & Stivers, 2001, p. 255). Rather than operating through a separate channel, co-speech hand gestures constituted social actions at the local, micro- level, working with the speech to convey propositional and pragmatic content. Our findings therefore support the Integrated Message Model (Bavelas & Chovil, 2000), which proposes that interlocutors perform visible acts of meaning (e.g., gesture) that are temporally and semantically integrated with the accompanying words (whether redundant or not) and that convey meaning that is explicable only in its immediate context. For example, when the patient touched her calf while talking about pain, the timing and semantic relationship between this touch and her speech signaled a semiotic relationship; the listener’s ability to recognize the touch as a meaningful gesture depended on explication provided by her speech. Gestures are selective representations (or indications) of what is being signified. The physician’s spray gesture need not be identical to the actual spraying action; by selecting and stylizing aspects of a particular hand movement, he could meet the timing and communicative demands of his full message. Focusing on the referential, propositional role of gesture highlights its potential for replacing or supplementing

precise, anatomical terms, which may be necessary given that patient understanding of anatomy may be limited (Weinman, Yusuf, Berks, Rayner, & Petrie, 2009). Gesture thus bridges experiential and epistemic gaps between physician and patient, facilitating reference to areas of the body without the need for specialized biomedical language.

From this theoretical foundation, our results replicated phenomena reported in all studies reviewed on the semiotics of clinically-relevant gestures. The patients in the six consultations in our material provided the sense and significance of their symptoms in gesture (Heath, 2002), and they used gesture to elicit attention that was previously not forthcoming (as in Excerpt 5). Like Hydén and Peolsson (2002), we observed gestures pointing around the body, both miming of body positions (e.g., sitting, stopping, kneeling), explicit demonstrations of actions (spray action, scratching action, putting on glasses), and even metaphorical gestures around the body to describe aspects of pain (e.g., “cramping” movement behind calves) or treatment (e.g., barrier gesture to show effect of medication). Although we did not conduct a fine-grained semantic analysis of the relationship between gesture and speech (e.g., Rowbotham, et al. 2012), we did conduct a dichotomous redundancy analysis (e.g., Gerwing & Allison, 2009) that indicated that gestures were indeed contributing information that was missing from speech. The redundancy averages in this material ranged from .62-.84, in line with findings from Gerwing (2017), who found .74-.88 of gestures supplied information missing from speech. Like Stevenson (2014), we saw physicians and patients using gesture strategically to communicate directly, briefly excluding the interpreter; for example, to initiate examination (displaying blood pressure equipment) and to conduct examination (demonstrating actions the patient should do).

The “signified” in patient, physician, and interpreter gestures

For patients and physicians to address the patient's condition, patients must communicate about aspects of their day-to-day life, which may include conveying information about pain and symptoms. "[Patients] transpose subjective, interpersonal experience and overlay that experience on their body's surface" (Heath, 2002, p. 615). Thus, in the clinic room, the function of the patient's body transforms from containing the pain to demonstrating it; that is, the patient mobilizes the body as a semiotic instrument (Hydén & Peolsson, 2002, p. 328). What patients signify in their gestures is therefore selective aspects of past experience, embodied in the present for the physician to consider.

Physicians are tasked with understanding the patient's situation sufficiently to be able to curate their medical knowledge and propose a plan for addressing the situation. Thus physicians' gestures serve to inquire about the patient's experience, to probe more deeply into what the patient has introduced, to advise, and to explain. Here, what is signified by gesture is what the physician has gleaned from the patient and the physician's biomedical and clinical expertise.

Interpreter gestures function differently from either patient or physician gestures. When a patient signifies a painful movement with a gestural demonstration, the gesture functions to symbolize the patient's memory of a past experience. When the interpreter copies this gesture, what is signified is, instead, the interpreter's recollection of the patient's gesture. In other words, while patients may transpose subjective, interpersonal experience in gesture, interpreters lack that experience and can only repeat the patient's gesture within the context of the patient's speech. Similarly, a physician's palm on her chest while asking a question embodies knowledge regarding precisely where the heart is. However, the interpreter can only mimic the physician's gesture to keep the physician's utterance integrated. Interpreters undertake an instantaneous yet nontrivial selection process regarding what aspects of movement to repeat and how. Explicating

this process could be informative regarding the semiotics of gesture use as well as the act of interpreting, both at the level of practice and ethics. For example, whether interpreters should aim to convey the affective, emotional aspect as well as the referential content of a patient's multimodal demonstration is, as yet, an open question.

Limitations

This study has several limitations. First, the small sample size had implications for how much we can generalize and is merely suggestive of patterns that would be strengthened by later replication and extension. Second, we did not conduct formal reliability for the gesture analysis, a procedure that is a key activity when conducting microanalysis of face-to-face dialogue (Bavelas, et al., 2016). Follow up studies should incorporate such tests of inter-analyst subjectivity. Third, the micro orientation of the analysis limited the extent to which we could take into account the wider context of the consultation.

Clinical implications

While much of gestural behavior may be preconscious, we propose that health care practitioners could become accustomed to gesturing more deliberately and consciously, noting whether the interpreter repeats the gestures. If the interpreter uses the same gesture, our results suggest that it indicates that the same topic is being discussed and even that the information in the gesture is being contextualized in the same way. Attending to patient gestures is also useful, as they foreshadow topics and perhaps add elements of the patient's experience that can be expected in the ensuing interpretation. By attending to the patient's and interpreter's gestures, the practitioner can take it as a good sign if the interpreter's gesture matches what the patient did. Modified (or absent) gestures can signal a need for clarification, providing an opportunity to

topicalize intersubjectivity and the interpretation process itself, allowing for repair there and then.

Rowbotham et al. (2016) showed that lay participants gleaned more information from gesture after watching a 5 min 28 sec instructional video, suggesting that meta-linguistic awareness of gesture could be a training opportunity for health care professionals. We propose that such awareness (of their own and others' gesture use) could contribute to using visible action as a window into the otherwise opaque process of interpretation (also see Li, Said, O'Neil, Ancarno, & Niksic, 2016 for a project teaching medical students linguistic analytic methods in clinical communication education). Note that any potential benefits of attending to gesture use is predicated on mutual visibility: the physician must watch both the patient and interpreter during the interaction (i.e., instead of turning away and orienting to the computer or paperwork during interpretation sequences). Seating arrangements in which all parties are in full view of each other allow for unobstructed opportunities for conveying information and monitoring the translation process. The findings presented here also suggest that it is worth considering the implications for telephone or video interpreting, which are promising and important areas of inquiry.

Conclusion

One of our aims was to contribute a methodology for further study. Our operationalization of body-oriented gestures (following Gerwing, 2017) proved a fruitful way into the multimodal material. Further, we developed a coding system that facilitated comparison between the primary participants' gestures and the interpreters' gestures. This coding system is transferable to further studies, allowing for replication of our findings or extensions of this work into hypothesis testing, other questions, or formal evaluation. Finally, we aimed to show how

directing attention to gesture may mitigate challenges health care professionals and patients face when working with interpreters; our analysis showed that the gestures indeed provided a window through which to view interpreted utterances.

Involving professional interpreters is the recommended strategy for meeting the challenge of increased multilingualism in health care interactions. Policy has pointed the way, evidence-based practice guidelines that rest on solid theoretical foundations and methodologies from the social sciences must follow.

References

- Bavelas, J. B., & Chovil, N. (2000). Visible acts of meaning. An integrated message model of language use in face-to-face dialogue. *Journal of Language and Social Psychology, 19*, 163-194. <https://doi.org/10.1177/0261927X00019002001>
- Bavelas, J.B., Gerwing, J., Healing, S., & Tomori, C. (2016) Microanalysis of face-to-face dialogue: An inductive approach. In C.A. Van Lear & D. J. Canary (Eds.), *Researching communication interaction behavior: A sourcebook of methods and measures* Ch 9. (pp. 129-157). Thousand Oaks, CA: SAGE. ISBN: 978-1-483-30302-4
- Beattie, G., & Shovelton, H. (2002). An experimental investigation of some properties of individual iconic gestures that mediate their communicative power. *British Journal of Psychology, 93*, 179-192. DOI: 10.1348/000712602162526
- Bolden, G. B. (2000). Toward understanding practices of medical interpreting: interpreters' involvement in history taking. *Discourse Studies, 2*, 387-419. <https://doi.org/10.1177/1461445600002004001>

- Calbris, G. (2011). *Elements of meaning in gesture*. Amsterdam, The Netherlands: John Benjamins Publishing.
- Cooperrider, K. (2014). Body-directed gestures: Pointing to the self and beyond. *Journal of Pragmatics*, 71, 1-16. <https://doi.org/10.1016/j.pragma.2014.07.003>
- Davies, S. E., Dodd, K. J., Tu, A., Zucchi, E., Zen, S., & Hill, K. D. (2016). Does English proficiency impact on health outcomes for inpatients undergoing stroke rehabilitation? *Disability and Rehabilitation*, 38, 1350-1358. <https://doi.org/10.3109/09638288.2015.1092173>
- Duncan Jr, S. (1969). Nonverbal communication. *Psychological Bulletin*, 72, 118-137. <http://dx.doi.org/10.1037/h0027795>
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, 1, 49-98. DOI: <https://doi.org/10.1515/semi.1969.1.1.49>
- Feyereisen, P., & De Lannoy, J. D. (1991). *Gestures and speech: Psychological investigations*. Cambridge UK: Cambridge University Press.
- Flores, G. (2005). The impact of medical interpreter services on the quality of health care: A systematic review. *Medical Care Research and Review*, 62, 255-299. <https://doi.org/10.1177/1077558705275416>
- Gavioli, L. & C. Baraldi (2011). Interpreter-mediated interaction in healthcare and legal settings: Talk organization, context and the achievement of intercultural communication. *Interpreting*, 13, 205-233. DOI: 10.1075/intp.13.2.03gav
- Gerwing, J. (2017) Introducing body-directed gestures as a semiotic resource in patient-physician dialogues. In P. Paggio & C. Navarretta (Eds.), *Proceedings of the 4th European and 7th Nordic Symposium on Multimodal Communication (MMSYM 2016)*,

- Copenhagen, 29-30 September 2016* (pp. 85-93). Linköping: Linköping University Electronic Press. ISBN: 978-91-7685-423-5.
- Gerwing, J., & Allison, M. (2009). The relationship between verbal and gestural contributions in conversation: A comparison of three methods. *Gesture*, 9(3), 312-336.
- Gerwing, J., & Bavelas, J. B. (2004). Linguistic influences on gesture's form. *Gesture*, 4, 157-195.
- Gerwing, J. & Dalby, A. M. (2014). Gestures convey content: An exploration of the semantic functions of physicians' gestures. *Patient Education and Counseling*, 96, 308-314.
- Hall, J. A., Harrigan, J. A., & Rosenthal, R. (1995). Nonverbal behavior in clinician—patient interaction. *Applied and Preventive Psychology*, 4, 21-37. [https://doi.org/10.1016/S0962-1849\(05\)80049-6](https://doi.org/10.1016/S0962-1849(05)80049-6)
- Hasnain, M., Connell, K. J., Menon, U. & Tranmer, P. A. (2011). Patient-centered care for Muslim women: Provider and patient perspectives. *Journal of Women's Health*, 20, 73-83. <https://doi.org/10.1089/jwh.2010.2197>
- Heath C. (1986). *Body movement and speech in medical interaction*. New York: Cambridge University Press.
- Heath, C. (2002). Demonstrative suffering: The gestural (re) embodiment of symptoms. *Journal of Communication*, 52(3), 597-616. DOI: 10.1111/j.1460-2466.2002.tb02564.x
- Holler, J., & Wilkin, K. (2009). Communicating common ground: How mutually shared knowledge influences speech and gesture in a narrative task. *Language and Cognitive Processes*, 24, 267-289. <https://doi.org/10.1080/01690960802095545>

- Hostetter, A. B. (2011). When do gestures communicate? A meta-analysis. *Psychological bulletin*, 137, 297-315. <http://dx.doi.org/10.1037/a0022128>
- Hsieh, E., Ju., H. & Kong, H. (2010). Dimensions of trust: The tensions and challenges in provider-interpreter trust. *Qualitative Health Research*, 20, 170-181. <https://doi.org/10.1177/1049732309349935>
- Hydén, L. C., & Peolsson, M. (2002). Pain gestures: the orchestration of speech and body gestures. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*, 6, 325-345. <https://doi.org/10.1177/136345930200600305>
- Iverson, J. M., & Goldin-Meadow, S. (1998). Why people gesture when they speak. *Nature*, 396, 228-228. doi:10.1038/24300
- Jacobs, E. A., Sadowski, L. S., & Rathouz, P. J. (2007). The impact of an enhanced interpreter service intervention on hospital costs and patient satisfaction. *Journal of General Internal Medicine*, 22, 306-311. <https://doi.org/10.1007/s11606-007-0357-3>
- Jefferson, G. (2004). Glossary of transcripts symbols with an introduction. In G. H. Lerner (Ed.) *Conversation Analysis: Studies from the first generation* (pp. 13-34). Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Kendon, A. (1980). Gesticulation and speech: two aspects of the process of utterance. In M. R. Key (Ed.), *The relationship of verbal and nonverbal communication* (pp. 207-227). The Hague: Mouton
- Kendon, A. (2004). *Gesture. Visible action as utterance*. Cambridge, UK: Cambridge University Press.
- Kita, S. (2009). Cross-cultural variation of speech-accompanying gesture: A review. *Language and Cognitive Processes*, 24, 145-167. <https://doi.org/10.1080/01690960802586188>

Kita, S., Alibali, M. W., & Chu, M. (2017). How do gestures influence thinking and speaking?

The gesture-for-conceptualization hypothesis. *Psychological review*, 124(3), 245.

Li, S. (2013). Co-construction of interpreted conversation in medical consultations. *Applied*

Linguistics Review, 4(1), 127-149.

Li, S. (2015). Nine types of turn-taking in interpreter-mediated GP consultations. *Applied*

Linguistics Review 6(1), 73-96.

Li, S., J. Gerwing, D. Krystallidou, A. Rowlands, A. Cox and P. Pype (2017). Interaction-A

missing piece of the jigsaw in interpreter-mediated medical consultation models. *Patient Education and Counseling*. 100, 1769-1771.

Li, S., Said, F., O'Neil, B., Ancarno, C., and Niksic, M. (2016). Using linguistic methods in

clinical communication education. *AMEE MedEdPublish* 5(3), 33.

Meeuwesen, L. (2012). Language barriers in migrant health care: A blind spot. *Patient*

Education and Counseling, 86, 135-136. doi: 10.1016/S0738-3991(12)00012-2

McNeill, D. (1985). So you think gestures are nonverbal? *Psychological review*, 92, 350-371.

<http://dx.doi.org/10.1037/0033-295X.92.3.350>

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought*. Chicago: University of

Chicago Press.

Pasquandrea, S. (2011). Managing multiple actions through multimodality: Doctors'

involvement in interpreter-mediated interactions. *Language in Society*, 40, 455-481.

<https://doi.org/10.1017/S0047404511000479>

- Pasquandrea, S. (2012). Co-constructing dyadic sequences in healthcare interpreting: A multimodal account. *New Voices in Translation Studies*, 8, 132-157.
- Penn, C., & Watermeyer, J. (2018). *Communicating Across Cultures and Languages in the Health Care Setting*. Palgrave Macmillan: London, UK
- Roberts, C. (2006). Continuities and discontinuities in doctor-patient consultations in a multilingual society. In M. Gotti and F. Salager-Meyer (Eds.) *Advances in medical discourse analysis: Oral and written contexts* (pp. 177-196). Bern: Peter Lang.
- Robinson, J. D., & Stivers, T. (2001). Achieving activity transitions in physician-patient encounters: From history taking to physical examination. *Human Communication Research*, 27, 253-298. <https://doi.org/10.1111/j.1468-2958.2001.tb00782.x>
- Roter, D. L., Frankel, R. M., Hall, J. A., & Sluyter, D. (2006). The expression of emotion through nonverbal behavior in medical visits. *Journal of General Internal Medicine*, 21, S28-34. DOI: 10.1111/j.1525-1497.2006.00306.x
- Rowbotham, S., Holler, J., Lloyd, D., & Wearden, A. (2012). How do we communicate about pain? A systematic analysis of the semantic contribution of co-speech gestures in pain-focused conversations. *Journal of Nonverbal Behavior*, 36, 1-21. <https://doi.org/10.1007/s10919-011-0122-5>
- Rowbotham, S., Holler, J., Lloyd, D., & Wearden, A. (2014). Handling pain: The semantic interplay of speech and co-speech hand gestures in the description of pain sensations. *Speech Communication*, 57, 244-256. <https://doi.org/10.1016/j.specom.2013.04.002>
- Rowbotham, S. J., Holler, J., Wearden, A., & Lloyd, D. M. (2016). I see how you feel: Recipients obtain additional information from speakers' gestures about pain. *Patient Education and Counseling*, 99, 1333-1342. <https://doi.org/10.1016/j.pec.2016.03.007>

Schouten, B. C. & Schinkel, S. (2014). Turkish migrant GP patients' expression of emotional cues and concerns in encounters with and without informal interpreters" *Patient*

Education and Counseling, 97, 23-29. <https://doi.org/10.1016/j.pec.2014.07.007>

Stevenson, F. (2014). Achieving visibility? Use of non-verbal communication in interactions between patients and pharmacists who do not share a common language. *Sociology of*

Health & Illness, 26, 756-771. DOI: 10.1111/1467-9566.12102

Swinglehurst, D., Roberts, C., Li, S., Weber, O., & Singy, P. (2014). Beyond the 'dyad': a qualitative re-evaluation of the changing clinical consultation. *BMJ Open* 4(9)

doi:10.1136/bmjopen-2014-006017.

Weinman, J., Yusuf, G., Berks, R., Rayner, S., & Petrie, K. J. (2009). How accurate is patients' anatomical knowledge: a cross-sectional, questionnaire study of six patient groups and a

general public sample. *BMC Family Practice*, 10, 43-48. doi:10.1186/1471-2296-10-43

Wittenburg, P., H. Brugman, A. Russel, A. Klassmann & H. Sloetjes. 2006. 'ELAN: A

Professional Framework for Multimodality Research' in *Proceedings of LREC 2006, Fifth International Conference on Language Resources and Evaluation*, p. 1556-1559.

Table 1. The main topic in each consultations, the duration, and raw gesture frequencies.

Consultation		Frequency of body-oriented gestures		
Main topic	Duration (min.sec)	Patient	Physician	Interpreter
Thyroid function	13.58	10	21	14
Headache	12.11	7	8	3
Leg injury pain	11.33	9	8	2
Pain in Calves	12.57	21	22	32
Chest pain	15.56	5	18	11
Acid reflux	9.31	2	36	35

Table 2. Additional examples of body-oriented gestures.

<i>Depicting abstract or metaphorical concepts over the relevant body region</i>	
	Squeezing hands behind calves (depicting cramping muscle)
	Pointing to temples (depicting using the mind)
	Pointing to eyes (depicting the health care system having a “look” at it)
	Holding an imaginary pill in left hand than right hand (contrasting medication use in the morning and at night)
	Demonstrating a horizontal barrier at stomach (depicting the protection a medication offers from stomach acid)
<i>Miming body actions</i>	
	Pointing to current seated position (demonstrating sitting)
	Hunching body (depicting kneeling in pain)
	Scratching motions over visible eczema (asking whether it is bothersome)
	Straightening out the leg (showing painful motion)
	Performing a stylized stillness (demonstrating having to stop)
<i>Manipulating objects that are not there</i>	
	Holding an imaginary sample container
	Putting on imaginary glasses
	Demonstrating spray action in front of the mouth with an imaginary dispenser
	Picking up an imaginary tablet
	Throwing imaginary pills towards mouth
	Drinking from an imaginary bottle with proposed medication in it