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Embodied Mapping: Negotiating Epistemic Access during Initial Place Reference

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ABSTRACT

This study explores the negotiation of locational epistemic access during initial reference sequences through *embodied mapping*, a practice in which co-participants (re)construct geographical maps by using their bodies and the space around them in concert with talk. Like a physical map, an embodied map becomes a mutually available resource that can be scrutinized or amended and therefore constitutes a resource for managing intersubjectivity and addressing epistemic asymmetry. Although embodied maps are ephemeral and physically intangible, they are treated as perceptible by co-participants and are made amenable to correction through the practices of visualization. *Embodied mapping* in novice second language interaction is a sophisticated, jointly accomplished resource for constructing gesture utterance packages that bolsters participants' limited linguistic resources. The data are in English and Japanese and originate from conversations video-recorded in a paired English as a Foreign Language (EFL) test setting.

Achieving mutually understood reference is an integral part of coordinated human action. Although conversation analytic (CA) and ethnomethodological (EM) inquiries have done much to reveal the mundane practices through which reference is jointly accomplished, less attention has been given to the role of embodied action in the negotiation of place reference. Adopting a multimodal CA perspective, this study explores how interactants use gestures, gaze, and directional orientations to help achieve place reference while conversing in a second language (L2). In particular, the study examines a phenomenon we call *embodied mapping* in which participants use their bodies to (re)construct geographical maps. Embodied mapping does not involve the use or creation of physical objects: Instead, participants use gestures, in concert with talk, to map out locations in the space around them, such as in the air or on the surface of a table. Embodied mapping is therefore a member's method for publicly negotiating relative knowledge regarding particular place referents.

Like a physical map, an embodied map can become a mutually available resource to be scrutinized or amended and can help participants manage intersubjectivity, particularly when epistemic asymmetries are at play. Embodied mapping practices display knowledge in a way that makes it amenable to recipient reinterpretation, and they therefore hold consequences for the ongoing interaction. Deictic and representative gesturing help accomplish embodied mapping in order to display and repair epistemic access to place referents occasioned during conversation. These public displays serve to clarify the depth of participants' epistemic access,

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shaping recipient design in subsequent talk and maintaining intersubjectivity between interactants. We demonstrate how the practice of embodied mapping is used to evidence claims of epistemic access to unfamiliar referents by K- participants as well as to reaffirm the epistemic authority of K+ participants who may repair or supplement the embodied map of another speaker. The study therefore documents how the visuo-spatial modality concurrently informs and enhances the spoken message during the jointly accomplished establishment of place reference.

Shared knowledge, recipient design and place reference

When participants refer to a place for the first time, one concern that becomes relevant is whether all parties know where that place is. This is particularly the case when giving and receiving directions, but it is also evident in how speakers design other turns to maximize recognizability for their recipient(s). As Schegloff (1972) notes, there are any number of correct ways to refer to a place, but not all are right for any given occasion. If a place formulation is unsuccessful, leading to recognition issues, speakers may provide further relevant information.

Maps are frequently used in human sense-making relating to locations, and Ethnomethodology and Conversation Analysis (EMCA) studies have explored how people use physical maps during the situated negotiation of place (e.g., Brown & Laurier, 2005; Psathas, 1979). In addition, researchers have shown how deictic/indexical gestures like finger-pointing are used both with and without textual resources like maps when referring to places (Stukenbrock, 2014). If a speaker is explaining where a place is, pointing to it on a map constitutes both an accurate, efficient method and strong evidence of knowledge. However, tangible maps are not always available, so participants may rely on other interactional affordances in their absence.

Speakers usually try to ensure that a referent is accessible to their recipient, i.e., it falls within common ground (Clark, 1996). Speakers anticipate their interlocutor's knowledge and select a reference form that will be both recognizable and succinct. In doing so, they orient to the conversational preferences of recipient design and minimization (Goodwin & Heritage, 1990; Sacks & Schegloff, 1979). In turn, recipients provide uptake tokens that indicate the accessibility of the referent, which can be as simple as a continuer or display of nonrecognition. As Heritage (2007) argues, participants tend to use tacit claims of recognition rather than overt demonstrations, showing the prioritization of minimization over recipient design. Recent research has also noted how overt knowledge checks like "Do you know x?" can be used to identify and address potential epistemic asymmetries during initial reference sequences. Overt knowledge checks pinpoint epistemic asymmetries and occasion public demonstrations of knowledge (Nanbu, 2020) that help participants negotiate who knows what and to what extent. This is particularly relevant to the current investigation since all our examples of embodied mapping occur during moments of initial reference and most are occasioned by "do you know" questions, thus reflecting participants' orientations to demonstrating the depth of their knowledge concerning the place referents.

Although reference has been a central concern within conversation analysis, the bulk of this work has focused on person reference. One exception is Schegloff's early work on place reference (Schegloff, 1972). He argues that speakers orient to a kind of "common sense" geography (p. 85), relying on knowledge they have about their recipient and relevant membership categories to select appropriate words for referring to places. He outlines a preference for relational locational expressions (e.g., Tom's house) and place names over geographical specifications like addresses. Kitinger et al. (2013) suggest that the machinery of repair can be used to reformulate place referents that are not recognized by recipients, and this can in turn help accomplish other interactional tasks.

Indexical embodied actions like pointing often accompany references to places (Schegloff, 1984). Pointing is used to direct another's attention to a mutually visible object (Mondada,

2014), and it can even locate an imagined place beyond the current spatio-temporal domain (Fukuda & Burdelski, 2019; Stukenbrock, 2014), such as “that’s where she was when it happened.” Similarly, studies of pointing in rural communities have shown that locals can accurately point to places over vast distances (De Dear et al., 2021; Stirling et al., 2022). In cases where the hands are unavailable, such as when demonstrating dance steps, the entire body along in conjunction with the deictic *here* may reference spatial and temporal configurations (Keevallik, 2013). However, pointing aside, there appears to be little research on other ways embodiment might contribute to doing place reference, particularly concerning the multimodal representation and visualization of maps.

Embodied maps are *immaterial objects* and are therefore “manipulated into being” (Keevallik, 2014, p. 249) for short-lived purposes, such as instructions or explanations. Creating a map through gesture requires collaborative imagining (Murphy, 2005), and that act becomes a resource for subsequent interaction. In the same way that a return gesture can only be understood in relation to some prior gesture (De Fornel, 1992), elements of an embodied map-in-progress are positioned and visualized with respect to earlier components and can shape those that follow. They therefore constitute an embodied tying device (Majlesi, 2015) or visual motif (Hazel, 2014) that is matched to other gesturally assembled semiotic devices within the map. These gesture-talk ensembles can be inspected for accuracy, modified accordingly (Hauser, 2019), and reused on later occasions (Eskildsen & Wagner, 2015). This suggests that co-participants rely on inter-corporality to jointly visualize and construct an intangible map (Greer & Nanbu, 2022). Consequently, embodied mapping involves a complex temporal nexus of gaze, gesture, postural adjustment, and epistemically sensitive reference practices.

Background to the data

The data we will analyze are taken from the Kobe Test of Oral Proficiency (KTOP) data set, a corpus of 156 low-stakes EFL oral proficiency tests video-recorded at a national university in western Japan between 2015 and 2022. This test pairs Japanese undergraduate students together for 4 minutes to undertake an open-ended discussion in simple English. The test-takers were participating in a class which developed their spoken English fluency through discussion, and the test results formed part of their grade. At the start of the test, students selected a topic card and were asked to discuss it freely: The cards included topics such as “travel” and “your hometown.” After the assessment, the instructor received the test-takers’ informed consent to include the videos in the KTOP corpus. The students were made aware that noncompliance would not affect their grade and the video-recordings of any test-taker who did not consent were excluded from the data set. Pseudonyms are used throughout the analysis and images have been anonymized with illustrations.

The test-takers all attended Kobe University, which is located in Hyogo Prefecture, so they were all somewhat familiar with that area, but in fact some of them came from other regions of Japan so their depth of knowledge of surrounding places differed. The tests took place in a quiet room adjacent to the students’ regular classroom. The test-takers were seated at a table facing each other. In each of the transcripts, we designate the student on the left as A and the person on the right as B. There were no writing implements on the desk, but there was a card (the test prompt) and an iPad that was being used as a timer. Also present was a teaching assistant who served as both the proctor and the camera operator but who was not active in the discussion.

Quite clearly, our participants are L2 users of English, but in line with the CA approach we remain agnostic toward that fact, except to the extent that they themselves orient toward that identity category within the talk. Despite the nature of our data set, we have no reason to believe that the focal practice is peculiar to novice L2 users.

After extensive viewing and transcribing of the video-recordings, we compiled a collection of 42 candidate cases from the corpus in which the participants enact embodied mapping within their talk. Our analysis focuses on a subset of cases in which the participants explicitly orient to place knowledge and use embodied mapping to negotiate the location of relevant places. Each example takes place during a spate of talk where participants are referring to a place for the first time.

We transcribed the conversations according to Jeffersonian conventions (Jefferson, 2004) and used a modified version of Mondada's (2018) approach to depict embodied features of the talk, as outlined in Greer and Nanbu (2022). See the [Appendix](#) for further details. Video clips of the excerpts are available at <https://doi.org/10.1080/08351813.2024.2410129>.

Analysis

Although many of the gesture-utterance packages we examined contained place formulations, only some were treated as maps. We defined embodied mapping as talk laminated with a combination of depictive, indexical, and deictic gestures that interactants recognizably use to convey and negotiate specific place references and their relative locations. We only consider such turns examples of embodied mapping when the participants themselves orient to their actions as explicating a location. Additionally, we excluded indexical pointing gestures with no depictive elements and depictive gestures with no specific reference points from our collection. The other defining feature of our collection is that each excerpt involves an initial reference in which the participants publicly orient to potential epistemic asymmetry, such as by try-marking a place name, reformulating it, or using an overt knowledge check question.

We begin our analysis by examining cases in which an interactant who claims relatively less knowledge about the place uses embodied mapping to demonstrate their recognition of a newly occasioned place referent. Because the K+ speaker treats the place they refer to as beyond the K- recipients' epistemic access, embodied mapping is deployed as a resource for the recipient to prove they do in fact know where it is.

We then examine cases where vague embodied mapping by a K- recipient conversely serves to highlight the recipient's unfamiliarity with the place referent. While these maps contain correct information, their lack of specificity or issues with their production suggest a relatively shallow level of epistemic access. This is apparent in the orientations of the speaker claiming to be more knowledgeable, who produces a second version of the map that contains more precise detail.

We also explore how embodied mapping can serve as a resource for interactional repair. When the recipient of a newly occasioned place referent displays access issues, embodied mapping may be deployed by an epistemic K+ speaker to facilitate recognition. Embodied maps thus enable both the online display and cooperative repair of the K- participant's understanding.

Confirming and evidencing knowledge of place reference

As outline above, embodied mapping is used as a resource to manage epistemic claims, rights, and responsibilities relating to relevant places. Using representational gestures in concert with talk, the teller positions multiple locations relative to one another, making otherwise private geographic knowledge available to public scrutiny.

One reason a participant might use embodied mapping is to prove they know where a place referred to by another speaker is located, particularly if it is a reference that the participants orient to as uncommon knowledge. This is the case in [Excerpt 1](#), where B gives the name of his hometown, Kawanishi ([Figure 1](#)): B incorrectly believes A is unfamiliar with this place.



Figure 1. A map showing the position of Kawanishi city in relation to Hyogo and Osaka.

Excerpt 1. Kawanishi.

```

01 A      where do you live.
02        (0.5)
03 B      |I'm in ↓kawanishi↓|
    b-px   |.....leans in |

04        | (0.2)
    b-px   |~swivels right-->

05 A      |>kawanishi=|yeah.<|
    a-hd   |.....nod---|
    b-fc   |.....squints-->
    b-px   |-----|

06 A      | (0.2) | (0.2) |
    a-fc   |-----|
    a-lh   |.....>
    a-rh   |.....>
    b-rh   |.....>

07 A      |uh=
    a-lh   |raises-->
    a-rh   |open-->
    b-rh   |...>

08 B      |=you |know?|
    a-lh   |~toward self-->
    a-rh   |----->
    b-rh   |points to A|-->

09 A      | (0.2) |
    b-fc   |smiles-->
    a-lh   |,,,,,|

```

- 10 A |yeah. |
a-lh |~down, pointing to B
a-hd |nods |
- 11 B |↑OWH! |=
b-fc |eyes widen-->
b-px |leans back-->
b-rh | , , , , |
- 12 A |=hy- hyogo prefecture?
a-lh |.....palm toward B-->
- 13 B |YE:s | yes ye[s].
a-hd |nods |
- 14 A | [a]h. |
a-hd |nod |
a-lh |~down/left
|held perpendicular
|to table-->
- 15 | (0.4)
a-gz |~down-->
- 16 A |uh:: | (0.5)
a-rh |...to LH |~~sweeps away from LH-->
- 17 |near: (0.4) |osak[a].
a-rh |----->
a-gz |down----- |~~to B
- 18 B | [s] |o(h)h.
|that's right
b-rh |.....
b-hd |nods
fig

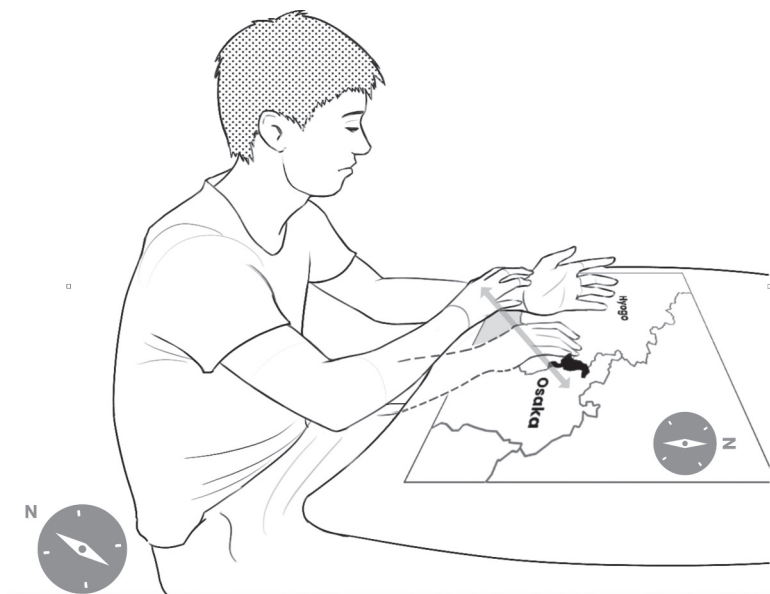


Figure 2. Line 17

A makes a claim of recognition in line 5, which B immediately treats as unexpected with “you know?” A responds with another claim of access (line 10), and B again orients to this as surprising with “oh!” (line 11). Such explicit knowledge checks commonly make relevant some form of evidence of epistemic access (Nanbu, 2020).

B then provides proof he recognizes the place referent Kawanishi via a two-part demonstration of knowledge using embodied mapping. He first says “Hyogo Prefecture?” while placing his left hand on the table with the palm facing right (line 12), which can be interpreted as a placeholder for Hyogo, either in its entirety or at its eastern edge (see [Figures 1 and 2](#)).¹ “Hyogo Prefecture” is produced with rising intonation, indexing A’s orientation to B’s epistemic right to confirm or deny the turn’s accuracy. When B provides emphatic confirmation with repeated “yes” tokens in line 13, A continues mapping, saying “near Osaka” and using his right hand to sweep back and forth from his left hand toward B, i.e., to the northeast of the map he is depicting. This somewhat vague, albeit correct, positioning of “Kawanishi” within Hyogo Prefecture is therefore narrowed to being on Hyogo’s eastern edge a slightly northerly position relative to the base of the map. This is acknowledged by B, who again points to A, providing a laugh-imbued confirmation in line 17.

A’s sweep indicates not only that Kawanishi lies in the same direction as Osaka if heading from Hyogo; it also depicts the map as being horizontally arranged, as though it were being set out on the table between the two interactants. A therefore sets west at the far side of the table by placing Hyogo there with his left hand and positions Osaka to the east of it. From B’s perspective these cardinal directions remain unchanged and the map is visualized on a horizontal plane. An embodied map can also be depicted in a vertical plane between the participants (e.g., [Excerpt 2, Figure 6](#)) and the interactants may even reposition themselves in order to “view” an emerging vertical map from the same angle ([Excerpt 5, Figure 13](#); [Excerpt 6.2, Figure 15](#)). In most cases the initiator of the embodied map will set its planar position, although this can be reworked by either party in situ.

In [Excerpt 1](#), then, A uses embodied mapping as a resource to prove his access to a place reference that B apparently did not expect him to know. While his two-part demonstration (“Hyogo Prefecture, near Osaka”) might still be comprehensible without gesturing, the embodiment adds a layer of directional explicitness that is otherwise only implied by A’s words; his pinning of Hyogo with his left hand followed by rightward hand sweeps toward what would be the northeast of his map help to solidify his telling and thereby strengthen the evidence of the knowledge being presented.

Respecifying a place reference via reciprocal embodied mapping

However, it is not always the case that the K+ speaker simply confirms the recipient’s contribution: Often they also gesturally respecify the “map” proffered by the K- speaker. This section highlights such instances to show how such joint mappings provide confirmation while at the same time indexing the relative expertise of the gesturers. As in the prior example, embodied maps are one way for recipients to demonstrate their successful recognition of a place name (Sacks, 1992). On the other hand, the informational quality of the mapping gestures can reveal the depth of their knowledge to be lacking. In such cases, the speaker claiming they are more knowledgeable may produce a second (re)specified map that builds on the first and serves three purposes: claiming epistemic authority, reducing epistemic asymmetry, and ensuring intersubjectivity. In all cases, interactants display an orientation to the map-in-progress as central to the unfurling sequence by positioning their gestures where they are highly visible, as well as shifting their gaze (or sometimes their entire bodies) to direct the interlocutor’s attention toward them, thus “doing visualizing the map.”

As an initial case, in [Excerpt 2](#) A tells B about his home prefecture, Okayama (see [Figure 3](#)). The test is taking place in Hyogo Prefecture and B comes from Osaka Prefecture, which is east of Hyogo, and while he apparently knows Okayama he claims he is not very familiar with it.

¹Note, the image in [Figure 2](#) is intended to represent A’s orientation to the map he is visualizing in a horizontal plane on the table: There is not actually a map on the table. We will discuss the planar representation of these embodied maps in further detail below.



Figure 3. A map showing the lateral relationship between Hiroshima, Okayama, and Hyogo Prefectures.

Excerpt 2. Okayama.

01 B where do you come from.
 02 (0.5)
 03 A >eh< ↑I'm from okayama. >prefecture.<
 04 do you kn(h)ow? okayama?
 05 B uh yes (.) I do ↑but I don't know
 06 so much about ↑o(.)↓kayama
 07 (0.4)
 08 B [I know]=
 09 A [yeah]
 10 B =|the |(1.1) |place| of okaya|ma. |
 b-gz |down-----|to A----->
 b-rh |.....|beat |,,,,,....|beat|
 11 (0.2) | (0.1)
 b-rh |....>
 12 B (hyogo-ku) (.) | (hyogo-ku)
 b-rh raised "placing gesture"-----|finger bend
 13 next.o
 b-rh ~~fingers sweep left-->
 14 (0.2)
 15 A → yes yes. |hyo:go, |
 a-lh |...places fist-->line 19
 b-rh -----|,,,,,....|
 fig |#1
 16 A → |hiro|shima,
 a-rh |....|places fist next to LH-->line 18
 fig |#2 |#3

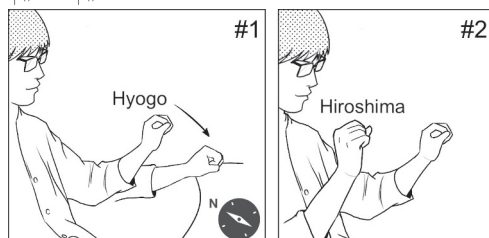


Figure 4. Lines 15 and 16

17 (0.4)
 18 A → |and| okayama.
 a-rh , , , , thrusts fist forward center-->
 fig |#4| #5

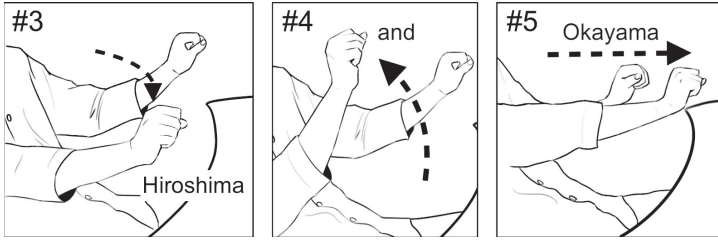


Figure 5. Lines 16 and 18

19 B |oh=oh
 a-lh , , , , >>
 b-hd |nods
 20 (0.9)
 a-lh , , , , >>
 a-rh , , , , >>

In line 1, B initiates a new topic with the information-seeking first-pair part (FPP) “where do you come from?” A’s response in line 3 includes the place referent *Okayama Prefecture*. A then adds a do-you-know (DYK) formulation (Nambu, 2020) to solicit an on-record claim of access to the place referent. In response, B proffers a claim of knowledge (line 5), which makes a demonstration of this knowledge sequentially relevant. However, B immediately delivers an epistemic hedge (Weatherall, 2011), which downgrades his depth of access (lines 5–6), and further downplays his claim in line 10. He then uses embodied mapping to display this knowledge in lines 12 and 13.

B’s mapping contains two distinct gestural phrases (see Figure 6). The first involves raising his right hand over the center of the table and moving his fingers slightly as he says Hyogo (line 12), locating east at the right of the table. The second (line 13) is a sweeping motion with the same hand toward his left side, delivered concurrently with “next.” While it may seem that this mapping gesture did not add much to his utterance (i.e., that Hyogo is next to Okayama), closer inspection and some knowledge of the local geography reveal the gesture does indeed contain additional information, since in absolute geographic terms, Okayama is located on the western side of Hyogo. “Hyogo next” establishes the closeness of Hyogo

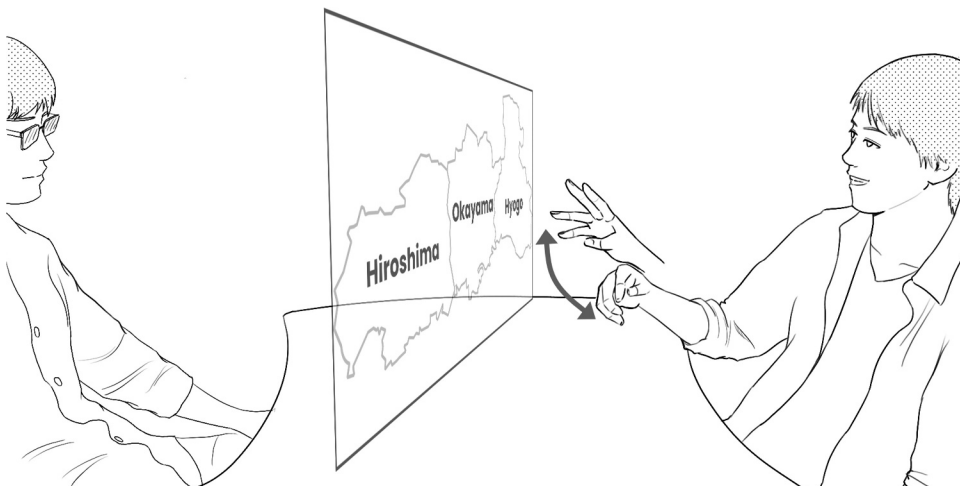


Figure 6. B’s gesture package in lines 12–13 depicts the map in a vertical plane.

and Okayama but does not specify directionality, so by depicting Hyogo in the air and sweeping his fingers to the left side, B demonstrates more specific knowledge, i.e., that Okayama is not only “next to” Hyogo but also west of it.

Since the participants are facing one another across a table, B’s map is produced from his own perspective, positioned in a vertical plane such that easternmost Hyogo is oriented furthest from the camera (Figure 6). Even though he is perceiving it from the opposite side, A aligns to B’s depiction of the map by keeping Hyogo and the east to his left (i.e., away from the camera) and placing western elements of the map (Okayama, Hiroshima) to his right. In line 15, A initially accepts B’s just-produced map as accurate (“yes, yes”) before working to (re)specify it. First, he raises his left fist while saying “Hyogo” (Figure 4), which is consistent with B’s map. He then produces “Hiroshima” while raising his right (i.e., west) fist and holding it parallel to his left (Figure 5). This is concluded with a third gesture phrase in which he first moves his right fist inward before thrusting it through the center of the two depicted points as he says “Okayama.” B treats this as new information by delivering a change-of-state token in line 19, which closes the sequence.

There are several points worth considering here. First, A constructed his embodied map to remain consistent with the positioning of “Hyogo” and “Okayama” established in B’s earlier version of the map (lines 12–13). This was done despite the fact that it was inverted for himself, suggesting that he was working on the same map his interlocutor had proffered. In other words, although there is no physical map in which to ground their shared understanding of where things are, the participants can work on an embodied map through depiction and public visualization.

Next, consider how and why A worked to (re)specify the map. As we have argued, B did initially use embodied mapping to demonstrate a grasp of “Okayama” as somewhere to the left/west of “Hyogo” (lines 12–13). However, his epistemic hedging, repetitions, and lack of a more distinct depictive gesture all paint this grasp as loose. Orienting to his epistemic primacy regarding Okayama, A confirms B’s imprecise demonstration as correct but also adds the referent (“Hiroshima”) to (re)specify Okayama between two geographic points. A’s embodied mapping uses listing intonation (Selting, 2007): the first two items (lines 15, 16) are produced with a continuing intonational contour, signaling a list-in-progress, and the third item (Okayama, line 18) is hearably falling. This works to emphasize Okayama as particularly important to A’s telling by anchoring it between two better-known locations. Throughout our data set we found that participants position unknown or unfamiliar topological/toponymical spatial descriptors in relation to known ones (see Levinson, 1996).

This use of gesture and talk to establish two reference points on either side of a third reference point placed in between is also apparent in Excerpt 3.

Excerpt 3. Takatsuki.

```

01 B           where are you from.
02             (.)
03 A           m: I'm from (0.5) |ohs- takatsuki.
    a-rh              |.....points to self--> ln 13

04             (0.3)
05 A           in osaka.
06 B           |yah I know: takats'ki.
    b-lh         |points at A----->
    b-fc         |raises eyebrow

07 A           O::H!
08 B           |my                |grandmother
    b-lh         |points to self |~~~~... to A--> line 12

09 A           oh your [ grandmo- ]
10 B           [and grandfa]ther,
11 A           ohn.
               yeah

```


Excerpt 3 again begins with the question “Where are you from?” This receives a response from A (line 3) that involves self-initiated self-repair (SISR) in which he hearably cuts off his initial formulation of the place referent *Osaka*, replacing it with *Takatsuki*. In line 5, A then adds “in Osaka” as a post-gap increment. Because *Osaka* can refer to either a city or a prefecture and Takatsuki is a city in Osaka Prefecture, this SISR was a place reformulation (Kitzinger et al., 2013), likely designed to address that ambiguity. In response, B overtly claims access to *Takatsuki*, saying “yah I know Takatsuki” (line 6), which A receipts in next turn with the change-of-state token “oh!”

B then goes on to provide an incrementally delivered account for her knowledge. In the first part of her telling (lines 8, 10, 12) she explains that her grandparents live in Kyoto.² B’s continuing intonation on the place referent *Kyoto* suggests that her telling is still in progress. In line 13, A implicitly projects the trajectory of B’s telling by producing more change-of-state tokens. While repeating “yeah” three times, A raises his right hand and holds it in the air at roughly eye level on his right side, between himself and B. The positioning of this gesture at such a highly visible point suggests A orients to it as significant.

While B continues her telling in overlap (line 14), A momentarily retracts his gesture. B then finishes her account “and (where) Takatsuki near,” accompanying it with a back-and-forth hand movement which ends with the hands held apart (line 16). In conjunction with her talk, it is apparent that this movement is designed to represent some indeterminate distance between Takatsuki and Kyoto. These directions roughly correspond with the locations on a map (see Figure 7).

With her account at an observable point of completion, A produces a gestural unit spanning from lines 17–19 that contains three distinct gesture phrases and is delivered with a spoken three-part list. While saying “Kyoto” with continuing intonation, he holds up both hands, with the left below shoulder level and the right above his head on the right side. With his right hand in this position, he moves his left hand slightly down and says “Osaka” (line 18), as if tapping a point in the air. Finally, with his left hand maintaining this position, his right hand lowers from over his head to eye level and slightly thrusts forward as he utters “Takatsuki” with falling intonation. Thus, A works to create his own version of B’s map that accomplishes two distinct actions.



Figure 7. The geographic position of Takatsuki City in relation to Kyoto and Osaka Prefectures.

²Takatsuki city is located between Osaka City and Kyoto City, but also on the border of Osaka Prefecture, close to Kyoto Prefecture. In Japan, prefectures are roughly equivalent to states or provinces.

First, he demonstrates his understanding of B's telling and its interactional import as an account for her knowledge of where Takatsuki is. Second, he refines B's map by more precisely representing the directional relationship of each place and thus claims epistemic primacy. B's preliminary map only included Takatsuki and Kyoto, correctly placing them side by side, but not displaying any attention to latitude in her depiction. A's map, meanwhile, includes three locations—Kyoto, Osaka, and Takatsuki—and each is placed with consideration to latitude and longitude. Kyoto is placed high on the upper right (northeast) with Osaka placed diagonally on the bottom left (southwest), and Takatsuki then positioned in the center between them, which corresponds with their actual geographical locations. This second version therefore constitutes an embodied substrate (Goodwin, 2013) in which the member with greater epistemic primacy (K+ position) builds on elements of the map to respecify and refine it.

In [Excerpts 2](#) and [3](#), the K+ speaker waited for the recipient to provide a demonstration that showed the depth of their epistemic access before orienting to their own expertise by respecifying the recipient's embodied mapping. There were also, however, instances in our collection where the speaker launched into a map-based informing only for it to be treated as irrelevant. Such counter-cases suggest that, when a recipient stakes a claim of deeper epistemic access, other practices (such as experiential accounts) are more salient. [Excerpt 4](#) is a case in point.

Excerpt 4. Fukuoka.

```

01 B      |where is y-      | where is your hometown.
    b-rh   |..points to A,,|

02 A      oh e::h my hometown i:s, (0.3) fukuoka.=
03 B      =|eh f u k u [o k a?]
    b-fc   |..raises eyebrows,,|

04 A      [u:h ]=
05 A      =|fukuoka   |is.u           |(0.4)
    a-rh   |..raises,,|lowers & pinches-|..to table-->
    a-gz   |at B-----|~~down/right-->

06 A      =eh: |top of the kyushu.|
    a-rh   ----|.....raises RH,,,,|
    a-gz   ----|~~~~to B----->>

07 B      >yeah yeah yeah yea[h yea]h.<
08 A      | [an=an] |
          yeah yeah
    a-hd   |..nod,,|

09      (0.4)
10 A      |do you know? |
    a-rh   |..selects B,,|

11 B      yes yes y[es].
12 A      [ye]s.
13 B      |I   w e n t| to fukuoka |in:: uh:: in march
    b-rh   |..to self,,|

14      (1.7)
15 A      °march?°
16 B      yeah yeah last march.

```

In this case, A is from Fukuoka, a city in the north of the southern island of Kyushu, which is about 450 km from where the conversation is taking place. After A tells B he is from Fukuoka (line 2), B receipts the referent in line 3 with an eh-prefaced question (Hayashi, 2009), which denotes a noticing of departure from expectancy. In other words, B's rising intonation on Fukuoka is likely treating A's response as newsworthy rather than unknown, as evidenced also by his eyebrow flash. Nonetheless, A formulates the ongoing talk as though B does not recognize the place referent, including initiating an embodied map. In lines 5–6, he explains that “Fukuoka is top of Kyushu” while raising his right hand to show the city's northerly location.

However, in this case, the recipient does not gaze at the map gesture to any great extent and does not elaborate on it. Although A can be expected to know more about his hometown than B, B at least treats the place name as recognizable and does not orient to geography as the best means of conveying his knowledge. It turns out that he does indeed have firsthand experience of the city from a recent visit (line 12), so he treats A's explanation as superfluous. Just after A launches the map, B cuts it off in the next turn with a multiple saying (Stivers, 2004). A then uses a DYK formulation (line 10) to pursue evidence for B's claim of access. B first answers affirmatively before giving an account (lines 13–16) that works to claim greater epistemic access to the place referent than A had given him credit for.

This counterexample suggests that embodied mapping is elaborated, negotiated, and refined primarily when the participants orient to epistemic asymmetry regarding the place referent. Knowledge of a location is treated as a baseline for epistemic access to a place referent and participants often work to establish this before moving on to more specified knowledge domains. Therefore, embodied mapping is primarily prolonged where there is a steep epistemic gradient: one participant claims either non-access (such as with “I don't know”) or shallow access, while the other participant is treated as a relative expert.

As shown in [Excerpt 4](#), accounts or more granular demonstrations are used instead of mapping when participants claim a greater degree of access. In [Excerpts 2](#) (Okayama) and [3](#) (Takatsuki), the person who initiated the sequence follows their response with a claim of understanding in third position that includes a somewhat hesitant initiation of the map. This map is then refined by the other participant, who is in the epistemic K+ position. However, in [Excerpt 4](#) (Fukuoka), the respondent initiates the map as part of a self-selected, post-expansive telling, and the person being positioned as K- treats the map-based explanation as unnecessary and does not add to the map. This suggests that the act of producing an embodied map serves to display one's depth of understanding.

Coproducing a visualized map

Epistemic asymmetries can also come to the fore during the co-operative creation of a map when the K+ participant enacts embodied other-initiated repair on some element of a map initiated by the K- participant. As in spoken repair practices, this can lead to insertion sequences that deal with the problematic element before returning to the map-in-progress. In [Excerpt 5](#), for example, the K- participant (A) is attempting to pinpoint the location of B's hometown of Gifu ([Figure 10](#)).



Figure 10. A map illustrating Gifu's location in relation to larger Japan.

Excerpt 5. Gifu.

```

01 A      o:h (0.7) |what's | (.) name.
    a-lh      |sweep rt|

02      (.)
03      your hometown.
04      (0.4)
05 B      |>what's name< eh:: my hometown i:s
    b-lh      |...to chest----->line12
    b-rh      |...to chest-----~forward/up->

06      (0.4) gifu.
    b-rh      ~~~~~forward/right/down--> line9

07      (0.2)
08 A      gifu.
09 B      |>do you know gifu?<
    b-rh      |...to self~~to A-->line14

10      | (.)
    fig      |#1
11 A      ↓yes gifu |uh:|::n:=
    a-px      |slight torque to front->
    a-gz      |up/right mid-distance-->
    a-rh      |raises index finger-->
    fig      |#2 |#3

12 A      =|::n |Japa|ne::[: s e ]
    a-px      |....|faces front----->
    a-gz      |....|at "map"----->
    a-rh      |~~IF traces curve through air
    b-lh      | , , , , , , , , |
    fig      |#4 |#5 |#6

13 B      [ |ja-|c|enter=
    b-hd      |nod|
    b-px      |...turns to front-->line15
    b-bh      |...makes round shape-->

14 A      |=cente:r >[ |okay [okay okay<|= |
    a-rh      | pokes map | , , , , , , , home position|
    a-gz      |at map----|~~to B
    fig      |#7

15 B      [ | c e n | t e r ]
    b-hd      |nods |
    b-px      |torques toward back-->
    b-bh      | , , , , , , , , |
    b-rh      |raises RH-->

16 A      =>I know I know<
17 B      |>center center<
    b-px      |~~shifts to middle, facing A>>
    b-bh      |repeats round shape>>

18 A      °I know°

```



Figure 11. Lines 10 and 11

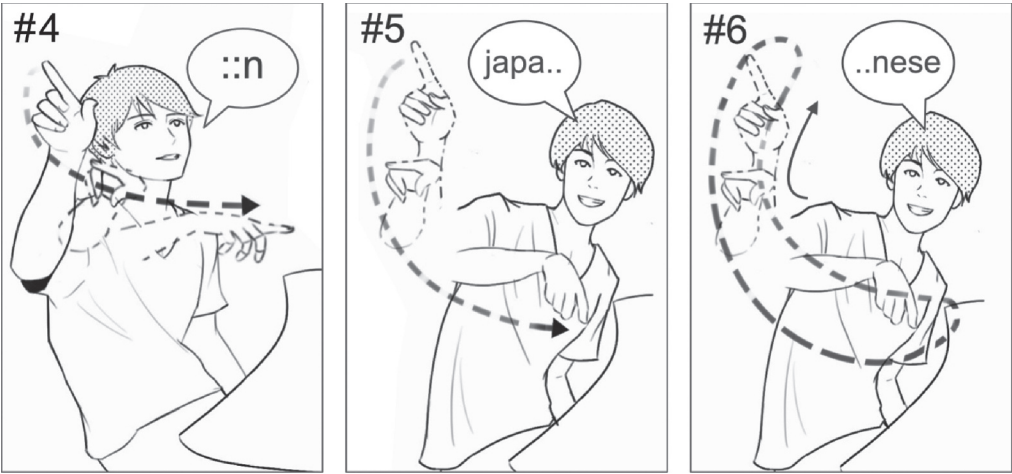


Figure 12. Line 12

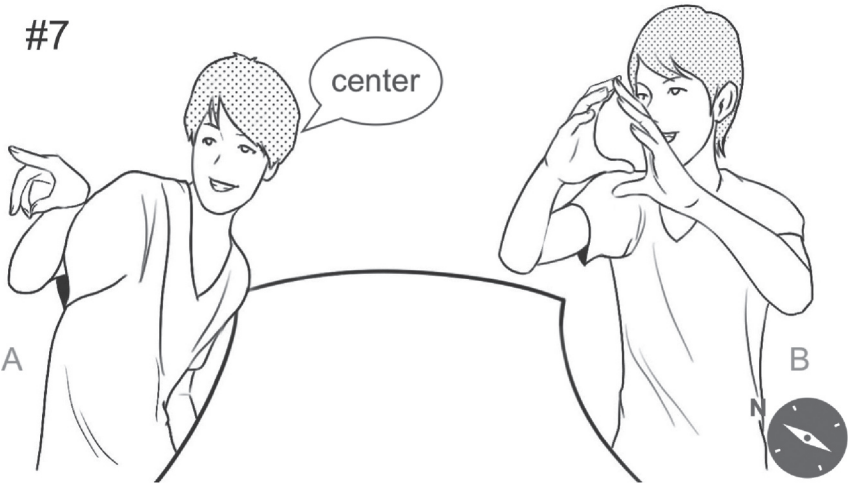


Figure 13. Line 14

The sequence begins with A asking B for the name of his hometown. After some delay, B gives the name of his hometown, Gifu, in line 6. A receipts this through repetition (Greer et al., 2009), before B initiates an overt knowledge check (“Do you know Gifu?” line 9). In next turn, A provides a grammatically apposite response (“yes, Gifu,” line 11) while facing B, then briefly shifts his gaze upward while producing some thinking noises and moving his arm and body away from home position (Figure 11).

This movement marks the visible onset of a multi-phrase gestural unit that leads to an extended co-construction of understanding. First, through his shift in gaze and posture toward the front of the room, A directs B’s attention to the ensuing gesture and highlights its importance for the ongoing talk. This shift in posture displays that A is “doing visualizing” and also creates a shared perspective so B can view A’s projected depiction from the same angle. While facing one another, the participant’s right/left axis is reversed, which means that if A were to draw his shape while facing B, he would either have to invert it (so that it looks correct from his recipient’s position) or draw it so that it is correct for himself and backward for B, sacrificing recognizability. By inviting B to face the front of the room together, A preemptively addresses these issues.

The first gestural phrase (lines 11–12/Figure 12) consists of a fluid tracing of the outline of Japan in the air using the right index finger, and this is laminated (Goodwin, 2013) with talk that adds semantic information and is prosodically inflected to index forward-oriented repair. The lexical affiliate “Japanese” is drawn out and produced in conjunction with his traced shape, making this depictive gesture recognizable as a rough outline of the shape of Japan³ and thus constitutes the onset of the map.

B likewise shifts his gaze and body to face the camera, attending to A’s ongoing embodied displays, and producing an utterance package (Kendon, 2004) of his own in line 13. He holds up both hands in a circular shape on the same plane as A’s gestures while saying “center” (Figure 13), demonstrating his recognition of A’s prior turn as a map. A’s initial representational map gesture acts as an established frame of reference for B to add his deictic gesture to, further specifying where Gifu is located.

A does not seem to visually inspect B’s gesture but does repeat the word “center” while adding another gesture phrase, a distinct deictic gesture of his own in which he pokes his finger forward into the center of his earlier drawn shape (line 14). This apex is followed by multiple *okays* and a return of his arm, body, and gaze to their home positions, closing his gestural unit.

A’s access to the location of B’s hometown is thus jointly established via talk and embodied conduct, and Gifu becomes available as a shared lexical resource to draw upon later in the conversation. Additionally, this practice of co-operatively establishing mutual access to locational information via embodied mapping, including the use of body torque (Schegloff, 1998) to create shared directional orientations, becomes a locally constituted practice utilized throughout their talk.

When viewed on a map, Gifu is indeed located in the approximate center of Japan. The barren physical environment of the test setting does not contain any means to draw a physical map (like a pen and paper), nor the means to electronically retrieve one (a smartphone or computer), but through the affordances of talk and gesture the interactants co-operatively, expediently, and artfully reach understanding via a form of inter-corporeal cartography.

Collaboratively repairing elements of a visualized map

Finally, in Excerpts 6.1 to 6.3, we conduct an extended single-case analysis of a knowledge-negotiation sequence which features collaborative repair of an embodied map. Speaker A is from Akashi, a town in western Hyogo, the prefecture where the test is taking place. As noted in the previous section, B is from Gifu, a town 3 hours in the other direction. B is therefore less familiar with Akashi than A is.

³Because A draws the shape facing the camera, it appears inverted or mirrored to us as observers but is correctly oriented for the participants.

⁴A local Akashi dish.

⁵The world’s second-longest suspension bridge, which joins Akashi City (in Hyogo Prefecture) to Awajishima (Awaji Island).

Excerpt 6.1. Akashi Bridge (Initial place reference).

```

01 B          >what's famous< i::n akashi. akashiyaki?4
02 A          >akashiyaki yes< ʈa:nd (0.3)
03           |akashi |kaikyo (oh)ash'.5 >do you know.< |
    a-lh      |raises |moves back & forth,,,,,,,,,,,,, |

04           (0.4)
05 B          |>I dunno< |what's- |
    b-hd      |shakes head
    b-rh      |..to B,,|
    a-fc      |jaw drops-->

06           [what's- what's that]
07 A          |[aka|shi kaikyo ōh]|ashi!4
    a-fc      |---,| |smiles-->
    a-px      |leans in----->line11

08           | (0.7)
    a-fc      |---,|

09 A          |uh::[:
    a-bh      |over table, palms down-->

10 B          |[bridge? (0.2)
    b-bh      |raises, BH apart
11 A          |yes yes.| |bridge.   |=
    a-px      |---, , , , |
    a-bh      | , , , , , , |

12 B          |>[very long?]<
    b-bh      |widens arms more-->line16

13 A          =bridge.
14           | (0.4)
    a-bh      |.....raises ≈1m wide-->

15 A          so:: big.
    a-bh      ----->

16 B          |Ha↓(g)::|::h |[I- I didn't-]=
    a-bh      |-----| , , , ,
    b-bh      |---| , , , , |
    b-rh      |waves-----> ((negating))
    b-hd      |tilts left----|shakes head-->

-----
17 A          |[eh hn hn hh]
    a-px      |leans back

18 B          =I haven't seen |it
    b-rh      -----, , |home position
    b-hd      -----, , |

```

This spate of talk stems from a DYK question and leads to an extended explanation from the K+ speaker that eventually provides the K- recipient with access to the referent. In line 3, A's response includes the place referent *Akashi Kaikyo Ōhashi*, a well-known bridge that connects mainland Hyogo Prefecture to Awaji Island. He then adds a stand-alone DYK before B displays any perceptible reciprocity. After a 0.4-sec gap, B responds with a claim of insufficient knowledge, "I dunno, what's that?" (lines 5–6).

A seems surprised by this response, widening his eyes, opening his mouth, and leaning in as he repeats the referent (line 7). This makes public A's initial expectation that B should recognize the place referent "Akashi Kaikyo Ōhashi," but B's response instead reveals an epistemic asymmetry which the participants go on to address.

Orienting to his status as the relative expert, A informs B about the bridge via gesture in line 9, and by line 10 B already begins projecting what is being referred to. He first asks "bridge?" then says "very long?," both of which receive confirmation. B is probably able to make these educated guesses due to the generic nature of the referent (since the word *ōhashi* translates literally to "big bridge"). In line 18, B adopts a strong K- stance toward the bridge, saying, "I haven't seen it," which occasions further expansion of A's informing.

With the knowledge gap established, the participants go on to collaboratively construct a series of embodied maps that illustrate not only the location of the bridge but also the surrounding towns and islands, as shown in [Excerpts 6.2](#) and [6.3](#). These maps include a variety of spoken and embodied repair that work to address the epistemic asymmetry.

Excerpt 6.2. Akashi Bridge (building and refining a shared map).

```

19 A      |awa|jishima: , (.) |and |hyogo | (0.4)
    a-lh   |raises, far left-----|to table
    a-rh   |...|to table
    a-bh   |...|together-->
    a-gz   |at B-----|to own hand->
    b-gz   |at A's face, blinking----->
    fig    |#1|...|#2|
20 A      |oh connect. | [↓'bridge'] |
    a-bh   |~~back and forth laterally,,|
    a-gz   |... B's face ----->
    b-gz   |~~A's hands~|A's face-->
    fig    |#3|

```

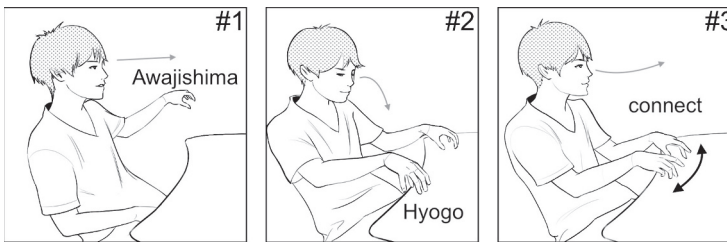


Figure 14. Lines 19 and 20

```

21 B      [Ho : a: : ]:ngh
22 A      |[( )]|
23 B      |[awa]ji|shi- | (0.2) (0.4) |
    b-gz   |~~right~~to A-----~right-->line29
    b-rh   |raise-----| , , , , , , , , |
    b-lh   |raises| , , , , , , , , | ((higher than RH))
24 B      |a- | (0.3) |
    b-px   |torques right----->line34
    b-bh   |raises toward wall behind~|spreads|
    Fig9   |...|#4|
25 A      |awa|ji (0.4)
    a-lh   |...|moves up, makes fist-->line27
    a-rh   |...|moves up, lower than LH-->line27
    a-px   |...|turns slightly left-->line34
    b-bh   |down then up/right

```

- 26 B |hyo↓go (.)
 b-rh |places palm in air above LH
 b-lh ---raises slightly
 a-px |torques further left, mirroring B-->
- 27 A |'hyogo* |[awaji,]
 a-rh |up/right-----
 a-lh |lifts and re-places below RH
- 28 B | [ah-an]=
 CoS HM
 b-rh |up/left
 b-gz |to A's hands
- 29 B =|ah- |awaji:
 b-rh |shifts RH below LH
 a-gz |to B's hands
 fig |#5 |#6
- 30 | (0.3)
 b-gz |to A's face
- 31 A |awaji.
 a-lh |places fist down
- 32 A [>|hyogo |awaji<] |conne:ct (t)o::
 a-rh |redoes placement |lateral back and forth-->
 a-lh |redoes placement----->
- 33 B [a w a j i]
- 34 B |Ha:::ngh | (.) |a(wa) -
 a-bh |...to lap
 b-bh |lowers--- |raises
 b-lh | |above RH
 a-px |torques to face B
 b-px |torques to face A |torques to wall->

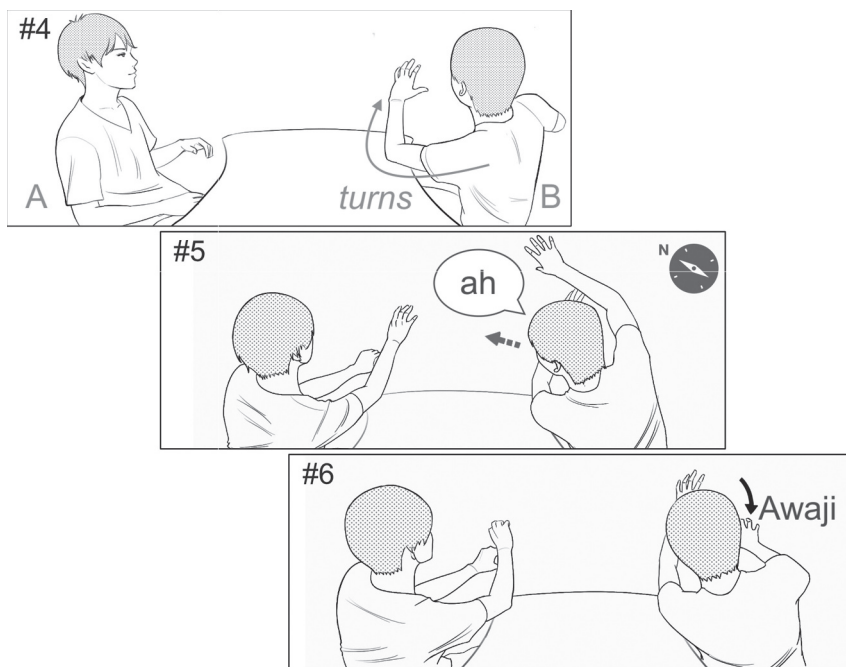


Figure 15. Lines 24 and 29

A responds to B's K- claim (Excerpt 6.1, line 18) through the use of three consecutive gesture-utterance packages that pair embodiment with various place referents. In line 19 (Figure 14), A first raises his left/west hand while saying "Awajishima," (*Awaji Island*) (Figure 14, #1), then raises his right/east hand while adding "and Hyogo" (#2) and finishes by saying "connect" as he moves both hands together (line 20/#3). Using limited grammatical resources and extensive embodiment, A is therefore able to efficiently create a map on the tabletop that illustrates the spatial relationship of the bridge to its surrounding locations. Taken alone, A's syntactically simple utterance "[Place A] and [Place B] connect. Bridge" might appear fragmentary, but produced in conjunction with the appropriately timed placement of gestures for each location and a reprise of the gesture he used earlier to depict the bridge, B is able to follow and he receipts it with an extended non-linguistic uptake token (line 21).

B then goes on to initiate a second version of the map that makes his understanding of the locations amenable to correction from A. He begins in line 23 by extending his left hand while saying "awajishi-" (a cutoff version of *Awajishima*), but abandons this and instead torques his body to face the back wall, where he continues his map in a manner that makes it more visible to both parties. B's abandonment here could also be related to the overlap from A in line 22, but using this moment to shift the position of the map was timely. If A had produced the map on a vertical plane between the two of them, A would have viewed an inverted (mirror) image of the map, but by twisting his torso and restarting the map in front of the wall, B makes an embodied proposal to visualize the map together facing the wall.

A aligns with B's postural shift by turning toward the wall (Figure 15, #4) and repeats "Awaji" with a gestural map element of his own, a fist placed toward the lower-left of the map (line 25). At this point, A's map is still in a somewhat horizontal plane over the table, but A likewise swivels to the wall and raises his hands to eventually match the height and orientation of B's, accepting B's proposal to coproduce the map on a shared vertical plane. B remains facing the wall and alters the intonation of his next utterance ("Hyogo," line 26) by emphasizing the second syllable so that it is hearably beginning a listing that projects further items. He also simultaneously moves his right hand to the upper right side of his left hand to proffer a gestural candidate understanding (Jokipohja & Lilja, 2022). This turn construction(al) unit (TCU) is thus a lamination of verbal, intonational, and embodied elements.

In line 27, A repeats "Hyogo" and mirrors B's hand positioning (right hand to the upper right), treating B's placement of the initial place referent as correct. After confirming Hyogo's position, in line 27 A redoes his *Awaji* gesture from line 25 by taking his left-hand fist off the map and straightaway placing it back to emphasize its relative location. Hyogo is placed upper-right (northeast) and *Awaji* lower-left (southwest). In overlap, however, B moves his right hand to the upper-left, placing *Awaji* in the northwest—an obvious mistake for anyone familiar with the local topography since that would locate an island in the middle of the mainland. In line 28, in overlap with A's formulation of *Awaji*, B utters "ah-an" as he shifts his gaze to A's hands. The Japanese change-of-state token is *ah* rather than *oh* (Endo, 2018), so this seems to be a moment of noticing—B is checking the position of A's hands and comparing them to his own (Figure 15, #5). By constantly inspecting the two versions of their maps-in-progress, the participants visualize and monitor them for moment-by-moment discrepancies.

In line 29, B self-corrects the position of his right hand by placing it lower than his left as he says *Awaji*, while A turns slightly to look at B's hands (Figure 15, #6). Although B's position is not entirely accurate, A treats it as sufficient by swinging his chair back to face B and closing his telling with "connect," the same gesture he used in his original explanation in line 18. B aligns by returning to home position and facing A (line 34), suggesting that they both see the map as complete.

After a moment, however, B initiates another sequence that extends the map south to include the larger island of *Shikoku*, which is located below *Awaji* and connected via another bridge, as shown in Figure 16.



Figure 16. A map showing the Akashi Kaikyo Bridge, Hyogo, and Shikoku.

Excerpt 6.3. Akashi Bridge (extending and completing the map).

```

34 B      |Ha : : : : ngh      | (.)      |a(wa) -
      a-bh      |...to lap
      b-bh      |lowers              |raises
      b-lh      |lowers              |above RH
      a-px      |torques to face B
      b-px      |torques to face A |torques to wall->

35 B      |sh:i|koku:
      b-gz      |BH      |to A
      b-bh      |moves left to make a circle above table-->

36 A      |shikoku: | [awaji:,]
      a-lh      |moves fist up/left
      a-rh      |...|moves fist up/right above LH
      fig       |#7      |#8

37 B      | [awaji:,]
      b-rh      |moves up/right
      fig       |#8

38 A      | [hyogo.] =
39 B      | [hyogo.] =
      a-rh      |places further up/right
      b-bh      |moves circle up/right-->
      fig       |#9

40 B      = ¥[O: : H >|kay okay o(h)kay< .hhh]¥
41 A      = ¥[o(h)ka(h)y      ( good )      ]¥
      a-lh      |,,,to lap
      a-rh      |,,,,,.....|thumbs up to B
      b-bh      |-----|,,,to lap-----
      a-px      |.....turns to face B-----
      b-px      |.....turns to face A-----
      fig       |#10

```

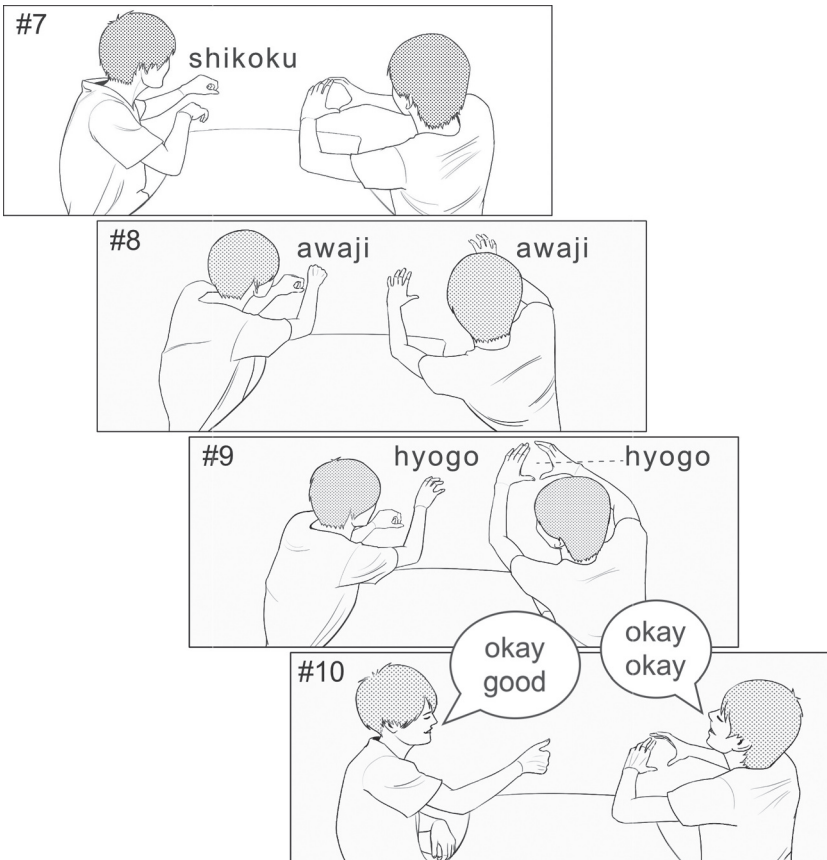


Figure 17. Lines 36–41

This sequence is a form of coda to the map in [Excerpt 6.2](#). It expands the base map by adding another major landmass but also reaffirms the relative locations of the two previously mentioned elements. B again makes an embodied proposal to co-visualize by retorqueing his body to the back wall (line 34) while raising both hands and saying “Shikoku” (line 35). A likewise turns toward the wall so that they share the same directional orientation and uses a fist to indicate “Shikoku” on his emergent version of the map at roughly the same latitude (line 36/[Figure 17](#), #7). They then deliver the next element of the map (“Awaji”) while moving their hands diagonally up and to the right (lines 36–37, #8) and continue tracing this upward line further before saying “Hyogo” again in perfect unison (lines 38–39, #9). Thus, with almost no grammar, the interactants perspicaciously utilize multimodal resources to negotiate the location of the bridge and display B’s gradually changing epistemic status, culminating with the instantiation of intersubjectivity. At this apex of achieved mutual understanding, both participants break into a brief celebration, laughing loudly and smiling. A also gives B a thumbs-up gesture (line 41, #10), an embodied assessment that subtly indexes A’s epistemic primacy and his central role as the adjudicator of knowledge in this sequence.

This complex reference negotiation began with a DYK question in line 3, which occasioned an overt claim of inaccessibility (“I don’t know,” line 5) that eventually led to a rebalance of epistemic asymmetry. This illustrates just how effective such knowledge checks can be as resources for expanding sequences and how embodiment can serve as a valuable resource for displaying the depth of one’s epistemic access.

Concluding discussion

This study has investigated the multifaceted interactional phenomenon of creating embodied maps to achieve mutually understandable place referents. Our analysis contributes to CA research on reference, epistemics, and embodiment, particularly by explicating how gesture, gaze direction, and relative body constellations can be enlisted to address interactionally occasioned knowledge asymmetries and establish recipient-designed recognitionals. Just as the ability to accurately point to a location indexes a speaker's familiarity with that place (De Dear et al., 2021), adjusting a prior speaker's attempt at an embodied mapping constitutes a tacit claim to greater knowledge of the contingent place referents. In this sense, invoking an embodied map within a telling is also a matter of membership categorization and perspective-taking.

In our data set, embodied mapping represents a judicious solution within a sterile test setting that does not allow the participants to easily enlist or create regular inscribed maps. Using the body to generate a short-lived map can promote both progressivity and intersubjectivity by helping to promptly deal with recognition trouble. Elements of a map-in-progress can be expressed via a range of gestures, including air-drawing, palm or fist placements, and pointing, and are designed to be identified as the place referents that are delivered concurrently through talk. Once a gesture-reference combination has been coupled with a location on a map-in-progress, the hand can be moved to another part of the map and become reidentified as another location within the expanding map. Indeed, securing points on a map-in-progress simultaneously lays out the plane in which they are located, providing relative spatial specification.

Doing embodied mapping in interaction therefore relies on visualization. As an immaterial object (Keevallik, 2014), the map constructor draws on affordances of the map, such as its planar orientation and place names that can be assumed to be known to both parties. When a speaker positions an item on a map-in-progress, they invite their recipient to see it that way. Recipients' orientation to the mapping is publicly displayed via go-ahead responses to the incrementally produced geographical points, and the speaker is able to continue to the next element of the map. Joint claims to visualization are enacted via the temporally unfolding turn construction. Where recipient responses in turn do not align with the K+ speaker's visualization of the map, progressivity is delayed while the item is multimodally repaired. Elsewhere we have documented visualization practices in which a speaker uses air-writing within solitary word-search sequences (Greer & Nanbu, 2022), but embodied mapping is significantly different in that it often encourages receipt throughout the turn construction, and that recipient uptake is predicated on the recipient's claims to be able to visualize elements of the map in relation to each other.

As shown in our analysis, three-part lists were a common feature in the maps in our collection. They could be identified at a very early stage of their appearance via listing prosody (Selting, 2007), meaning the placement of a first element on the map could project other imminent positionings and therefore alert the recipient to monitor the map-in-progress for that development. Falling intonation on the third element denoted it as the final item but also flagged it for particular recipient scrutiny as holding some particular interactional import, as evidenced via uptake and the completion of the sequence. Thus, highlighted features of the maps were designed to be seen as connected to each other and to form a gestaltic ensemble.

In this situation, non-pointing gestures play a crucial role in conveying locational references. The imagined maps are aligned vertically and rely on intrinsic spatial representation. Rather than using an actual map or an ad hoc drawing, these English learners opt for a third solution, by miming a "representation of a representation" of the location, and therefore invoking conventionalized understandings of geographical representations.⁶ Using the map as an imagined prop along with a small number of simple terms simplifies the complexity of geocentric or egocentric terminologies, making it a suitable approach for participants with language and knowledge constraints. The crucial role of gesture rather than language within such joint mapping activities lends support to the position that embodied behavior holds primacy over verbal behavior (Stevanovic & Monzoni, 2016).

⁶We thank an anonymous reviewer for this observation.

Our work also builds on prior research by Nanbu (2020) that analyzed how demonstrations of knowledge are solicited and accomplished. Although that study primarily focused on talk, evidencing and negotiating knowledge claims can also be accomplished via complex multimodal assemblages that put subtle gradations of epistemic access on public display, as the current analysis has shown. Although our study has provided initial insight, these complex moments of co-gesturing, gestural repair, and hybrid gestures (that combine deictic and iconic elements) remain underexplored within EMCA. Research is still needed to further explicate the role of co-gesturing and gestural repair in negotiating depth of knowledge and managing intersubjectivity. Showing how these practices might work when referring to people or other kinds of knowledge domains is also necessary.

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Appendix. Additional transcription conventions

Our transcripts follow standard Jeffersonian conventions (Jefferson, 2004), with embodiment depicted via a simplified version of the conventions developed by Mondada (2018). The embodied elements are positioned in a series of tiers relative to the talk and rendered in gray.

	The onset of an embodied action is marked with a vertical bar
- ->	The action described continues across subsequent lines
- ->	The action reaches its conclusion
.	Preparation of the action
- - - -	The apex of the action is reached and maintained
////	Retraction of the action
~~~~~	The action moves or transforms in some way
#	Locates the precise position of a panel within a designated figure

Embodied actions are identified relative to the talk by the participant's initial in lowercase along with one of the following codes:

-gz	<i>gaze</i>
-lh	<i>left hand</i>
-rh	<i>right hand</i>
-bh	<i>both hands</i>
-px	<i>proximity</i>
-hd	<i>head</i>
-fc	<i>face</i>

Where necessary, English translations appear in *italics* directly below each Japanese morpheme.