The Interactive Ecology of Construal in Gesture: A Microethnographic Analysis of Peer Learning at an EMI University in China

Michael Paul Stevens Pérez

Abstract

Depictive manual gestures do not appear in isolation, but are motivated by a complex of experiential knowledge, communicative goals, and contextual-environmental factors (Harrison 2018; Kendon 2004; Müller 2014; Streeck 1993, 1994, 2009b). However, little is known about the incremental, moment-by-moment formulation of depictions in elaborate sequences of talk. Furthermore, questions endure about depiction as a learning resource within the contingent interactivity of the foreign language academic classroom. This study explores these questions in the context of subject-related student talk at a Sino-foreign university in China by focusing on how gesturers build expositions through intercorporeal and intersubjective sense making (cf. Merleau-Ponty 1945/2012).

Drawing on empirical material from the corpus of Chinese Academic Written and Spoken English (CAWSE), I aim to contribute greater understanding of the intersubjective ecology of depictive gesturing. The study builds on previous research on depictive gestures in the classroom (e.g. Rosborough 2014; Roth & Lawless 2002) by focusing on sequences of gesturing within two distinct classroom tasks: i) dialogic explanations of complex systems and ii) interactional multi-party group discussions.

By converging theories of intersubjectivity drawing on Cognitive Grammar (e.g. Langacker 2008; Blomberg & Zlatev 2014) and Conversation Analysis (Heritage & Atkinson 1984; Schegloff 1992), I use microethnography for the investigation of gesture as a cognitive practice (Streeck 2009b; cf. Erickson 1995; Streeck & Mehus 2005). The analysis engages concepts in phenomenology, ecological cognition and enactivism in order to illustrate the publicly displayable achievement of enactive construal in spoken exposition. These analyses expose the ways that speakers depict

for intersubjective visualization of the topic-at-hand, and anticipate and react to affordances that occur within the landscape of interaction. Speakers design their depictions, by manipulating construal dimensions in three ways: i) depictions are integrated into the exposition for projecting and delimiting epistemic arenas where construal relations are tailored for specific structural aspects of the depictions, ii) depictions invite participatory frameworks for co-analysis of the topic-at-hand, and iii) speakers refashion their depictions to anticipate previous trouble. Furthermore, the analysis of the interactional order of the tasks illustrates the intercorporeality, the pre-reflective disposition towards sense-making, of construal in the moment-by-moment construction of academic classroom talk.

This study has implications that problematize the notion of the body as a communicative resource by obscuring the notions of planning and strategy. Overall, the analysis shows that explanations and discussions involve finely grained attenuation of the corporeal dimensions of spoken language.

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Chapter 1 Introduction

1.1 Motivations and focus: depiction by gesture in learning contexts

In this thesis I explore gesture and body movement in the context of subject-related student talk at an English Medium Instruction (EMI) university in China. I specifically focus on how form features of gestures used for depiction illustrate intercorporeality and intersubjectivity in multimodal exposition. Depictions, much like discursive constructions, necessarily involve selection and organization in order to achieve reference (Goodman 1968; Streeck 2009b). Depictions thus impose a particular analytical perspective, or *construal*, onto the experience being conveyed. While social psychological and cognitive notions of construal take a subjective approach, i.e. that construal involves individual interpretations of the world, this study rejects this view in favor of construal having an inherently intersubjective dimension: construal is active meaning making in and through joint conceptualization (Croft 2009; Möttonen 2016ab; Rybarczyk 2015; Verhagen 2005; cf. Langacker 2008). Intersubjectivity, to varying degrees, involves the taking into account of other people in our everyday inferences, analyses, and pragma-normative constraints in language (Husserl 1931/1960; Zahavi 2001). Additionally, the investigation of gesture in this study foregrounds the inherent intercorporeality of communication. Intercorporeality, sometimes called *a priori* or embodied intersubjectivity (cf. Zlatev & Blomberg 2016), refers to the pre-reflective, sense-making disposition humans, who have bodies, take toward the world (Di Paolo, Cuffari, & De Jaegher 2018; Merleau-Ponty 1945/2012). In other words, all body movement is meaningful (Loenhoff 2017). Therefore, to conduct an analysis of depiction means to interrogate it as meaningful conduct within a matrix of meaningful acts.

Consider the example in Figure 1.1, which reproduces a sequence of depictive gesturing drawn from one of the corpora used for this study. Here, a student is explaining the chemical process of osmosis. Coinciding with her verbal explanation are depictions of a large glass beaker and water inside it.
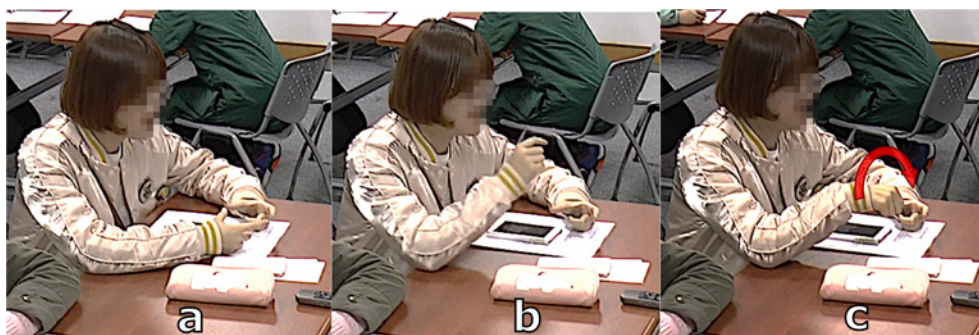
Figure 1.1 Depictive gestures in a sequence

The participant first (a) depicts a large beaker, then (b) points into the beaker, and then (c) enacts a pouring motion into the beaker.

Second language researchers often have questions about the verbal choices that learners make. For this study, however, questions regarding choices in gesture form motivate the examination of gestures in sequence. In the example above: why did the explainer depict the beaker using two hands forming semi-circles, instead of, for example, by acting as if she were holding it? Secondly, how does an analysis of such phenomena account for her decision within the interaction itself, but without knowing anything about her deliberative thought process?

A cursory analysis of the sequence uncovers some preliminary answers to these questions. For instance, in the stimulus that the participant read, the large beaker is drawn as a glass cylindrical object, but to assume that her gesture is attempting to reproduce the drawing would miss crucial aspects of her depiction. Through an analysis in sequence, it can be observed that the depiction is not merely a reproduction, but serves a deictic and action-oriented function in the enactment of

pouring water; i.e. the large rim of the beaker depicted by the semi-circled grip gesture appears to enable a particular visualization in the ensuing description.

Taking these types of sequences as the point of departure, this study addresses two interrelated issues in research on gesture and learning. The first is how to account for spontaneous, depictive gesturing as a learning resource in the EMI classroom. This context, where English is used as an academic lingua franca by speakers of a different language or languages, is a rich but challenging setting, intermingling culture with a language that is for the participants a relatively new context. For this study in particular, the EMI classroom serves as a site to observe learning in a unique setting. Empirical material in the form of video recordings was collected in parallel for both this study and for the corpus of Chinese Academic Written and Spoken English (CAWSE), a broader set of multimodal corpora collected at a Sino-Foreign university in China, where roughly 90% of the student population is Chinese national. This means that for the entirety of their academic degrees, the students engage with academic content using a language different than their mother tongue. However, rather than focusing on the students' language in terms of a second or foreign language, this study investigates how embodied actions, particularly depictive gestures, are brought together with spoken exposition to shape learning. Accordingly, the focus is on episodes of talk where the participants pull resources together to visualize topics and processes not within immediate view of their addressees.

The second issue that I address in this study involves the methodological problem of how to empirically investigate depictive gesturing without recourse to interpretations of psychological processes (cf. Antaki 2006). In brief, the issue of the motivation 'behind' gesture remains entangled in debates about the nature of human cognition, instrumentality, and gesture as evocative of inner mental states. Decades of

gesture research has come to the consensus that gestures serve both communicative and speaker-internal functions (Gullberg 2010; Kelly, Church, & Alibali 2017). However, the idea of gesturing as a tool for communication can be problematic, and whether interlocutors attend to gestures and to what extent remains under debate (Gullberg, de Bot, & Volterra 2008; Rasmussen 2014). Therefore, this thesis takes an enactive assumption in viewing gestures as integral to human *linguistic bodies* (Di Paolo et al. 2018) who pursue sense-making through a visible "enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs" (Varela, Thompson, & Rosch 1991: 9). The primary question which drives this thesis is thus as follows: *How does spoken interaction create the conditions for the emergence of depiction as a communication strategy in exposition?*

1.2 Manual gesture and depictive practices

The act of gesturing refers to the ensemble movement of hands, arms, head, and body that appear congruently with speaking or signing (Kendon 2004: 7), which, when depictive, "engage in a pattern of movement that is recognized as 'creating' an object in the air" (*ibid*.: 160). Much of the classical literature on gesture dismissed depictive hand movements into the periphery of informative and argumentative discourse and to the purview of the theatrical arts (Kendon 2004: 17–19). Up to the end of the 19th century the topic of gesture centered around the innateness of language, and gesture's function as an expression of emotions or underlying ideas, not unlike the debates about language innateness and relativity as found in contemporary linguistics (Kendon 2004: 35–38). Gesturing is more than a paralinguistic phenomenon: it is not incidental to meaning but tangibly part of meaning making. It is also closely tied to how we identify each other as human, because the observation of gestures during speaking enables the listener to view the speaker as more than a mere language

producer. Such a perspective has implications for the analysis of gesture as well. As McNeill (1992) explains, "[r]ather than causing us to slice a person analytically into semi-isolated modules, taking a gesture into account encourages us to see something like the entire person as a theoretical entity—his thinking, speaking, willing, feeling, and acting, as a unit" (11). It is within this unifying observation that more recent investigators have understood the practice of gesturing as a holistic, enacted gestalt. Müller (1998, 2013), drawing on various observations on the body's *expressive movements*, sustains the notion that gestures are always multi-functional, and therefore analysts must attend to their presentational function in the moment of speaking (cf. Müller 2016).

Similarly, Streeck (2009b, 2010, 2013) advocates for a praxeological/ecological perspective on gesture, where depictions are understood as exhibiting practical experience of the hands. The ecological view of gestures places depiction along a continuum of interaction with the world, where some gestures directly annotate and interact with objects within view, while others recruit the imagination in visualizing something "beyond the present encounter" (Streeck 2009b: 85). Depictive gestures, then, are visible actions within situated practices of meaning-making; speakers configure their hands into a variety of forms in order to *craft* their depictions. Gestures also "do not always consist of prefabricated parts akin to the entries in a lexicon; they are often made up on the spot" (Streeck 2013: 680). Depictions therefore lie somewhere between spontaneity and planning, and involve imaginative practices in the visualization of a topic-at-hand.

How is gesture situated within language, on the one hand, and imaginative activity, on the other? Much like drawing and sculpting, depiction is an activity performed with an imaginative direction: I depict because I want you to see

something. Yet due to the particular anatomical, temporal, and spatial features of the body, manual depictions in face-to-face communication are constrained (Mittelberg 2014; Mittelberg & Evola 2014). Thus, depiction involves selecting particular features of a referent and structuring those features in order to organize a coherently meaningful ensemble. Our depictions "enable us to apprehend or imagine [a referent] in certain ways", and each "actively organizes the world" (Streeck 2009b: 119).

This perspective of active organization conjures a dexterous notion of gesture in the making of depictions, and thus depictions can be seen as a form of *manual analysis* whose methods actively create visualizations (Müller 2014; Streeck 2009b). A practice similar to depiction is what Streeck (2005, 2009b) calls *ception*, or *thinking-by-hand*, which occurs when a speaker is attempting to make sense of abstract, emotive, or ineffable experiences: talk of emotions, ideas, relationships, or abstract processes. Each of these depictive practices motivate the question "by which methods gestures *depict*, *analyze*, and *evoke* the world for purposes of communication" (Streeck 2009b: 120, original italics). This conception of depiction links to the nature of the classroom where teachers and students become "engaged in pulling a world-for-remark into view" to give analysis to salient topics and concepts (Macbeth 2000: 26). Therefore, a secondary question that drives this thesis is as follows: *How do we account for depictive gesturing as the analysis of an imagined world pulled into view?*

1.3   Enactive sense-making and the body

A major assumption of this thesis is that gestures are motivated by practical and experiential schemas of continual action (Streeck 2009b; Müller 2014, 2016), i.e. that environment and body are continually coupled in a dynamic cycle of sense-making (Goodwin 2000a, 2018). Integrated into such a view of gesture is the natural disposition of embodied beings to perceive each other within cycles of meaning-

making, what has come to be termed *intercorporeality* (Merleau-Ponty 1945/2012, 1968). Thus gestures are situational—they bear the mark of interactive contingencies which gather communicative elements into explicatory wholes (cf. Goffman 1983), and in this thesis I take the view that these contingencies are the *affordances* for communicative action (cf. Gibson 1979/2015).

Affordances are what we observe in terms of our approach to the environment, and how we perceive that environment as inviting, facilitating, and furnishing action (Rietveld & Kiverstein 2014). Furthermore, our acting upon affordances illustrates our *care* in how we do things: "dealing with obstacles, finding a good path towards a goal, and about doing something right, in a fluid, efficient, and elegant manner" (Di Paolo et al. 2018: 44). From a communicative perspective, affordances are those aspects of language-in-use which enable or constrain the trajectory of the sequence of utterances and interlocution between speakers, listeners, and even readers (cf. Erickson 2015; Hutchby 2001; Jensen 2017). In the context of gestures-in-interaction, formulations of depictive sequences entail various affordances and constraints in their deployment as interactive phenomena (Jensen & Pedersen 2016). However, as interactively perceived conceptions of possibilities, affordances in the stream of discourse are not merely received for action, but are oriented to by interlocutors with intentionality, i.e. meaning-bearing action. The concept of affordances thus has implications for learning, in that it is not merely the reception or processing of information by which learning is *acquired*, but "depends on its meaningfulness to learners themselves" (Atkinson 2010: 12). The analysis of depictive gestures as aspects of learning therefore entails how they afford and constrain gesturing in sequences of depiction. Consequently, in this study, sequences of depiction are

observed for how they provide analyses of the content of talk, by providing visible interpretations of the topic-at-hand.

The assumptions I take are in support of a perspective on meaning-making that attempts to go beyond a 'multimodal' perspective on communication. Traditionally, approaching language as multimodal involves analyzing language as incorporating multiple sensory modes of reception and production (cf. Jewitt, Bezemer, & O'Halloran 2016). In this sense, communication necessarily involves verbal, vocal, and visual dimensions (Selting 2013). That is, that although there are lexical and grammatical aspects of language, i.e. words and their syntactic structures, other dimensions also factor into how meaning is negotiated between interlocutors. The vocal modality refers to the shape of sound utterances, the contours of intonation through which we interpret emotive states such as emphasis or excitement, as well as morphological differences in various languages. The visual mode refers to all of the aspects of speaking that we take in through the eyes—facial expressions, head and body movements, shoulder shrugs, and manual gestures. Indeed, it has been questioned to what extent the notion of *mode* continues to be useful, due to an inherent transmission model of communication that pervades it (Deppermann 2013), i.e. that language is taken in and produced by the senses. So while visual aspects of communication, such as gestures, are here parsed as the object of inquiry, the verbal, vocal, and visual together are taken as emergent units of analysis to examine the interlocking complexity of human communication. Furthermore, from a phenomenological perspective, gestures are understood as illustrating intercorporeality, the *a priori* givenness of the body as the prerequisite not just for meaning-making, but for experience itself (Merleau-Ponty 1945/2012). This issue will be further explored in Chapter 3. Briefly, to view gestures as part of our

intercorporeality is specifically to avoid viewing them as modes of language production or codes according to a semiotic system, and thus any conception of gestures as body language or nonverbal communication is rendered problematic (cf. Harrison forthcoming; Kendon 2008; McNeill 1985, 1992). In accordance with an intercorporeal perspective on gesture, Csordas (2008) asks:

> wouldn't it be simpler to talk instead about nonverbal communication, or body language, instead of intercorporeality? Simpler, yes, but misleading because it presumes that the nonverbal is structurally analogous to the verbal and can be studied in parallel by means of parallel methods. (114)

That is to say, that methods for the analysis of gesture must involve their rootedness as intentional, corporeal sense-making practices and meaningful actions that are both spontaneous and constrained by communicative dimensions in ways naturally distinct from spoken language (Goodwin 2000a, 2003; Harrison 2018; Streeck 2009b).

The frame of analysis will therefore examine sequences of depictive gestures, building and extending previous research into the meaning of discreet, individual gestures into the chain of gestures one after another. As Harrison (2018) points out:

> Gestures are rarely performed singularly with individual utterances in isolation. The impulse to gesture often culminates in a 'burst' of gestures, that is, a sudden stream of gestural forms, multiple in number, sometimes overlaid and seemingly inextricable the one from the other. (104)

From a semiotic perspective, gestural meaning occurs within kinesic ensembles, where a gesture can be continually used and transformed, and its semiotic variation carried over throughout an utterance (Calbris 2011; Goodwin 2000ab). This carryover is evident, for example, in gesture sequences of negation, where complex utterances involving interplay of multiple stances "hinge" at the wrist of the gesturer (Harrison 2018: Ch. 6). Thus, the articulatory properties of the hands themselves are part of

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what make up the pre-conditions for meaning-making, because how humans interact with and understand the world is contingent upon the types of bodies humans have (Shapiro 2019).

1.4 Gesture in a second language

Turning to the EMI classroom, part of a students' development in the academic community includes navigating the challenging terrain of conceptual analysis in a language that is not their mother tongue. In EMI classrooms, students often conduct their learning within communicative tasks where they are instructed to explain something to their peers. These types of tasks are considered useful because they activate student knowledge and afford variation in putting a second language (L2) into use. Communicative tasks also allow students to engage with one another and solicit collaboration in the understanding of target knowledge. Within the context of the EMI classroom, these tasks are given an additional possible function—to engage in practice of English as an *academic* lingua franca (EALF: Mauranen, Hynninen, & Ranta 2010). EMI classroom settings, where EALF is the norm for the teaching of content, afford distinct challenges than language learning contexts. Content classes are by design focused on teaching skills and concepts within a specific knowledge domain, whereas the language classroom is geared towards teaching language skills (although it is not uncommon in language-focused classes to present tasks that simulate the communicative goals of everyday life). To date, there is little research which examines depictive gestures specifically in EMI contexts. Therefore, in this study I observe how L2 users, encumbered by multiple socio-linguistic challenges (Gullberg 2011), nonetheless engage with and construct concepts through processes of embodied interaction which shape their language into displays of knowledge, along with the meaningful emergence of gestures for academic purposes.

A corollary investigation involves the distinctions between immediacy and planning in gestures as communication strategies (Gullberg 1998, 2003, 2006; cf. Dörnyei & Scott 1997). In L2 research in particular, the notion of strategy invokes a conception of language learners as finding ways to adjust or accommodate deficiencies in their knowledge, either as emergent deficiencies manifested in language production, or as repair strategies as a result of communication breakdowns (Dörnyei & Scott 1997). Such a notion of deficiencies however, perpetuates not only an information-exchange model of communication, but also a characterization of learners as requiring compensation, a view that has come under much criticism in more recent learner-centered perspectives (e.g. Burch 2014; Eskildsen & Markee 2018; Lee & Burch 2017; Markee & Kunitz 2013; cf. Gullberg 2013). Specifically, at issue for learning is the problem of how to define a particular bit of language use as strategic. Communication strategies have come to be defined as emerging from communicative intent and communicative breakdowns, which respectively operate on distinct notions of strategy, namely, planning and compensation. Planning, as it is broadly defined, refers to "plans of action to accomplish a communicative goal" (Dörnyei & Scott 1997: 179), wherein a degree of intention is presumed in the deliberation of planning. Unpacking the notion of planning thus involves understanding possible motivations in the articulation of gestural formulations qua communication (cf. Kendon 1994). Compensation, as mentioned, relates to the idea that language learners manifest their challenges by relying on the resources at their disposal. The compensatory perspective, however, perpetuates a facilitative view of gesture that I argue prevents understanding of the interactive contingencies that shape meaning in gesturing. Given that all people gesture to varying degrees and across languages, ethnicities, and cultures, gesture is a natural aspect of linguistic, sense-

making bodies—bodies which are distinct from the kind of functionality of machines. Human materiality is distinct from that of machines because "[human] bodily processes operate and self-organize historically rather than *function*" (Di Paolo et al. 2018: 20), that is, that the embodied agency of human beings are "always open to new possibilities, to unforeseen solicitations, and serendipitous or creative deviations". Thus, people in communication are not merely passively reacting to the circumstances in which they find themselves, they actively create them, bringing forth the worlds they enact upon. An enactive view of communication strategies eschews planning, in favor of viewing communication as circumscribed by the creativity of speakers to intermingle their embodied knowledge with new, unforeseen circumstances. Unforeseen contingencies are thus not mere breakdowns in communication but emergent, transformative ecologies for meaning-creation. Therefore, by exploring the dialogic ecology of people in interactions, the notion of planning is effaced into the immediacy of intercorporeality as guided by empirical affordances in the interaction itself, and not in the minds of interlocutors.

Despite the problematic notion of strategy in communication, a view towards gestural strategies has identified practices of gesture when problems do appear to arise. Compensatory practices of gesture observed in the literature include gestures used for word search signals (Goodwin & Goodwin 1986; Ladewig 2013), for depicting troublesome or possibly ambiguous words (Burch 2014; Gullberg 1998), for resolving anaphoric reference (Burch 2014; Gullberg 2006), for replacing or visualizing missing words (Gullberg 2011), for resolving grammatical problems (Gullberg 2013), and for eliciting verbal completion from another (Mori & Hayashi 2006). I argue, and hope to show in this thesis, that these notions become blurred in the observation of embodied knowledge building. As will be seen in the tasks observed in this study, ELF

classrooms afford distinct contexts for the use of linguistic and material resources. Björkman (2014), for instance, notes that in goal-oriented classroom tasks, "speakers cannot afford to abandon the message or avoid the topic", and therefore communication strategies are geared towards "communicating one's message effectively (which is prioritized over language complexity)" (124). Also, while the analysis will at times appear to focus on the individual gesturer, considering the dialogic and socially constructed nature of explanation (Antaki 1994), it can be assumed that depictions are created *for* the communicative event. The analysis of intersubjectivity then falls onto how depictions are by design created *with* another's intentionality, and not simply as monologues reflecting individual knowledge.

1.5   Direction and organization of the thesis

The research questions that motivate this thesis are as follows:

1. *How does spoken interaction create the conditions for the emergence of depiction as a communication strategy in exposition?*

2. *How do we account for depictive gesturing as the analysis of an imagined world pulled into view?*

In turning to the EMI classroom setting, these additional questions emerge:

3. *How is conceptual content construed multimodally in L2 explanations, and what is the relationship between gesture and construal as formulated in multimodal utterances?*

4. *How might an enactive view of cognition in L2 learning environments reconceptualize learning and communication in the L2 classroom?*

Exploration of these issues will involve probing the intersubjectivity of depictive gesture within two conversational practices: i) the design and structuring of depictive sequences, i.e. their *formulation,* and ii) the repair and reiteration of these

sequences in *reformulation*. Formulation and reformulation each entail recipient design: how "a conversation is constructed or designed in ways which display an orientation and sensitivity to the particular other(s) who are co-participants" (Sacks, Schegloff, & Jefferson 1974: 727). Recipient design can involve word selection, topic selection, admissibility and ordering of sequences, options and obligations for starting and terminating conversations, and other contingencies of spontaneous spoken language (*ibid*.). The analysis of formulation, then, involves examining places in a conversation where objects or activities are identified, against the multiple possibilities for formulating such places, thus involving speaker choice (Schegloff 1972: 80).

Entailed in the notion of formulation is the particular perspective and structure, or *construal*, that speakers impose onto conceptual content (Langacker 1987). Therefore, the driving focus of this thesis will be on how utterance formulations, as construals, demonstrate intersubjectivity by creating the conditions for depictive gesturing. To study intersubjectivity in construal, I converge multiple but complementary frameworks from embodied cognition, cognitive semantics, and conversational analysis under a microethnography of gesture as a cognitive practice, i.e. in foregrounding how interactants display understanding and use embodied epistemic resources to pursue learning (cf. Streeck & Mehus 2005; Streeck 2017). I trace reformulations of descriptive utterances as a way to access alternate construals in verbo-gestural depictions, each involving corresponding methods of analysis. One method is through self-speaker repetition and repair during turns, which calls for a *microgenetic* analysis of incremental change. Secondly, when these speakers explain to new interlocutors, the reiterated and reshaped expositions can be retroactively traced *micro-longitudinally*. A third way to access construal is through collaborative

reformulations and elaborations, as observed in adjacent turns-at-talk between interactants. These variations on reformulation are investigated using two distinct classroom tasks: i) a semi-naturalistic, dialogic explanation task of complex systems, and ii) an interactional multi-party group discussion used for assessment of academic English skills.

This thesis is organized into the following six chapters. Chapter 2 provides background literature on questions regarding the function and meaning of gestures in learning contexts, from both experimental and observational/micro-analytic literature. Chapter 3 exposits the theories on cognition and language which frame the thesis, namely, the phenomenological concepts of intentionality, intersubjectivity and intercorporeality which motivate a reading of Langacker's theory of Cognitive Grammar (1987, 1991, 2008). In chapter 4, the phenomenological concepts are used as the basis to argue for a microethnographic approach (Streeck 2009b; Streeck & Mehus 2006), heavily guided by the method of Conversation Analysis (Schegloff 2007). Chapters 5 and 6 involve the study's empirical analysis.

In Chapter 5, the analysis of the recurring format of an explanation task warrants a micro-longitudinal method for analyzing changes across different iterations of the task. I therefore apply tracking methods for the transformations of selected embodied practices within instances of use (Markee 2008, 2011; cf. Clark & Wilkes-Gibbs 1986, Melander 2009, 2012). However, the trajectory of microlongitudinal change also involves microgenetic transformations within turns at explanation, so the trajectory of these changes is analyzed in support of how the microlongitudinal changes are achieved. In Chapter 6, given the possible recurrent learning objects within a longer task sequence—a peer group discussion—I examine collaborative reformulations of embodied practices in the form of specificity relations in

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elaborations of a topic-at-hand, in which I also observe distributional patterns of verbo-gestural pairings as active practices of cognition (Goodwin 2000b, 2018; Jensen 2017). The cognitive dimension of the study is therefore reflected in the analysis of how embodied actions evince gesturer orientation towards *their own analysis* of concepts in interaction. Chapter 7 concludes the thesis with a summary and discussion of the empirical analyses in view of gesture as a cognitive phenomenon, which drives the analysis of gesture as an enactive communication strategy. The thesis ends with a discussion on limitations and future directions.

Chapter 2 Research on gesture in learning

2.1 Conceptualizing learning

Probing the links between gesture and learning engages different approaches depending on how learning is conceptualized. From an applied linguistics perspective, where learning is focused on the acquisition of language and the resolution of language-related issues, learning has been conceptualized from either an individual, cognitivist perspective or in terms of cognition being situated and distributed within context (Walsh & Jenks 2010; Ellis 2010). However, each of these share a common assumption that learning entails either some kind of variation of output language or adaptation in behavior (Ellis 2010; Larson-Freeman 2007). Cognitivist and individual perspectives focus on describing learning in terms of changes in mental processes, presumably evaluated in changes in the output of discrete linguistic items. In contrast, socially-distributed conceptions examine variation in broader sets of behavior which are themselves accounted for as cognition in interaction (e.g. Lave & Wenger 1991). These differing approaches become complexified when assessing learning in view of gesture and embodied actions that emerge within learning events, further challenged by the distinct natures of language and gesture (McNeill 2005). These contrasting conceptions of language and gesture therefore implicate different methods of observation and analysis. For instance, experimental research from psychological approaches have examined gesture use in specifically tailored explanation activities in order to elicit systematizable gesture-speech pairings. Situated approaches rely on observation of more natural data such as everyday conversation or classroom activities, although some observational studies use semi-experimental elicitation setups as well. In studying the classroom environment, situated approaches have tended to take a broader view on learning in considering contextual factors such as

task design, material artifacts, and other resources (van Lier 2000; Ellis & Barkhuizen 2005).

Indeed, much of the research on gesture from cognitivist approaches demonstrates the ubiquity of gesture in learning contexts such as problem solving and explanation (Goldin-Meadow 2004). For instance, early research using Piagetian conservation experiments, where children were tasked with explaining changes in quantities that they had observed, provided early insights into the relation between gesture and concept development (Breckinridge Church & Goldin-Meadow 1986; Goldin-Meadow, Alibali, & Breckinridge Church 1993). Much of this early experimental research focused on the facilitative role of gesture in young learners, while qualitative research has been more concerned with the broader communicative functions of gesture in natural conversation (but see Streeck (1983) for an early study on classroom interaction). Therefore, the lion's share of experimental research on gesture has adopted a dualistic understanding of cognition and the body, reflected in the way gesture is metaphorized as a *window* into thought (cf. Goldin-Meadow 1997, 2005; McNeill 1992; McNeill & Duncan 2000), albeit with differing conceptions of thought and mind (McNeill 2005). By viewing gesture as a means to accessing underlying thought processes or patterns, a facilitative assumption pervades much of gesture research. Early research into the psychology of gesture thus has a tendency to approach gesture in terms of the motivations and intellectual functions for the individual gesturer, i.e. the role gesture plays in the articulation of a person's ideas, feelings, and comprehension of something learned. While acknowledging the importance of the experimental work in isolating frequencies and functions of discrete gestures, this current study adopts its assumptions from certain qualitative and situated perspectives on learning, which by retaining some cognitive assumptions

about gesture, view cognitive phenomena as having interactional implications first and foremost (Antaki 2006; cf. Goodwin 2003). Nonetheless, one limitation to situated research is that it is difficult to obtain enough material for observation. Everyday conversation and classrooms can be chaotic places of interaction, with little advance knowledge of the types of behavior the analyst will encounter. In these settings, depictive gestures might be difficult to capture *in the wild*, i.e. as spontaneous acts that matter to the gesturer.

Nonetheless, noteworthy research into the links between gesture and learning using a variety of methods have been helpful in contributing to the legitimacy of gesture as integral to language (whether spoken or signed). I attempt to pursue in this thesis a calibration of analysis, extending the scope yet magnifying the level of detail on learning objects. I argue that through such a calibration, a more precise understanding of gesture use can be attained through a syntagmatic rather than a paradigmatic analysis of gesture, where an extended view of the meaning-making impact of gestures can be gleaned. To do this, meaning in gesture is analyzed through microgenetic and micro-longitudinal trajectories in sequences of explanation and discussion.

This chapter, specifically, synthesizes findings from a variety of approaches in order to find common ground in the exposition of gesturing as a communicative, cognitive, and learning practice. The basic questions that guide this chapter are:

1. *What are the major links between gesture and explanation in the literature?*

2. *What are some of the ways that learning has been conceptualized in gesture, particularly in the observation of concept analysis in explanation?*

While a thorough review of the literature on gesture and learning would go beyond the scope of this thesis, I focus on studies that will be relevant to the analysis.

I first review some of the experimental research in section 2.2. In section 2.3, I review the sets of qualitative classroom studies most aligned to this thesis, i.e. embodied cognition (EC), sociocultural theory (SCT), and conversation analysis (CA). Section 2.4 explores literature centering on exposition, while section 2.5 returns to a discussion on conversational analysis and interaction studies of learning in the classroom.

2.2   Gesture in experimental research on learning

Numerous experiments have used explanation tasks for understanding the links between gesture and learning, placing emphasis on the type of information conveyed in gesture and its relation to speech. In experimental studies, the conversational setting is deliberately manipulated in order to isolate quantifiable, statistically analyzable data-sets of gesture-speech codings. David McNeill's early setups, in which participants watched cartoons and then narrated them back to the experimenter (1986, 1992), laid the groundwork for demonstrating that gestures are tightly coordinated with speaking, and thus appear meaningful to both speaker and addressee. Moreover, these studies contributed to the claim that gestures display holistic, imagistic aspects of thought, as opposed to discrete, sequential, and combinatoric aspects as in speech (McNeill 1992). Thus, changes in verbo-gestural pairings have been investigated for how gestures can provide new ideas and new information (Breckinridge Church & Goldin-Meadow 1986; Cook, Mitchell, & Goldin-Meadow 2008). Studies on change and gesture have also investigated the role of gesture in transitional knowledge-building in the moment that a child is developing understanding of a concept (Goldin-Meadow et al. 1993), and have reported that children who gesture appear to learn more (Alibali & Goldin-Meadow 1993; Broaders & Goldin-Meadow 2010; Cook & Goldin-Meadow 2006).

The links between gesture and learning have also been examined in the solving of mathematics and geometric problems. For instance, in a variety of experimental conditions, gestures were found to assist in spatial reasoning (Alibali, Kita, & Young 2000; Chu & Kita 2011; Kita 2000; Tversky 2009), improve memory in reducing cognitive load (Cook & Goldin-Meadow 2006; Goldin-Meadow, Nusbaum, Kelly, & Wagner 2001; Ping & Goldin-Meadow 2010), and improve accuracy when counting (Alibali & DiRusso 1999). Under experimental conditions, it has also been observed that gesturing a problem-solving task appears to be better than demonstrating it (Trofatter, Kontra, Beilock, & Goldin-Meadow 2015).

Observation of *mismatches* between speech and gesture have led to understanding of how gestures interact with verbal information (McNeill 1992: Ch. 5). Early work by Breckinridge Church and Goldin-Meadow (1986) identified mismatches as when the gesture appeared to show different information from that of speech, for instance when a structural or dimensional aspect of an object is displayed in gesture but the speech describes an action that is performed onto it. Using a Piagetian conservation task, the researchers examined how children's displays of mismatches illustrated either problematic areas of knowledge or deeper understanding. This notion of mismatch as rooted in discordant information has also been used to interrogate the relationship between gesture and learning (Alibali 1995, 1999; Cassell, McNeill, & McCullough 1999).

Further research has suggested that mismatching can lead to different degrees of participation, in that viewers attend to mismatchers differently, inviting further assistance from their peers or from an instructor (Breckinridge Church & Goldin-Meadow 1986; Goldin-Meadow & Singer 2003; Pine, Lufkin, & Messer 2004), or for more varied instruction (Goldin-Meadow & Singer 2003). It has also been suggested,

conversely, that when teachers display mismatches between gesture and speech, students give more attention to the teacher's explanation (Singer & Goldin-Meadow 2005). Still another conception of mismatch is in terms of variability (Alibali 1995, 1999), studies of which have found that speakers will change their strategies by using different combinations of speech and gesture.

However, the notion of mismatch does not clarify the complex relationship between gesture and thought. For instance, if thought is representational, then it is possible that there are different modalities at work in thinking—imagistic and verbal, as advocated by McNeill (1992, 2005). Using an alternate view, gesture as practical action respecifies not only the relationship of mismatch between gesture and speech, but also the notion of gesture as a learning strategy. Furthermore, micro-analytic observations of gestures in interactive learning have opened up the question of what mismatches exactly entail. Thus, the potential for observing learning in terms of incremental changes in learning practices has potential for research on gesture in interaction.

2.3   Situated learning perspectives

Generally, situated perspectives view learning in terms of the contingencies of the contextual and material environment in which learning practices take place (Lave & Wenger 1991; van Lier 2000), with corresponding relation to functional analyses of language (Ellis & Barkhuizen 2005). These studies generally adopt qualitative methodologies grounded in alternative conceptions of cognition (cf. Atkinson 2011). However, investigations where change itself is the object of analysis are rare. One exception is Melander's studies using micro-longitudinal CA to explore how distinct participation frameworks prompt variability in patterns of learning behavior (Melander 2012a,b; Melander & Sahlström 2009). Melander & Sahlström (2009)

examine how a conceptual topic is interactively oriented to over time, fostering changes and reintegration of the topic in new instances of interaction. Melander (2012a) underscores the ways that epistemic asymmetries become juxtaposed as children learn to jump rope, while another study examines how epistemic asymmetries evolve over time in the analysis of a child teaching Japanese to her peers (Melander 2012b).

While not directly researching change, multiple studies have used qualitative micro-analysis to engage various developmental (cf. Lantolf & Thorne 2006) and embodied theories of cognition (cf. De Freitas & Sinclair 2012; Edwards, Ferrara, Moore-Russo 2014) in the classroom. In turn, CA has contributed to illustrating the ways that knowledge and understanding are displayed and made accountable in interaction. What these conceptions have in common is that learning can be demonstrated in a visible way, as transitional knowledge *in-vivo*, or live in the moment. This section reviews these paradigms for the ways that gestures, particularly those used for depiction, have been interpreted as illustrating concept development and understanding.

2.3.1   *Sociocultural and multimodal research in the classroom*

A large body of research has developed using SCT, a framework derived from the learning theories of psychologist Lev Vygotsky. Vygotsky theorized that children's developmental thinking was primarily concrete and image-based, and shaped by socio-historical factors, therefore lending itself to studying gesture as giving access to the dual nature of thought (Lantolf, Thorne, & Poehner 2015; cf. Vygotsky 1987). A central notion of SCT is that linguistic and extralinguistic resources function as *meditational* tools that support and transform cognition in transitional learning (Gánem-Gutiérrez 2013). Studies along the SCT framework have thus provided

discussion on the potential pedagogical applications of gestures in the classroom (Smotrova & Lantolf 2013; Smotrova 2014, 2017), while other studies focused on the developmental use of gestures in individual speakers (Lantolf 2010; McCafferty 1998, 2002, 2006; McCafferty & Ahmed 2000; Stam 1998, 2006, 2008, 2016). In longitudinal studies of a Spanish speaking English language learner, Stam (1998, 2006, 2008, 2016) applied Slobin's (1991) thinking-for-speaking framework to study the conceptualization process during the learner's development in her new language. According to the thinking-for-speaking hypothesis, the grammar of a particular language provides a structure in which speakers in that language formulate experience (Slobin 1991). Stam (2006) found, for instance, that during the course of development, the L2 user constructed patterns of interlanguage (aspects of both languages mixed) that were reflected in gesture, later developing the use of metaphorical gestures (Stam 2016). Cross-cultural studies on internalization processes in L2 acquisition have also shed light on the meditational functions of gesture (McCafferty 1998, 2002, 2004; McCafferty & Ahmed 2000).

More recently, SCT has been used to investigate learning in authentic classroom settings. Rosborough's (2010, 2012, 2014) research into one classroom of young learners of English as a second language examined the meditational functions of gesture and how teacher and students used gesture for making meaning. For instance, in the analysis of student gestures in pursuing spelling of the word *crab*, Rosborough (2012) observed how students produced distinct depictive forms, each focusing on different aspects of crabs (e.g. crawling vs. claw pinching). Each of these gestures was picked up by the teacher to use for discussion of the concept *crab* and for trialing the use of a particular phonetic blend (*cr-*).

Smotrova (2014), in her doctoral dissertation studying the functions of gestures in bilingual classrooms, found that students use gesture to express understandings of L2 concepts prior to or in lieu of explicit verbalization, as seen when they mimic teacher gestures during the learning of new content. In one interaction that she analyzed (Smotrova 2014: 166–169), a student asked the teacher for the meaning of the word *town*. In the excerpt, the teacher responded by saying that "town [...] is another word for city" (167). As the teacher says this, the student performs a gesture similar to one done earlier by the teacher when she explained synonymy, a motioning back and forth of the hand. In Smotrova's interpretation, the student's gesture enacted a gestural construal of the concept of *synonymy-as-substitution*, while the verbal message from the teacher inserted the terms to create the multimodal co-construction of the newly introduced term's meaning. Her study concluded that teacher gestures enhanced and facilitated student learning, and that student gestures took a variety of forms in displaying understanding.

2.3.2 Gesture in Conversation Analysis

CA developed as a set of methods designed primarily to uncover the interactional social order of talk (Schegloff 2007; cf. Garfinkel 1967). Its core methodology "works from raw data to noticings of patterns using a combination of distributional regularities, commonalities in contexts of use, participant orientations and deviant case analysis" (Stivers & Sidnell 2013: 2). In terms of learning, CA examines how interactants resourcefully use the plurality of means available to them to produce social actions, which is how CA conceptualizes meaning. Moreover, the proximity of multimodal aspects of language becomes even more evident when linguistic resources are "less than fully developed" (Kasper 2006: 91). L2 interaction research drawing on CA has had considerable insight into learning, primarily through a praxeological

paradigm and a socially distributed and empirically accountable approach to learning in the classroom (Kasper 2006; Markee & Kunitz 2013; Mondada & Pekarek Doehler 2004; Seedhouse & Walsh 2010). Advocates for studying learning using CA stress that learning be understood as "situated in and developed through social interaction in cultural, institutional and historical contexts" (Kasper 2006: 91). Such a view entails viewing cognition in terms of its social distribution, which aligns with CA's adoption of a strict, analytically participant-centered perspective that constrains researchers to observe learning as empirically verifiable (Seedhouse & Walsh 2010). This *emic* perspective entails "registering how coparticipants simultaneously produce coordinated social actions and display their understandings to each other through their interactional conduct" (Kasper 2006: 93). Moreover, observation garnered through thick description of learner utterances highlights the documentation of "the speaker's cognitive, emotional and attitudinal states" as they are expressed by the speakers themselves (Seedhouse & Walsh 2010: 137).

While learning as a cognitive process may be incongruent with CA's empirical perspective, CA has potential to demonstrate learning through sequential changes in the formatting of talk-in-interaction. Sequentially incremental analysis has been able to show, for instance, how student actions such as whisperings, repetitions, and rephrasings form part of the fulfillment of an L2 grammar task (Mondada & Pekarek Doehler 2004). It can likewise demonstrate how learners make selections from peer dialogues to draw attention to points of learning (Seedhouse & Walsh 2010), or how reformulations of previous utterances demonstrate understanding (Mondada 2011; cf. Sacks 1992). These displays can be taken further in how embodied actions such as gaze and gesture display orientation to objects of learning and thus interactively demonstrate understanding as well (Mondada 2011; Ro 2019).

Despite its interaction-centered approach, the CA literature suffers from a dearth of exploration into content learning in favor of competencies and skills (Melander 2009: 65–66; but cf. Evnitskaya & Jakonen 2017; Evnitskaya & Morton 2011; Kupetz 2011). This favoring of skills over semantics has bearing on the analysis of gesture as well, especially given the inability to account for any "interactional consequence" of gestures that appeared to be ignored by the interlocutors (Rasmussen 2014: 32). Nonetheless, studies into L2 interaction have been able to demonstrate how gestures are integral to creating participation frameworks for learning. Classroom research such as Eskildsen and Wagner's (2013, 2015, 2018) longitudinal studies of gesture-speech couplings, for instance, illustrate how gestures co-exist with the transformations that learning new vocabulary can undergo. Other studies have demonstrated the centrality of gestures for teachers in organizing their lessons moment-by-moment (Kyratzis 2017; Majlesi 2014), in-turn organization (Hayashi & Mori 2006; Lee 2017), and repair (Hauser 2013, 2014; Seo & Koshik 2010).

Depictive gestures have also been integral to collaborative knowledge building in L2 settings (Harrison, Adolphs, Gillon Dowens, et al. 2018; Majlesi & Broth 2012). As reported by Majlesi and Broth (2012), interactive processes can engage collaborative understanding of the meaning of a gesture between L2 speakers, while Harrison et al. (2018) analyzed the salience of perspective for repairing epistemic asymmetries, in this case in the realignment of a virtual map created through gesture. In their study on assessed group discussions, Gan and Davison (2011) reported that depictive gesturing was used more often by higher scoring students than by lower ones.

2.3.3 *Embodied cognition in STEM*

Broadly speaking, embodied cognition enjoins cognition and the body, to varying degrees, in supplementary or mutually constitutive roles (Wilson 2002). Perhaps the most widely applied area for embodied cognition in learning environments has been in Science, Technology, Engineering, and Mathematics (STEM) pedagogies. These studies have generally attempted to demonstrate not only the role of the body in a learner's development of conceptual knowledge, but also how gestures indicate the emergence of abstract scientific and mathematical concepts from corporeal interaction with the material world (Edwards & Robutti 2014: 1). By adopting a broadly embodied theoretical perspective, research into learning can illustrate how gesture and body movement are integral to concept development. For instance, numerous studies on adolescents learning new ideas in physics classes reported that gestures are deployed during explanations to enact processes onto visual resources such as diagrams and three-dimensional models (Roth 2000; Roth & Welzel 2001; Roth & Lawless 2002; De Freitas & Sinclair 2012). In a foundational study, Roth (2000) reported that as learners begin to adopt new discourse on scientific concepts, their gestures appear to "pick out, describe, and explain scientific phenomena" from diagrams (Roth 2000: 1683). For example, when attempting to explain a pulley-system drawn on a chalk-board, a participant uses both pointing and iconic gestures in absence of speech to depict the movements that occur (*ibid*: 1693–1702). With three-dimensional models, in turn, participants were observed using gestures to animate the models and "become part of the phenomenon" by attempting to mimic the type of movements and physical relationships that occur within them (Roth 2000: 1703). Similar findings were suggested in Roth and Welzel (2001) and Roth and Lawless (2002) with the use of metaphorical and abstract gestures, suggesting that these are

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also rooted in physical experience and subsequently transformed under the conditions of spoken explanations.

More recent studies have broadened the scope of gesture in STEM to examine more varied embodied practices of young learners as they achieve insights into mathematical conceptual knowledge (Roth 2010; Bautista, Roth, & Thom 2011; Thom & Roth 2011). Bautista et al. (2011), for instance, found support for a radical perspective on embodied cognition in observing the ubiquitous kinetic movement of the learner's body for the emergence of abstract mathematical knowledge. Other studies in this vein have suggested links between learning and sound (Bautista & Roth 2012a), full body movement in the learning of concepts (Bautista & Roth 2012b; De Freitas & Palmer 2016), and the gestures of blind mathematics students (Healy & Fernandes 2014).

Studies by Nemirovsky and colleagues have also explored insights into the ways that speakers visualize salient aspects of their explanations. Nemirovsky and Ferrara (2009), in an observation of a high school algebra student, identified several methodological strategies for partitioning her explanations. In "juxtaposed displacements", the student's gestures "enacted partial aspects of a situation—each taking place in distinct times and locations—next to each other" (167). Another partitioning strategy involved the calculated temporal alignment of gestures with specific principles salient to the explanation (*ibid*.: 167–168). In the study of a young boy's explanations after a trip with his mother to a science museum, Nemirovsky, Kelton, & Rhodehamel (2012) likewise observed the participants' use of multiple strategies for visualizing their experience. For instance, in a shared explanation with his mother, the participant enacted various aspects of his experience by attempting to recreate the exhibit in the air. When his mother intervened with her own gestural

depiction, the boy could see where the visualization went wrong and offer his own depiction, thus demonstrating how gestural depictions are attended to, affording spaces for collaborative sense-making. Furthermore, the boy's gestures were also observed as transforming his explanations as he developed them across the interview. Other studies have expanded on the phenomenological perspective of the explainer by considering the explainer's body in motion (Nemirovsky, Rasmussen, Sweeney, & Wawro 2012), and the question of cultural differences in the interpretation of stimuli in explanations (Bryce & Blown 2016; Radford 2014).

Research using embodied/ecological approaches to cognition in second language (L2) research continues to be rare; however, the recent development of Atkinson's (2002, 2010) sociocognitive framework in applied linguistics critically addresses the cognitivist assumptions in second language research. Atkinson (2010) argues for the hypothesis that learning is inseparable from the environment, and therefore any situated perspective needs to account for the contextual affordances that engage participants in meaning-making. This supports the notion that learning is itself the adaptive behavior that is illustrated in changes geared towards contending with a task-at-hand. Exemplified by the behavioral dynamics of an L2 English tutor and her student (a young Japanese L2 learner of English), Atkinson (2010) demonstrates how a learner's meaningful engagement with the material is afforded by her tutor's motivational tone in recounting her own personal experience. More recently, studies in the sociocognitive framework have explored the alignment of cognition in interactive learning (Atkinson, Churchill, Nishino, & Okada 2007), the ecological processes of word learning (Churchill 2007), and environmental factors for language teaching (Atkinson, Churchill, Nishino, & Okada 2018). To date, only one study using a sociocognitive framework has examined gesture, in Churchill, Nishino,

Oakada, and Atkinson (2010). Their analysis demonstrates how the use of a tutor's gesture in a grammar lesson was integral to aligning her perception of a salient grammar problem to her student. The continual reuse of the tutor's gesture for other salient points collaborated in "shaping and enhancing [the student's] trajectory of experience and repertoire of participation", and thereby not only creating a space for co-attending to these points, but also creating links between distinct elements of the grammar lesson (Churchill et al. 2010: 242). What these studies point to, as has already been considered in CA, is that situated learning involves consideration of the task not only within its context, but in how that context is continually shaped and reshaped through its unfolding (Heritage & Watson 1984). The next section explores the literature on explanation as a discourse environment and contextual medium for learning in the classroom.

2.4   Research on multimodal exposition

Research on teacher and learner oral exposition has examined the discourse context itself as a locus of situated learning. Studies of spontaneous and natural data have shown that in face-to-face situations speakers routinely draw on gesture, gaze, and material resources of the surrounding environment to accomplish multimodal explanations (Koschmann & LeBaron 2002; Kupetz 2011; Goodwin 2000a, b; Streeck 1996, 2002). As a communicative classroom task, explanations are often given as ad hoc activities in the classroom where the instructor calls on a student to explain or summarize (cf. Kupetz 2011). Chi (2009) characterizes classroom explanation as a type of constructive production activity where learners have opportunities for elaboration to go beyond the given material, depending on the types of instructions given. Specific research into the function of gesture in explanation tends to focus on the coordination of discourse in oral exposition and instruction giving, whereas much

interaction research examines how tasks such as explanations and discussions are collaboratively constructed by the participants. This section will explore both of these settings, with focus on learner-centered studies on exposition and explanation.

2.4.1   Gestures in lectures and instruction

Literature on depictive gestures by instructors has generally reported on the degrees to which gestures display figurative and metaphoric content in explanations. For instance, Corts and Pollio (1999) observed that university lecturers use more idiosyncratic and creative gestures during novel aspects of their lectures. A follow-up study by Corts (2006) found that such "bursts" of gestures coincided with analogies and metaphors and often retained metaphorical features when performed in other lectures (211). Núñez (2006, 2008) and Mittelberg (2006; Mittelberg & Waugh 2009) also reported the ways that gestures build links through metaphor and metonymy in mathematics and linguistics lecturers, respectively. The interplay of metaphor and conceptual matters has also been found to be coordinated in gesture, resulting in speaker-specific composites of multimodal metaphors (Górska 2014; Stevens & Harrison 2019).

CA studies on instruction tend to focus on authentic data-driven analysis of case studies or collections in order to uncover the interactional order of instruction giving. Research on instruction has illustrated the integrality of gesturing in pragmatic functions of spoken discourse, such as for efficacy in turn-taking (Vilela & Rachel 2017), the organization of participation and instruction (Arnold 2012), the choreographing of definition explanation (Belhiah 2013), and for attention to learner competence (De Stefani 2017). Studies on depictive gesturing have been able to illustrate the saliency of depictive forms in instruction. LeBaron and Streeck's (2000) study on a woodworking shop highlighted the changes that depictions undertook over

the course of repeated instructions. Nishizaka (2006) also reported on the precise calibration of gestures for violin instruction so that the student could transfer them into actual performance. More recently, Gerwing and Landmark Darby (2014) reported that depictive gestures in medical instruction displayed enough regularity to be given pedagogical attention for teaching medical students. Finally, Lilja and Piirainen-Marsh (2019) reported how depictive gestures in one-on-one instruction tend to follow the explanation, and thus not only depict salient aspects of the instruction, but also provide a visible turn-giving cue to their students.

2.4.2   *Learners in spoken exposition*

Studies involving explanation in interaction within learning settings have attempted to account for how speakers gesture differently depending on the type or characterization of the task. For example, Tabensky (2008) reported that L2 learners produce different kinds of gestures in individual, oral presentations as opposed to interactive discussions or storytelling. The more ubiquitous gestures in individual expositions were open hand gestures that appeared to present the information, while depictive gestures were more frequent in interactive settings where expositors sat with their peers. These findings suggest that depictive gesturing is contingent upon an expositor's ability to clarify and communicate knowledge for an audience (Tabensky 2008: 310).

In an early semi-experimental study on young learners, Crowder (1996) made the distinction between *descriptions* and *explanations* by examining the level of presumed knowledge of the participants. For instance, she found that specific features of depictive gestures such as temporal synchrony and discordancy were different depending on whether the participant was attempting to make sense of the information (*explanation*) or transmit understood knowledge (*description*). Explanations involved

verbalizations in the midst of learning how to convey information that has just been studied. On the other hand, descriptions appeared more complete and demonstrated more confident understanding of what was learned (Crowder 1996: 178). In dividing participants in this way, Crowder was able to observe differences in gesture-speech pairings. Learners identified as explainers tended to repair or revise their gestures more often, perform them more hesitatingly, and mismatch more often (cf. Breckinridge Church & Goldin-Meadow 1986), thus appearing to foreshadow upcoming aspects of the explanation (Crowder 1996: 195). Explainers also tended to verbalize their lack of understanding during these episodes. In contrast, learners in the describer group appeared to revise their gestures less frequently, or not at all, and demonstrated more command of their gestures by appearing to perform the gestures for their recipient in a "teacherly" manner (Crowder 1996: 178). Gestures from describers tended to be timed synchronously with the verbal expression, and were more often redundant, in that the information between gesture and speech appeared synonymous. Tabensky (2008) and Crowder's (1996) work shed light on the differences between learners and task types. However, as noted by others, acts of describing and explaining are often integrated within spoken interaction, and in the midst of classroom activities each plays a vital role in sense making (cf. Stukenbrock 2009; Kupetz 2011).

Kupetz (2011) observed distinctions between explanations and descriptions based on observation of how the different participants attended to spoken discourse. In this micro-analysis of a single-case of a high school student in a Content and Language Integrated Learning (CLIL) science classroom, Kupetz found that a student changed aspects of his explanation when prompted by teacher and classmates for elaboration. For instance, the student initially described a phenomenon through

gesture and inscription. However, when the teacher and his peers prodded him to deepen his explanation (though verbal cues and back-channeling), the student attempted to more finely coordinate his talk, gesture, body posture, and inscriptions in order to accomplish the explanation. His subsequent failure of which prompted other students to collaboratively complete the explanation. Such an analysis demonstrates how what counts for the participants has impact on the trajectory of the activity, and illustrates how a speaker can be prompted to calibrate an explanation through reformulation.

A different conception of student explanation is offered by Koschmann and LeBaron (2002), who characterize it into the broader notion of *learner articulation*, the practice of "giving utterance to ideas and fitting them together" (250). Similar to Crowder's (1996) analysis of descriptions, they note that learner articulation "accommodates the notion that learners may achieve new understandings, through the process of combining ideas, in the course of expressing them" (*ibid*.: 250) Their findings include that learners will use their hands to display what they know, and thus use gesture that is related to recipient design and recipient response. Similarly, Lund (2007), in her analysis of a small corpus of dyadic explanations between novices and teachers, found that gestures were used not only to clarify ambiguities by both parties (i.e. through depiction of talked about items), but also were carefully reformulated by the students in order to maintain important aspects of the explanation.

2.5   Summary

Two issues emerge in examining the literature on gesture and learning. The first involves the relationship between gesture and speech in interaction, that is, in showing how gestures are interactively consequential to talk (Rasmussen 2014). Secondly, if one needs sufficient evidence for making claims about what gestures mean, copious

sets of samples are needed in order to show correlations within gesture-speech pairings. These issues have further implications for gesture and learning.

Examining the literature underscores the need to explore gestural sense-making in its interactive context, which entails a view of the intersubjective dimensions of gesture within the immediate stream of utterances. Although discrete experimental methods have been useful in developing generalizations about paradigmatic gesture-speech pairings and their facilitative functions, wider analysis of the context remains the purview of qualitative micro-analysis. The literature on explanation from STEM researchers using embodied frameworks demonstrates that explanation of complex processes involves an intermingling of corporeal and material artifacts. It also demonstrates the potential to take distinct perspectives on cognition into discourse analysis. The SCT studies reviewed have also been vital in bringing gesture into the analysis of situated learning, shedding light on the mediational functions of gesture. Nonetheless, such a perspective can appear to consign gesture to the periphery of learning, and, as an analytical object, into facilitating "a means to access learners' underlying mental representations" (Stam 2006: 147). Atkinson (2002) points out how SCT tends to favor a hierarchy of knowledge where internalized concepts retain status over externalized practices, and thus reflects a dualistic and representationalist view of knowledge. Such a perspective returns to the problem of gesture interpretation, especially for contexts lacking interactional uptake (such as in monologic explanations and individual oral presentations). Furthermore, little work has been carried out on microgenetic change in gesture, perhaps due to a dearth of natural classroom environments for students to reformulate conceptual matters at hand. However, as Schegloff (2009) notes, repetitions in and of themselves cannot constitute evidence for comparison, given that in any given reiteration a repeated

phenomenon has a renewed possibility to be attended to (or not) by the interlocutors. This is why, by expanding the interactional scope of the analysis, the micro-details of talk and gesture become illuminated within the goal-directed field of meaning in which they are sequentially embedded (cf. Pedersen 2015). To this end, as I hope to show in this study, CA's cognitive assumptions can be re-specified as embodied and ecological rather than merely distributional.

In this current study, then, I follow from recent calls to re-examine the analytical potential of manual gesture beyond compensation for communicative breakdowns (Burch 2014; Gullberg 2011, 2013). In view of the literature and the questions that emerge from an examination of general findings, I propose taking a three-fold approach to respecifying the function of depictive gestures and the intersubjective affordances which contribute to their use:

1. An ecological-enactive perspective on cognition and learning.

2. A re-articulation of Cognitive Grammar's rubric of construal towards (embodied) intersubjectivity in depictive gestures.

3. A CA methodology that closely examines how gesturers and their addressees attend to each other intersubjectively through turn design, repair, and adjacency.

This current study seeks to extend some of the previous research by taking a wider scope at the onset of analysis to situate instances of gestural explanation within their interactive contexts. That is, the analysis is rooted in using the interactional ecology as explanatory of the contingencies that shape the unfolding sequences of gestural depiction, which in turn shape the participants' talk. The exposition of this three-fold theoretical approach is given in Chapters 3 and 4.

Chapter 3   Perspectives and frameworks for cognition and intersubjectivity

3.1   Introduction

For the investigation of embodied exposition in the classroom, this study triangulates research on two levels: theoretical and empirical (cf. Waugh, Fonseca-Greber, Vickers, & Eröz 2007). It offers 1) a theoretical alignment of various theories on cognition, language, and interaction, and 2) a triangulation of empirical material through the collection of classroom interaction from different task types. This chapter engages with perspectives on cognition to develop an ontology suitable for the study of depictive gesture as a cognitive practice. To do this, I integrate ecological and enactive cognition with the cognitive linguistics (CL) framework of Cognitive Grammar (CG) for the analysis of intersubjective construal. The next chapter extends this integration into the Conversation Analysis (CA) of classroom tasks in interaction. I argue that CG and CA, through a mutual origin in the philosophy of experience known as phenomenology, share basic assumptions about cognitive and communicative practices, specifically pertaining to notions of intentionality and intersubjectivity (cf. Möttönen 2016b; Blomberg & Zlatev 2014). When made explicit through the ecological and enactive perspectives on cognition (which also share phenomenological lineage) these assumptions unpack the fundamental dynamic meaning-making of multimodal discourse. In answering the general question of this thesis of how to account for learning in depictive gestures in the classroom, this study rests on the premise that meaningful utterances amount to formulations of content under a particular construal (cf. Langacker 1987, 2008; Talmy 2000; Croft & Cruse 2004). Such a view aligns with recent CA specifications of utterance formulation, where *formulation* is understood as the selection of expressive means, against

alternate possibilities, in the context of its utterance (Enfield 2011; cf. Bilmes 2011; Hauser & Prior 2019). Therefore, this chapter focuses on elucidating the cognitive and communicative nature of construal as an experientially enriched cognitive activity/ability. It aims to consider language users' ability to structure experience from the perspective of *in situ* utterance design, towards the development of an *ecological microanalysis*.

The philosophical exposition begins in section 3.2 with a review of key notions in phenomenology, ecological psychology, and enactive cognition that form the ontological and epistemological background to this study. After an overview of phenomenology in 3.2.1, section 3.2.2 examines how recent perspectives in ecological psychology and enactive cognition can be brought together as explanations of human cognitive processes. A shared lineage in phenomenology informs a perspective on enactive *sense*-making (De Jaegher & Di Paolo 2007; Cuffari 2012; Di Paolo et al. 2018), the view that human bodily action is saturated with meaning and meaning-making potential given people's readiness for interaction with the world (cf. De Jaegher 2009).

Having established phenomenology as the philosophical thread of the analytical framework, section 3.3 moves into an exposition of the major assumptions of CL, focusing on Langacker's (1987, 2001, 2008) CG framework and its assumption that meaning is equivalent to conceptualization, i.e. the dynamic and conceptual selection of referential *content* and its structuring as *construal*. While the objective remains the question of gesture in terms of learning, the critique of the notion of strategy as related to mental abilities obviates an exploration of gestural depiction in terms of traditional notions of planning. I therefore attempt to justify the respecification of strategic communication in terms of the *affordances* of the interactive linguistic

environment (cf. Rietveld & Kiverstein 2014; Rietveld & Brouwers 2016; Van Dijk & Rietveld 2017; Scarantino 2003) that guide the selection and structuring of intercorporeal formulations. However, given CG's ambiguity towards mental representation as the site of conceptualization, section 3.4 turns to a critique of CG as having recourse towards an intersubjective description of conceptualization processes (Möttönen 2016a, b; Rybarczyk 2015; Verhagen 2005). Here, I outline an analysis of depictive gesturing as demonstrating intersubjective construal in enactive sense-making, followed by a review in section 3.5 of some of the literature illustrating the public and intersubjective nature of construal in gesture. A conclusion and summary of the chapter is provided in section 3.6, with a view towards the analytical methods developed by CA for the interpretation of intersubjectivity in spoken discourse, as exposited more fully in the next chapter.

3.2   Phenomenology, ecological psychology, and enactive cognition

Taking an enactive perspective on cognition means viewing cognitive activities such as imagining and remembering as actions which are performed in the world. As *enactive*, these activities entail a cognitive agent's treatment of the world in a certain way (Gallagher 2017). Additionally, it means "[taking] as a starting point what is at stake for a person in the concrete interactive situation" (Di Paolo et al. 2018: 81; cf. *care*). In turn, the ecological perspective on cognition views the environment as a dynamic milieu of continually changing properties that shape our perception, and hence re-orients cognition in terms of how it is tailored to and by the environment (Gibson 1979/2015).

This section explores the development of these perspectives in view of their roots in the phenomenological concepts of perception, intentionality and intersubjectivity. Gathering these notions in contemporary cognitive science is a

generally *embodied* perspective on cognition, the assumption that cognitive processes cannot be reduced to either brain or conceptual activity, but are also (or exclusively) *embedded*, *extended*, and *enactive* (cf. *4E* cognition). These perspectives share the view that human actions and interactions in the world—perceptions, language comprehension, emotional experiences—"essentially rely on the system's body and its dynamical and reciprocal real-time interaction with its environment" (Newen, De Bruin, & Gallagher 2018: 5). While the embedded and extended conceptions view the mind, to varying degrees, as ontologically distributed beyond the brain-body network and into objects in the world (cf. Clark 2008), the current study considers the enactivist perspective within its current treatment in contemporary phenomenology and radical embodied cognition (e.g. Gallagher & Zahavi 2012; cf. Hutto & Myin 2013).

3.2.1 *The Structure of Consciousness in Phenomenology*

Forming the philosophical backdrop to this thesis are the phenomenological perspectives on perception and intersubjectivity. These notions drive the basic philosophical exploration originating in Husserl, later developed by thinkers building on a more specifically embodied view of cognition. Phenomenology is the philosophy of conscious experience developed by Husserl in the late 19th and early 20th centuries. Phenomenology can be defined as the imperative to examine the nature of experience by methodical orientation towards describing the fundamental constitution of consciousness and interaction with the world (Gallagher & Zahavi 2012: 6; Merleau-Ponty 1945/2012: xxi).

Phenomenology originated in Husserl's (1913/1983) response to certain basic problems of philosophy of mind that arose from the Enlightenment debate between empiricism and rationalism. Here he was concerned with the epistemic dichotomy of

subjectivity and objectivity, specifically in the critiques by Descartes (1637) and his argument of the *Cogito*, and Kant's (1787/1927) subjectivist account of cognition rooted in pre-given conceptual structures—both conceptions giving primacy to the self in any account of experience (Merleau-Ponty 1945/2012: xxii–xxiii). In Descartes' (1637) view, intellectual capacity is the only pre-requisite for experience, while for Kant (1787/1927) the subjectivity of experience precluded any possibility to comprehend the *world-in-itself*. For Husserl, the slippery slope into relativism revealed in Kant's project, coupled with the untenable separation between the mind and body as concluded by Descartes, were insufficient in dealing with the epistemological issues concerning the possibility of objective knowledge and the problem of other minds (*ibid*; Zahavi 2003: 10).

The phenomenological account of perception considers the ways perception is less a passive receptor of experience and more of an active construer of it (Gallagher & Zahavi 2012: 8). The active part of perception Husserl called *intentionality*, referring to the attention that perceiving beings direct towards objects of experience (following Brentano 1867/1924). This attention is motivated by a disposition towards knowledge of the world, loading consciousness with meaning prior to any passive experience (Husserl 1931/1960). For Husserl, then, the individual experience of perceiving and intending is situated within a permeating knowledge of the world and other people; and since the meaning of experience is prior to these, it is therefore taken for granted. For Husserl this was the necessary pre-requisite to knowledge of other people as sharing in one's lived experience, what he termed *intersubjectivity* in contradistinction to the subjective experience of the self, and the objective, brute knowledge of the outside world. Thus one of Husserl's most important contributions was his analysis of the directedness of consciousness in the distinction between what

he termed the *natural* attitude of everyday life, and the *objectifying* attitude found in both natural science and psychology (Husserl 1913/1983). The natural attitude is the one taken by people as they go about their daily lives, the "ignored obviousness" of normal, self-directed disposition towards the world (Gallagher & Zahavi 2012: 23). Although insufficient to gain true knowledge, given the assumptions everyday thinking brings to bear on experience, the natural attitude is where we are customarily situated when perceiving the world.

Alternatively, the attitude prescribed by empirical science and psychology in Husserl's time saw fit to describe the world objectively, i.e. without recourse to personal interpretation on the part of an individual. Although paving the way for important contributions to the understanding of our world, the objective, scientific attitude falls short of accounting for how the world, others, and we ourselves come to be meaningful for each other (Husserl 1913/1983). Husserl stressed the need to explicate different ways to make sense of experience, and therefore developed phenomenology as simultaneously a theory of consciousness—as constitutive of intentional direct perception—and as a method for studying the possibility of experience from a first-person perspective.

In subsuming perception into a framework of intentionality, the phenomenological account of experience re-assigns the nature of human activity from a passive perceiver to an active one. Gallagher and Zahavi (2012) summarize perception from a phenomenological perspective constituting five structures:

(1) Consciousness is intentional. All consciousness is about something, and perception is "smart", i.e. guided by previous experience, habits, and knowledge.

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(2) Perception is a gestalt. Something is always in focus while the rest (or most) is not, implying that:

(3) Perception is always incomplete. An object is never observed all at once. This means that perception and conception are synthetic: they involve a formulation of experience through time.

(4) Experience is phenomenal and qualitative in nature: a *what is it like* to perceive something in the way it is perceived (e.g. what does it mean to experience an object as *red*?)

(5) Experience is temporal: it is made up of anticipation, expectation of further experience, and what is brought beforehand to an experience. (Gallagher & Zahavi 2012: 7–10)

These structures entail the active nature of perception, and thus, when understood as meaningful directed intentionality, is itself the nature of conscious experience.

With respect to the body, Husserl's later work develops a notion of experience as being constituted and underscored by our corporeality, i.e. we cannot have experience but in and through a body (1952/1989). But like perception, the body is not observed as a disconnected entity outside of our minds: it is experienced by us as lived. Husserl's turn to the body is crucial to understand the phenomenological position of experience as a first-person occurrence. To characterize experience as first-person, however, risks formally entailing subjectivity (Husserl 1952/1989; Zahavi 2001). The character of first-person experience is, rather, *intersubjective*, i.e. already situated for encounter with other beings. Heidegger (1927/2010) developed this notion further to account for our "always-already" nature of our embeddedness in the world: to exist means to find oneself already in a social world, and not one that is merely accessed through the senses (40). Merleau-Ponty (1945/2012) extended the

concept of embeddedness by invoking the body as pre-given to experience, suggesting that in order to have experience, we must have bodies. He emphasized the essentiality of the body in his account of perception, continuing the critique of both common, everyday sense making, and scientific notions of perception and experience initiated by Husserl.

Merleau-Ponty (1945/2012) situates consciousness as intermingled with the body, not as embedded or inside one. As human beings we are necessarily living out our experience because of our bodies, and not merely within them (it is thus perhaps more appropriate to talk about Merleau-Ponty's view of consciousness as *bodied*, rather than embodied, given this requisite entanglement of the body for experience.) Such a view naturally unfolds into the development of a cognition that goes beyond taking into account the body, but also considers the *taken-for-grantedness* of humans as bodied beings. As experience or consciousness does not occur within a body but because of it, it is perhaps more appropriate to say that bodily experience is the pervasive dimension of experience, not a scavenger of experiences that become stored in some way, e.g. as mental representations. As bodied and *worlded* events, then, human actions must be accounted for in terms of how they are a pursuit of meaning. The human body is essential to understanding cognition in any experiential sense (Gallagher & Zahavi 2012), and our intersubjectivity thus involves a two-sidedness accounted for by phenomenology in terms of our encounters with a pre-given (social) world, and in our corporeal nature. As Cuffari (2011) explains:

> Both the fact that humans are always situated in a historically thick, rich, individual-transcendent world and the fact that human selves are particularly embodied provide phenomenological starting places for encountering other human beings and engaging in practices of understanding and meaning-making with them. (143)

This intentionality towards the world, as an embodied intentionality, has its culmination in an ontology rooted in gesture. Thus gestures are *equiprimordial*, i.e. gestures are instrumental insofar as they are part of our natural endowment of sense-making abilities (cf. Macquarrie 1960). The equiprimordiality of gesture (both as bodily sense-making and in the sense of gestural acts writ large) thus foreruns any instrumentality of the body, and rather transgresses it as a lived experience, with its ultimate expression in the creation of objects of art (Gómez Pérez 2013). Indeed, an analysis of gesture must consider its "taken-for-grantedness" as a communicative intent (Streeck 2003), because gesturing, in its most basic sense, is an "intelligent body's way of being in the world" (Cuffari 2011: 188).

Under a gestural rubric, embodied actions become viewed as embedded in a dynamicity of the interactive world, and thus also reveal their readiness to interact in that world (Merleau-Ponty 1945/2012). Unpacking phenomenology into its intentionality, intersubjectivity, and intercorporeality thus reveals the dual nature of cognition: it is both environmentally shaped and situated, and meaningfully pre-disposed to that situadedness. These two conceptions of cognition will be explored in their expression as ecological and enactive cognition in the next sections.

3.2.2 *Ecological psychology: explaining cognition in the environment*

Ecological psychology was developed by J. J. Gibson (1950, 1966, 1979/2015) as a challenge to the prevailing behaviorist account of animal perception and action in the environment. Gibson found influence in Merleau-Ponty's re-orientation of the relationship between an organism and its environment (Heft 2001, cited in Muller 2018: 2). By changing the focus from behavior to environment, Gibson (1979/2015) developed a perspective on cognition entailing its distribution in an organism's interaction with that environment. He thus proposed the concept of environmental

affordances as a theory of visual perception of surfaces, which accounts for how repeated skillful action within a specific ecology leads to evolutionary adaptation. Gibson (1979/2015) defined affordances as:

> what [the environment] offers the animal, what it provides or furnishes, either for good or ill [...] I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment. (119)

Affordances are not properties of things; they are what properties enable for action as perceived by cognitive beings. For example, the branches of a tree become suitable resources for swinging if the animal can simultaneously perceive in the tree and in itself the properties that enable the act of swinging. Likewise with non-natural objects, a wall of a building is not necessarily designed for leaning on, but its properties (e.g. stiffness, broadness), afford using it to lean on and give rest to a tired passer-by. The relativity of object properties to specific organisms is perhaps why, as suggested by Scarantino (2003), Gibson coined verb and prepositional constructions to talk about affordances (950). For example, a surface of support is *stand-on-able*, but also *walk-on-able* and *run-over-able* for the appropriately endowed organism (Gibson 1979/2015: 119). It is important, then, to note that affordance theory is a theory about the relations of properties. Properties afford actions only when they are perceived as such (Scarantino 2003). This is why it is impossible to assemble a taxonomy of affordances in the way we can describe the properties of a thing. Depending on the attributes of the animal, properties can afford infinite actions, much like how the taste of coffee does not *actually reside* in the coffee; the taste of coffee becomes activated (and meaningful) when touched by a human tongue (Liberman 2013: 218).

Gibson's notion of affordances has lineage with Merleau-Ponty's (1945/2012) conception of *solicitations* in the environment in attempting to account for how action is direct rather than planned (cf. Rietveld & Kiverstein 2014). Objects solicit cognitive beings to act upon them in a certain way, and so we learn these actions through repetition until they become *sedimented* (Merleau-Ponty 1945/2012: 131). In other words, repeated actions become so effortless and skillful that the need for reflection and planning into an inner mental world is removed. Thus, action and perception become unified in direct perception—perception is *for* action (Gallagher 2017). Romdenh-Romluc (2012) explains this unity as when "One experiences appropriate parts of the world as soliciting one to perform particular movements that *together* constitute an instance of [x-movement]" (201, emphasis added).

At the level of a social construct, the concept of affordances can be problematic if not carefully phenomenalized at the scale of interaction (cf. Lempert 2012). Nagy and Neff (2015) make the point that as a research concept, the notion of affordances is often used to describe the ways that people use technologies, and thus risks reducing the concept to a description of features and functions rather than a social concept. For instance, in various communication studies on technology, affordances can be observed in how new technologies guide complex practices such as music composition (Gall & Breeze 2005), ambulance dispatch and control (Martin, Bowers, & Wastell 1997), and for generating novel forms of news-telling (Graves 2007). However, these conceptions of affordance overemphasize the facilitative design aspects of technologies, "pushing users to the uses that were designed and intended" (Nagy & Neff 2015: 4). This view has consequences for communication and language research, for instance in how a language can afford possibilities for a speaker (Aronin & Singleton 2012). Someone learning English, for example, may be guided by the

possibilities to enter a new job market. "To have a knowledge of English", Aronin and Singleton (2012) postulate, "is significantly to extend possibilities of all kinds across a very wide range of domains" (55). In applied linguistics and sociocultural theory, an "ecosocial" conception of affordances is invoked to explain how learners adapt their behavior in the classroom (Rosborough 2012: 64; cf. van Lier 1996). However, all of these invocations share a theme of instrumentality that permeates how objects of perception are conceptualized and analyzed. An instrumental view of affordances can be seen in the ways that, for instance, a computer messaging system affords new ways of communicating, or a language affords employment opportunities to guide plans of future action. Thus, the notion of a direct perception that affordance theory is advocating is forfeited for a more traditional, instrumental view of human action, albeit extrapolated in different ways with respect to the particular properties of each affordance-bearing entity. Positively, such a view might enhance research agendas that seek to demonstrate individual and societal empowerment in their choice of actions. Nonetheless, invoking affordances at the level of facility remains a macro-level conceptualization of human agency and planning.

Another issue, noted by Sharrock and Coulter (1998), is that Gibson's theory is at risk of falling back into an information exchange model that stays within the subject-object dichotomy (Scarantino 2003 makes a similar assessment). That is, that although Gibson presumes to provide an explanation of direct perception, his account of perception fails to collapse the perceiving subject and the outside world, and thus maintains an inner world/outer world separation. Such a view is perhaps why the concept of affordances becomes invoked for the mentioned facilitative and objectivizing explanations of human activity (cf. Nagy & Nedd 2015). Nonetheless, as Carvalho and Rolla (2020) contend, the issue is not necessarily in the account of

perception, but with the conception of *information* and the processes involved in the interpretation of environmental information as affordances. Sections 3.2.2 and 3.2.3 explain how an enactivist account strives to bridge this divide. These issues notwithstanding, affordance theory does foreground the intersection of agency, autonomy, and automaticity that are involved in acts of meaning-making.

Micro-level affordances in utterance-construction have been given attention mostly in research on social actions, for instance in how recipient actions such as gaze, gesture, and various other responses (e.g. minimal or expansive), open up possibilities for actions taken up by the speaker. As Erickson (2015) describes it, "what listeners are doing influences what speakers are doing (and vice versa), simultaneously and sequentially, with shared timing holding together the whole multiparty performance as concerted social action" (442). Through careful analysis of how meaning in conversation relates to interaction, an affordance theory for interaction can build a picture of the "semiotic ecology" of what interlocutors provide for each other in conversation (Erickson 2015: 422). A micro-analysis of semiotic ecologies would therefore entail bracketing an interactional *core* at specific moments in the conversation to examine how participants guide and design their actions accordingly. For instance, Hutchby (2001) invokes the notion of affordances in his description of how conversation becomes reshaped by human interaction with computers, or in computer aided multi-party chat rooms. He illustrates through turn-by-turn analysis how interlocutor action and reaction reveal to each other what works for them (except in the case of human-computer interface which is one-sided to the human interactant). Within a very different setting but along similar lines, Harrison and Fleming (2019) observed how real estate showrooms build landscapes of affordances that guide potential buyers into a culture-specific community of owners. Turning to the

classroom, Rosborough (2012), in examining teacher and student interaction, appraised compensatory student gestures which afforded joint-attention between peers and the teacher.

Thus a foregrounding of affordances as enabling and constraining actions, as I undertake in this study, provides a trajectory for tracing the learning functions of those actions. In the next chapter, I advocate that CA is well-suited for an analysis of not only interactive affordances but also the intersubjective affordances that motivate goal-oriented activity at the microgenetic scale. In the next section, however, the enactive account of participatory sense-making is explored to better understand affordances from the perspective of cognition for interaction.

3.2.3   Enactive cognition and participatory sense-making

Enactivism is an emerging concept in cognitive science, encompassing explanations of cognition on multiple scales. While ecological psychology emphasizes the role of the environment for cognition, enactivism stresses the continuum between a living organism and its environment, foregrounding the self-producing relationship between environment and agents already prepared to give meaning to experiences and "create the worlds they experience" (Parthemore 2013: 4). In this respect, enactive cognition is an account of how environments *become* ecological systems—networks of organisms and material phenomena that intermingle in meaningful ways. The enactivist account of cognition entails a continually transformative relationship between organism and environment, and can thus be viewed as an explanation for how living organisms come to view ecological information as affordances for action (Carvalho & Rolla 2020). While enactivism is a vast enterprise that reconceptualizes numerous concepts in the cognitive sciences, for the purposes of this study I will

focus on the enactivist account of agency as involving two notions: perceptually-guided action and sense-making.

Enactivism grew out of a dissatisfaction with the cognitivist account of mind and contemporary critiques of emergent systems, instead proposing a radical notion of embodiment (Gallagher 2017; cf. Varela et al. 1991). In essence, traditional cognitive science maintains a symbolic conception of mind, i.e. that the mind is constituted by representations of experience, thus perpetuating a separation between mind and body that gives precedence to internal mental processes over the significance of the environment and of the body. Rather than holding experiences of the world in the mind and expressing them through symbols (i.e. language), enactivism views living beings as agents who "bring forth a world" and "enact dimensions of meaning and significance through the living body in action and through multiple kinds of physiological, sensorimotor, and interpersonal couplings" (Di Paolo et al. 2018: 17–18). Central to this understanding of mind is that cognition is constituted by both an embodied agent and an environment that is rich in possibilities for meaning. Enactive cognition entails two sets of relationships: i) perception and action, and ii) the sensorimotor system with cognitive structures. Due to recurrent and habitual coupling of the sensorimotor system with the environment, cognition emerges for the purpose of perceptually-guided action. As Varela et al. (1991) explain:

> the point of departure for the enactive approach is the study of how the perceiver can guide his actions in his local situation. Since these local situations constantly change as a result of the perceiver's activity, the reference point for understanding perception is no longer a pregiven, perceiver independent world but rather the sensorimotor structure of the perceiver (the way in which the nervous system links sensory and motor surfaces). This structure—the manner in which the perceiver is embodied—

> rather than some pregiven world determines how the perceiver can act and be
> modulated by environmental events. (173)

The enactive view of perception extends the phenomenological and ecological accounts by recognizing that each organism has its own structures which enable its perception to be active and direct. This ties to the notion of sense-making.

According to Di Paolo et al. (2018), "*sense-making* is the capacity of an autonomous system to adaptively regulate its operation and its relation to the environment depending on the virtual consequences for its own viability as a life form" (33, original emphasis). Things in the world, then, are meaningful in the moment they are engaged with in whatever way agents come to use them. This engagement co-enacts an autonomous, ecological system built on "concern" (Di Paolo et al. 2018: 32), i.e. the motivation to maintain the system (e.g. continue living), or reduce uncertainty (Carvalho & Rolla 2020). The monkey swinging on a tree transforms the tree into a meaningful object, taking it from *swing-on-able* (to use Gibson's heuristic) to *swing-on-able-for* the meaningful goals and purposes involved in sustaining the life of the organism. Di Paolo et al. (2018) give the example of arctic seals who during winter live a majority of the time underwater (28–29). In the winter there is very little food, so the seals stay underwater to be closer to the food supply. In order to breathe they make breathing holes in the upper ice surface with their teeth, but naturally these holes freeze over and the seals need to continually remake them. This results in an ecological system in which the cycle of hole-making sustains the species, who as a result have adapted in ways specific to that environment. While this is an example of how eco-systems can function as autonomous relations, it illustrates the meaning-directed nature of actions. Arguably, gesturing is more directly perceivable as

meaningful embodied action, gesturing is necessarily enmeshed in sense-making. As Cuffari (2011) suggests:

> gestures are cognitively (and bodily; these are not to be seen as different) about or toward something, as seen in any of the various ways they deal with things in the world, and also they are communicatively intentional, in that their being-toward is enacted in a way that brings something out as something for an interlocutor. (187)

So while gestures are imbued with intentionality, it is in their disclosing of *readiness-to-hand*, through the body's movement in and out of positions, that this intentionality is made visible as inherently intersubjective (Cuffari 2012; cf. Heidegger 1927/2010). The next section brings ecological and enactive cognition together in order to foreground the intersubjective nature of cognition.

3.2.4   *Ecological and Enactive cognition in interaction*

Bridging these two notions together, a complimentary picture of ecological-enactive cognition can come into view. Indeed, part of enactivism's initial theoretical conception involves a critique of Gibson's theory of affordances, for instance in pointing out Gibson's commitment to an organism/world dichotomy (Varela et al. 1991: 203–205). More recently however, others have taken a more conciliatory perspective. For instance, Baggs and Chemero (2018) argue that the two perspectives have complementary explanatory assumptions: ecological cognition is an ontological explanation, whereas enactivism is an epistemic one. "Both types of explanation are necessary" they claim, because:

> the ontological strategy explains how structure in the environment constrains how the world can appear to an individual, while the epistemic strategy explains how the world can appear differently to different members of the same species, relative to their skills, abilities, and histories. (Baggs & Chemero 2018: 1)

Carvalho and Rolla (2020) likewise identify the complementarity of an eco-enactivist perspective through an information model of cognition, taking a pragmatic view of information. For them, environmental factors are not sense-stimuli but "ecological information", i.e. not merely objects activating the sense organs to produce sensations, but are already informational as to their relational properties (Carvalho & Rolla 2020: 5). Foregrounding the relational systems of organism and information thus provides a more nuanced view of the cause-effect relation as traditionally understood. The specific choice of action taken by the organism renders a specific meaning about the thing (cf. intentionality), which at once sets up the relation between the thing and the organism—it is 'for' the organism in a very specific way. Carvalho and Rolla (2020) use the example of smoke and fire. Smoke, while metabolically derived and perceptually *caused* by fire, when perceived as a semiotic indicator of fire demonstrates the habituation of meaning from perceiver-environment couplings. Arango (2019), drawing on the philosophy of Wittgenstein, proposes that enactive actions, when considering human beings especially, should be understood as "perceptual practices: the enactment of intersubjectively constituted and regulated (finely attuned) techniques of commerce of […] meaningful (multimodal) perceptible material" (2).

To examine an enactive notion of affordance, I draw on the example of forest-bathing, a form of nature therapy developed from traditions in Japan (Tsunetsugu, Park, & Miyazaki 2010). Forest-bathing, which comes from the Japanese term meaning 'taking in the forest atmosphere', refers to the practice of taking a walk in nature, with the intention of receiving spiritual and biological health benefits. What I think this practice and related notions illustrate are in how the properties of the forest, conceptualized as having therapeutic abilities, initiate a network of practices for

engaging with the forest in a specific way. Forest-bathing as a socio-historical practice illustrates how people can initiate, beyond a mental representation of the forest, new co-ecologies for action that transform the perception of the forest from, say, lumber or climbing (as facilitative conceptions). By having reanalyzed the properties of the forest, forest-bathing as a practice changes not only the way the forest is perceived, but how people participate, behave, and treat it, thus interpolating multiple conceptualizations into new epistemologies of the forest (e.g. Kohn 2012; Wohlleben 2016).

In sum, the view advocated in this thesis is that examination of human activity should be considering the active exploration of the world as already geared towards meaning-making, but also (transformatively) receptive to the relative uncertainty of communicative interactions. Thus, notions such as *strategy* or *plans of action* are understood as regulative actions for the possibility of meaning making and interactivity. In learning environments, students, teachers, and the classroom are mutually prepared for interaction, i.e. the instructional, task-related factors of the brick-and-mortar classroom, and students' readiness-to-interact, pre-orient them towards interaction.

An enactive perspective on the classroom has lineage with the notion of direct learning proposed by Michaels and Carello (1981). Paraphrasing the evolutionary perspective, the classroom is a type of ecological niche which "complements the variety of actions a species must perform" (Michaels & Carello 1981: 44), where *species* is understood as the interactive participants who co-construct the learning experience. More specific to the activities in the classroom, tasks-in-interaction are themselves environments during which a landscape of affordances unfold—creating what is meaningful because they are brought forth by the students themselves as the

students see each other's utterances as meaningful through the sequential order of sense making. Such a view specifies the usage-based paradigm of language by reinforcing that language consists of acts of meaning-making. Meaning is not to be observed in the result of action or even the action itself, but in the readiness-for-action or disposition which displays a commitment to act (Mackey 1969, cited in Carvalho & Rolla 2020: 5; cf. Di Paolo et al. 2018). If we take the position that all language consists of moving targets of meaning potentials, we can begin to understand how ongoing, dynamic language making can be analyzed as a landscape of actions and enactions (for similar perspectives in language as ecological cognition cf. Thibault 2011, Steffensen 2011). The participants in task-oriented classroom activities enact construal as a directed practice of sense-making, which is demonstrated to be gradable and contingent upon social affordances. Taking this view to its dynamic conclusion, language in sequence, or language as action, is not only contingent on the affordances of the multimodal order of interaction, but also shapes that order to create new possibilities for action, due to the dynamicity of affordances.

However, it is not enough to simply examine the individual's reaction to interactive affordances; a more comprehensive account of direct perception in interaction must consider the parties to interaction as an autonomous system (Dale, Fusaroli, Duran, & Richardson 2013; De Jaegher 2009; De Jaegher, Peräkylä, & Stevanovic 2016). The autonomy of social interaction entails regularities and practices (i.e. contextual affordances) that "enable and constrain the participating individuals' actions […] which cannot be reduced to things like individual actors' communicative intentions" (De Jaegher et al. 2016: 3). Furthermore, understanding itself must be equated with mutual direct perception of these affordances (De Jaegher 2009: 537). To better comprehend intentionality and sense-making from the

perspective of language users, the remainder of this chapter explores Cognitive Grammar's notion of *conceptualization* and how it brings into the fold gestural enactment in meaning-making.

3.3 Cognitive Grammar and Construal

Having considered some of the philosophical framework for intersubjectivity, I turn to the perspective on subjectivity and intersubjectivity in language. In this thesis I take a cognitive grammar (CG) approach to the analysis of intentionality in language. In CG, meaning is understood as the structuring of specific content unfolding dynamically through time (Langacker 1987, 2008). Thus, speaker intentionality becomes enacted via a complex of relations wherein perception is imposed onto the content of experience as speakers articulate and shape expressions in interaction. This section explores CL's perspective on subjectivity in language, focusing on Langacker's (1987, 2008, 2015) particular notion of *construal* as the imposition of structure in linguistic utterances. I show how construal proves to be a useful analytical tool for the present study.

3.3.1 Cognitive Linguistics and subjectivity

Broadly speaking, CL considers language to be "an instrument for organizing, processing, and conveying information" (Geeraerts & Cuyckens 2007: 3), and approaches the analysis of language in terms of basic cognitive abilities manifesting therein (Langacker 1999). CL grew out of a response to the mid-20th century turn towards a computational foundation of cognition, understood as the *cognitivist* view of language (cf. Chomsky 1965; Fodor 1983). In the cognitivist view, language is an abstract logical system reflecting innate grammatical structures that transparently correspond to the world (Croft & Cruse 2004: 1–3). On the contrary, CL advocates

for the subjective, experiential, and contextual nature of language, and so any analysis of language must, at the very least, take such factors into account (Geeraerts & Cuyckens 2007: 5; Langacker 1999: 4). One of the major positions of CL is that language is perspectival, in that "the categorization function of the language imposes a structure on the world rather than just mirroring objective reality. Specifically, language is a way of organizing knowledge that reflects the needs, interests, and experiences of individuals and cultures" (Geeraerts & Cuyckens 2007: 5). This notion of structuring is referred to in CL as *construal*, and various cognitive linguists have adopted an explanation of construal as revelatory of underlying experiential factors influencing meaning making processes (Croft & Cruse 2004: 40). While construal as a concept has been susceptible to having recourse to a mentalistic explanation (cf. Möttönen 2016a: 12–13, for an overview), Langacker's (1987, 1991, 2008) CG framework lends itself to an analysis more compatible with an overtly phenomenological standpoint on cognition (Sambre 2012; Zlatev 2010, 2016). This is possible given CG's commitment to an embodied and intersubjective account of meaning as conceptualization (Blomberg & Zlatev 2014; Möttönen 2016b: 221–222; Rybarczyk 2015: 16; Zlatev & Blomberg 2016). However, before entering into the specific theory of construal as laid out in CG, the shared background assumptions that premise the CL approach bear examination.

Croft and Cruse (2004) highlight the major hypotheses of CL, cast in light of their contradistinction to a cognitivist notion of language, i.e. that the mind has a separate language faculty that stores rules for its use. As Croft and Cruse (2004) note, CL begins with the notion that language is not an autonomous cognitive faculty, but derives from other, more basic cognitive functions such as memory, perception, and sensorimotor abilities (1–3). Rather than rules being stored in the mind/brain,

language is a function of regularities of experience and conceptualization, i.e. the coupling of experience with the ongoing mental activity of imagining and thinking (Langacker 2008). It follows that semantic information arises out of experience but is not a one-to-one mapping, i.e. semantics is not truth-conditional upon correspondence with the world. Another assumption made by CL for a theory of language is that knowledge of language is usage-based—grammatical forms and lexical meanings emerge from actual language use (Langacker 2009; Tomasello 2003). Thus, rather than language users exploiting linguistic knowledge that is stored in the brain as abstract grammatical forms, grammar is conventionalized and transformed by a shared linguistic community, schematized in general patterns of structure and *entrenched* or habituated over time (Langacker 1987: 100). This final assumption is what commits CL theory to a usage-based ontology, construing the notion of conceptualization as an active process that occurs in the moment of language use, and not an implementation of a set of instructions waiting to be accessed by the language user (cf. Tomasello 2003).

CL's hypotheses have important implications for meaning in language. For one, conceptual structure cannot be reduced to truth-conditional correspondence with the world, and thus CL is further committed to a subjective account of meaning making. Meaning is subject to construal in use, i.e. of how experience is structured in communication, in the moment of use through the gathering of the articulatory mechanisms of language—phonology, morphology, syntax, and semantics. Thus, meaning making is a dynamic process rooted in the sequential unfolding of articulating experience (Langacker 2001). If experience is taken, after Merleau-Ponty (1945/2012), to involve skillful, embodied practice within a dynamic and affordance rich environment, then an enactive view of conceptualization, rooted in its description

as an action- and goal-oriented practice, comes into view. The next section explores CG's perspective on meaning and how subjective structuring plays into the formulation of utterances.

3.3.2   *Meaning as conceptualization*

How people interact with the world and with others directs how they construct utterances. In turn, how this interaction plays a role in cognitively motivating meaning making is part of the project of Langacker's framework of cognitive grammar. Meaning entails a two-folded nature, consisting of experiential/conceptual content and how that content is structurally articulated in a given instance of use (Langacker 2008: 32). Meaning thus emerges from the formulation of utterances and the mental imagery they evoke, and this section explains the importance of mental experience to meaning in Langacker's framework. The implications for a notion of *enactive* conceptualization is then presented.

As Langacker (2008) conceives it, an utterance is essentially an *in situ* instruction, rather than a stored rule, for imagining or drawing attention to something (460), and it is this imagining that characterizes a conceptualization. It follows that linguistic meaning is not carried by words, but through morpho-syntactic relations of grammatical constructions in use that evoke a conceptualization; in other words, "grammar is meaningful" (Langacker 2008: 3). Conceptualization, therefore, is constituted by content and construal: by both experiential knowledge and its structuring into discursive articulation (i.e. whether spoken or written). Furthermore, lexico-syntactic relations occur within situationally relevant "usage events", what is traditionally understood as context (Langacker 2008: 17). Usage events are constituted by the ground—the relations between speakers, hearers and their utterances and actions—within which conceptualizations are formed (*ibid.*: 28, 59).

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Thus CG evinces a strong intersubjective account of meaning as socially shared and constructed through socially shared cognitive processes (cf. Langacker 2001).

3.3.3 Dynamicity and Imagination

Langacker (2008) identifies two inherent properties to language that characterize mental experience and which form the background to all formulations of utterances. The first is *dynamicity,* which relates to the temporal nature of conceptualization and language making: "As neurological activity, cognition necessarily takes place through time" (Langacker 2008: 500). Langacker's model of the *current discourse space* (CDS: Langacker 2008: 59), develops on the dynamicity of language. The CDS is where "As discourse unfolds, at each step the current expression is constructed and interpreted against the background of those [steps] that have gone before", thus excavating the sequential temporality of conceptualization. This is why CG emphasizes the dynamic nature of construal in meaning (Langacker 2001; but cf. Cruse 2008 for an alternative proposal on dynamic construal). The second property deals with our relation to reality, called *fictivity* in Langacker (2008) and since updated to encompass all aspects of *imagination* (Langacker 2015). The notion of imagination develops from the idea that people's relation to the real world is complex and phenomenal given that "cognition consists of far more than sensory and motor interactions. What happens in the social, cultural, and imaginative spheres is as real and important to us as physical occurrences" (Langacker 2008: 59).

Langacker's (2008, 2015) abstraction of experience into dynamic and imaginative conceptualization usefully separates the temporal and the phenomenal, however these must be understood as mutually entangled in actual experience. Imagination necessarily entails a dynamic, temporal experience. As Langacker (2015) puts it, "Language and conception are things that *happen*" (131, emphasis in original).

Temporality is essential to how utterances formulate particular trajectories for imagining and arriving at their conceptions, attributable to our abilities of *mental scanning* and *reference point construction* (Langacker 2008). Mental scanning refers to the directionality that an utterance evokes for the comprehension of its contents. Descriptions are particularly salient in their capacity to evoke alternate sequential trajectories, i.e. in one direction or another, or as unified, static images. For instance, the difference between the phrases in Example 3.1 is in how a recipient is to imagine the scene, construed as either a dynamic event (3.1a), a static event (3.1b), or as a dynamic path with a clear trajectory of movement (3.1c).

(3.1, cf. Croft & Cruse 2004: 53–54)

a. the Boston Bridge collapsed

b. the collapse of the Boston Bridge

c. the Boston Bridge crosses the Charles River (my own example)

The adjacency of the subject and verb in 3.1a evokes temporality in the event—the bridge was standing but then it *collapsed*; while the nominalization of *collapse* in 3.1b evokes the event as a singular moment in time. The verb in 3.1c turns the subject, a static object, into a moving entity, achieved by constructing the scene in the imagination. Thus, the alternate formulations of utterances—how entities in an utterance are ordered—is non-arbitrary, i.e. different formulations can construe meaning differently (Langacker 2015: 133).

A corollary operation to scanning is the construction of reference point relations within and across utterances, by "invoking the conception of one entity for the purpose of establishing mental contact with another" (Langacker 2010: 363). In an

utterance designed as a reference point construction, a reference motivates a mental path to a target, where the path itself is construed in various ways. For instance, when contextualizing a topic of talk, the reference functions as a schematic place holder for a general domain, serially specified in an elaboration. The domain functions as a predicate instantiating a figure-ground relationship with its elaboration (cf. Goodwin & Duranti 1992: 9–13).

Reference points are formulated throughout language, but are especially inherent in possessive and deictic expressions. For instance, the phrases in Example 3.2 both have as their primary imaginative targets a *car*, but it is accessed in alternate ways.

(3.2)

a. The car

b. My car

In 3.2a *car* is accessed through anaphoric reference because the definite article presupposes a previous reference. In 3.2b, the possessive marker, 'my', precedes the target *car*, thus creating a path of mental access *through* the speaker and then to 'car'. Gestures function prominently in constructing reference point relations, for instance by disambiguating demonstratives in context ('that car over there' + index finger point), or in creating spatial relations between directions (cf. Haviland 2000).

Blomberg and Zlatev (2014; Zlatev & Blomberg 2016) argue that mental scanning is better understood in terms of intercorporeality. Mental, or more appropriately, visual scanning involves enactively perceived imaginings which occur dynamically at the moment of experience, thus "Dynamicity does not only belong to

the moving entity, but also belongs to the act of perceiving" (Blomberg & Zlatev 2014: 154). In other words, mental simulation is respecified as the evocation of an experience in real time. The 'accessing' of salient entities in a conceptualization are pursued in the process of constructing and following the utterance (Zlatev & Blomberg 2016).

3.3.4   Construal relations

Construal relates to the specific ways that utterances are structured so as to evoke a particular conceptualization between speakers and hearers[1]. Langacker (2008, 2015) defines construal in terms of the relation between the alternate ways that conceptual content can be structured, in other words, in how the same thing can be said in different ways and from different points of view. Construal is also a relationship between interlocutors, their common ground, and the content of their talk in a usage-event, i.e. "The relationship between a speaker (or hearer) and a situation that he conceptualizes and portrays, involving focal adjustments and imagery" (Langacker 2015: 487–488). The notion of focal adjustment invokes a photographic analogy, where construal relations amount to calibrations in how a scene is to be visualized (linguistically this translates into how utterances evoke a conceptualization). As Langacker (2008) summarizes, "In viewing a scene, what we actually see depends on how closely we examine it, what we choose to look at, which elements we pay most attention to, and where we view it from" (55). Thus, like a camera lens, we adjust the scope, field of vision, and depth of zoom portrayed in an utterance, and we likewise position ourselves and our hearers relative to that portrayal.

Using a rubric of focal adjustments affords identification of an array of construal dimensions that operate in the meaning of an utterance. For instance, every

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[1] For the purposes of this thesis, I refer to the interactants within the domain of spoken language.

formulation necessarily involves a *selection* of content to be expressed, in a particular syntactic relation, and with a degree of detail or *specificity*. Therefore, as "Every expression omits much more than it explicitly conveys" (Langacker 2015: 126), every utterance is an enactment of focusing attention towards a field of potential meanings (Langacker 1997). Conversely, expressions can be *schematic* with respect to their level of detail. The differences between the phrases in Example 3.3 are a matter of conveying degrees of description (adapted from Langacker 2008: 56):

(3.3)

a. Something happened.

b. Somebody saw a ferocious porcupine with sharp quills.

Examples 3.3a and 3.3b illustrate alternative ways of construing the granularity of the scene. But as can be observed, there are also relations of specificity within utterances: in 3.3b the subject is construed schematically with respect to its predicate.

Analytically, specificity is relational in terms of the level of precision that is recruited for a particular context of use, i.e. specificity can only be identified with respect to a comparison. Nonetheless, as Möttönen (2016a) notes, specificity relations display a high degree of intersubjectivity because any response necessarily entails the other's knowledge of the context of the CDS's semantic possibilities. For example, if an overseas friend on a chat asks me how hot it is in China, there may be a variety of possible ways to answer, but in the actually occurring CDS I invoke only one of those possibilities. However, the question entails intersubjective understanding in that a) because I am in China and they are not, the need to explicitly state the knowledge asymmetry between us is obviated, and b) my friend presumes that a sufficiently

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precise response will be given. If I respond with something such as 'really hot', then they may let it pass, or request elaboration, in which case the utterance would be reformulated. These reformulations, then, can give syntagmatic access to speaker-hearer analyses of the specificity relations between utterances.

By evoking content through selection processes and giving a certain level of detail to it, aspects of utterances are made more or less *prominent* in the CDS of unfolding formulations. Essentially prominence is a relation between what is construed as salient in relation to what is less salient in an utterance, i.e. what is to be drawn out of the utterance that is most significant. Speakers can usually construe prominence by *profiling* specific aspects of the utterance, by drawing attention to it through the multiple linguistic resources at their disposal.

Profiling also reveals the degree of attendance an entity is given in an utterance through an asymmetric relation, sending some aspects of an expression to the background and others to the foreground. Langacker (2008) uses a theater metaphor where selections are brought "onstage" and foregrounded against a background scene (63). Simply talking about something puts it onstage, yet also evokes a multiplicity of connoted and collocated entities. For instance, talking about *cats* may evoke a set of background or tandem visualizations that co-occur with the utterance of cat: tangential objects such as mats and litter boxes, or activities such as petting or kicking. Uttering particular entities can also make particular characteristics more salient. This occurs often with entities that are difficult or impossible to conceive without also imagining a wider whole. Utterance of the term *whiskers* evokes an animal's face that acts as a background to the utterance. Indeed it may be impossible to visualize certain entities without further correlating entities; likewise with actions such as *kick* or *jump* which cannot be imagined without an active *doer* (Langacker 2008: 63–64).

Background/foreground relations can also be evoked sequentially, for example when formulating definitions, a type of categorical relation between a domain and its members or constituents. Defining a term by nominalizing it and then formulating its meaning creates a prominence relation between the term and the elaboration. It also creates a specificity relation in that the term is less specific than the elaboration. An essential aspect to keep in mind is that categories and their members, what are traditionally called concepts, are understood here as evoked in the CDS of a spoken usage event. One must therefore talk about concepts-in-use as they are formulated and emerge in conversation. As Taylor (2003) indicates, a category, as a cognitive structure, is not an exhaustive "listing" of attributes, members, or constituents, but are whole conceptualizations which may include some or other aspects attributed to its domain (66–67). The verbalization of categories thus evoke specific sets of entities relative to the CDS and what is conceptualized for the speakers and hearers at the moment of utterance. Contextualizations likewise involve a background/foreground construal relation, given that, as contexts are spoken into being by participants in talk, constituents that refer to a presupposed context must be formulated in talk (cf. Goodwin & Duranti 1992). Speakers visibly display, through their talk and interaction, manipulation of the focal adjustment in order to constrain the topic of talk. In the canonical construction, *x is y,* uttering *x* ushers in a context for the CDS, but the sequential utterance of *y* recontextualizes both *x* and the CDS. It is therefore problematic to ascribe categories and contexts to utterances without being able to observe whether and how parties to talk orient to them as such. The interactional dimension of formulations and reference are explored in Chapter 4.

Similarly, speakers manipulate the *perspective* of a viewing arrangement in an utterance. Utterances create perspectival relations because they locate the center of

experience with respect to a description. For example, the utterance 'My cat is outside' locates the center of experience as being inside with respect to *my cat*. Personal pronouns also function to build a perspective within a description, along with prepositions and motion verbs. 'My car' profiles a possessive relation while also centering attention onto the speaker; imaginatively we are perceiving 'car' from the perspective of the owner. Perspectival construal thus creates relationships between subjective and objective conceptualizations. For Langacker (2008, 2015), subjective and objective perspective is a matter of implicitness and explicitness of the entities involved in the interaction, what he calls the ground. For instance, a description of something that is not in view construes the elements of it objectively, in that the person speaking is inviting both they and their interlocutors to put the objects of the description onstage. The phrase 'Mary lives across the hall' (cf. Langacker 2015: 124) places a situation and its constitutive relations on an equal plane for viewing. However, what remains implicit is the speaker's (and hearer's) vantage point: Mary lives across the hall *from the speaker*. Therefore reference point and prominence relations are inherently part of a perspectival construal. What is put onstage becomes the path for accessing the focal point. The phrases in Example 3.4 all construe different vantages through reference point relations:

(3.4, cf. Langacker 2015: 124)

a. She lives across the hall from Bill.

b. She lives across the hall from me.

c. She lives across the hall.

The phrases in 3.4 answer the question, 'Where does she live', relative to an objectively construed entity: *Bill* and the speaker (through *me*), are put onstage, and

are thus explicit. However, 3.4c construes the answer subjectively, that is, by implying the speaker's presence relative to where the person lives. Perspective can entail degrees of physical and psychological distance within the construal relationship. For instance, the utterances in Example 3.5 both place *son* onstage, but are not only accessed through different pronouns which construe a distinct relation between speaker and hearer, but can have different meanings depending on the relationship between members of the ground.

(3.5, cf. Rybarczyk 2015: 120)

a. Our son has problems at school.

b. Your son has problems at school.

Example 3.5a places both parents onstage along with their son. However, the meaning of 3.5b changes if it is spoken by a parent or a non-parent. The use of *your son* when spoken by a parent can have the effect of distancing the speaker from certain parental duties attached to the child's schooling (Rybarczyk 2015: 120–121). Thus the relevance of the ground becomes intersubjectively salient.

Finally, expressions can also be formulated to construe something *in terms of* or *as* something else, most often in expressions involving figurative and non-literal relations. For example, the utterance 'The bridge crosses the river' evokes motion onto the static entity of *bridge*, thus construing abilities into it. Metaphors are also a way of construing a particular way of viewing something. By formulating someone's anger as 'explosive' (cf. Taylor 1995: 5), the physical act of expressing anger is juxtaposed with the image of an exploding bomb (cf. Jensen & Cuffari 2014). Likewise, metonymy relies on our ability to ascribe a part of something in reference

to the whole, or the possessor standing in for the possessed. The expression 'I'm parked over there' is meaningful in a context where cars are in view, and the knowledge of ownership that is understood between interlocutors enables the heuristic reading of *parked*. The implications of construal for an intersubjective account of gesture will be explored in the remainder of this chapter.

3.4   Intersubjectivity in construal

Foregrounding the intersubjective aspects of Langacker's CG framework involves emphasizing the coordinated conceptualization that is evoked between speaker and hearer (Rybarczyk 2015: 16), wherein construal is re-specified as having a functional basis in communication (Croft 2009: 410). More recent explorations of construal emphasizing the social dimension of perspective indicate a shift towards unpacking the *a priori* intersubjectivity of construal (cf. Zahavi 2001). Langacker, using the visual metaphor, explains the intersubjectivity of construal in arguing that both speaker and hearer enact a conceptualization, what Rybarczyk (2015) identifies as a "collective observer" viewpoint towards a given formulation (16). In other words, the joint attention of the collective observer coordinates the enacted imposition of a construal in the moment of an utterance's formulation. Thus the intersubjectivity between speaker and hearer is both a unifying event and a dynamic motivator for utterance construction. For example, when referring to a third person who is not present, the speaker selects a referring expression that acknowledges both the speaker's and the hearer's relation to the referent individual as well as the speaker-hearer mutual relationship (cf. Rybarczyk 2015).

Similarly, Möttönen (2016a) emphasizes the dynamic aspect of construal in identifying a prior intersubjectivity within syntagmatic and paradigmatic planes. That is, construal operates both vertically, at the instance of an utterance's formulation, and

horizontally, as it develops through the temporal sequencing of discourse construction (cf. Halliday & Mattheissen 2006 for a systemic functional but distinct elaboration on the notion of syntagmatic and paradigmatic planes of construal). For instance, with respect to the specificity of an utterance's interrelation within a given discourse event, "Every expression belonging to a pragmatic (yet linearly constituted) paradigm of co-referential expressions updates the paradigm, making each subsequent expression more specific" (Möttönen 2016a: 59). Thus intersubjectivity in construal, in the first instance, means that a construal cannot be reduced to a single individual conceptualization (Möttönen 2016a: 63), but must be understood as reflected both in the expression and reception of the utterance, and thus as a relation between possible alternative construals and the matrix of prior utterances toward projected formulations.

CG can thus be operationalized and recruited in the analysis of intersubjective alignment because of the ways that grammar is invested with the sequential-temporal order of construal. As Verhagen (2005) notes, "The development of the notion of 'construal' in the work of Langacker and others has provided a framework in which [subjectivity and objectivity] can be handled simultaneously in an integrated way" (22), that is, through intersubjective alignment (cf. section 3.2.1 above). Moreover, CG appears committed to a relational perspective on cognition, that is, in how it views cognition as "our primary way of engaging" with the world and others (Langacker 2008: 500). Nonetheless, Langacker's explanation for a cognitive relation with the world retains some of the language of *mind-reading* that ecological and situated accounts of cognition seek to avoid. I submit that an eco-enactive view of cognition can re-orient cognition as viewing construal as one of the ways people treat the world so as to bring this world in view for talk-at-hand. Therefore, gestures, rather than being seen as merely semiotic resources, are understood as active sense-making as

already part of the communicative intentionality motivated by intersubjective alignment. This view echoes Merleau-Ponty's (1945/2012) intercorporeal directedness in communication. With regards to interlocutor's' sharing each other's vocabulary and syntax, having linguistic knowledge:

> does not mean that the words act by arousing 'representations' in me, which could be associated with them and which, when taken together, could eventually reproduce in me the speaker's original 'representation'. I do not primarily communicate with 'representations' or with a thought, but rather with a speaking subject, with a certain style of being, and with the 'world' that he aims at. Just as the significative intention that initiated the other person's speech is not an explicit thought, but rather a certain lack that seeks to be fulfilled, so too is my taking up of this intention not an operation of my thought, but rather a synchronic modulation of my own existence, a transformation of my being. (Merleau-Ponty 1945/2012: 189)

Following from Merleau-Ponty's and Gibson's notion of direct modulation of behavior, this thesis advocates a non-representational view of linguistic and gestural construal. It hopes to illustrate the sequentiality of construal as a practice of sense making, rather than as a cognitive or deliberative process which is manifested in language.

Such a conception of the dynamic and imaginative nature of intersubjective alignment can be extended into the analysis of the turn-organization system as done by CA (Sacks 1992; Sacks, Schegloff, & Jefferson 1974; Schegloff, Jefferson, & Sacks 1977). The previous chapter introduced research on gesture within the formatting of communicative turns in learning environments. The next chapter will align the CA view of meaning with the notion of cognitive practices with meaning as intersubjective conceptualization outlined in CG. Such an alignment rests on a shared understanding of the phenomenological perspective, specifically as both CG and CA

seek to demonstrate how language functions for describing and living in a shared world.

3.5   Construal as a publicly displayed achievement in gesture

Construal in terms of subjectivity is perhaps immanent in gesture just as it is in language. How gestures have been studied as far as their relationship to construal and intersubjectivity will be the focus of the current section.

3.5.1   Gesture and subjectivity

McNeill (1992) laid the groundwork for cognitive research on gesture by arguing that thought is composed of two facets: the verbal component as articulated through speech and writing, and the visual/imagistic component as articulated through the hands. These observations have resulted in widespread empirical studies that compare different languages using the *thinking-for-speaking* hypothesis, a cognitive principle posited by Slobin (1991) contending that the grammars of different languages structure linguistic expression differently. Findings from a Slobin-oriented framework, using Talmy's (1985) distinction between verb-framed and satellite-framed languages, attest to the various ways different grammars correlate with corresponding patterns of gesturing (Kita & Özyürek 2003; Brown & Gullberg 2008; Negueruela, Lantolf, Rehn Jordan, & Gelabert 2004; Stam 2015; Wessel-Tolvig & Paggio 2016).

Other studies have examined the close links between conceptualizations of time and space, and manifestations of these in gesture. An influential study by Núñez and Sweetser (2006) observed how gesturers in the Andean language Aymara construe time in *past-is-front* and *future-is-behind* patterns along with the same construal patterns in speech. Their results showed that the participants who were fluent in Aymara but not in Spanish produced backward gestures for the future and frontward

gestures for the past, suggesting that the time patterns of a language are consistently embodied in the thought process of its speakers. Núñez, Cooperrider, Doan, and Wassmann (2012) reported similar findings in speakers in the Yupno valley of Papua New Guinea, where gestures were found to correspond to the location of the speaker's relative geographic position, e.g. the past was construed as behind the speaker if he or she faced uphill, but construed as in front of the speaker when facing downhill. These encodings changed depending on whether speakers were a) using their right or left hand, and b) whether they were indoors or outdoors. The above research shares the assumption of a weak linguistic relativity in that gestures somehow express particular representations of time and space that are encoded in the language's grammatical structure.

Given the visuo-spatial features of gestures, much research has focused on the underlying imagistic and experiential qualities of thought, perhaps suggestive of the mind as a "region of space" (Harrison 2018: 73). This line of research has examined gestural construal in terms of how interpretations or immanent assumptions are manifest in specific types of gesture, particularly in the sense of discreet gestures construing something *as* something else. Harrison (2018: Ch. 4) identifies how speakers use gestures and space in the construal of *blockage*, *force*, and *distance* to formulate negation expressions, i.e. in expressions that construe a rejection through the vertical hands facing an interlocutor or disaffiliation through the construal of distance. Streeck (2005, 2009b: Ch. 5) likewise examines what he calls *ception*, the gestural practice of construing conceptual content in terms of a tactile experience. Indeed, construal is central to Streeck's (2009b) concept of depiction as well, in that any depiction necessarily makes a selection towards representing the referent. Such a view links closely to Müller's (2016) analysis of depictive gestures in the way they

present rather than *represent* content. Her conception of gestures' schematic-iconic relation underscores the imaginative function of gestures, in that any depiction presents an abstraction of a referent which in the moment of presentation is taken as a whole entity or event.

Integrating CG's rubric of focal adjustments within an analysis of gesture therefore remains a potential area for examining the role of gesture in spoken exposition. To this end, some researchers have begun to take an explicitly CG-rooted interpretation of gestures in spoken language usage events (Cienki 2015; Kok & Cienki 2016; Ladewig 2020). Taking a CG approach to gesture would entail beginning with momentary uses of language as the starting point for how speakers formulate their grammars and conceptualize content (Cienki 2015: 499). As integral and emergent aspects of speaking, gestures potentiate construal relations for conveying meaning in specific ways. For one, the mere act of gesturing during speaking construes that moment as prominent with respect to non-gesturing moments, which can function to buttress figurative language with imagery (Müller 2008; Müller & Tag 2010), or display a move in interaction towards a new topic or new segment of information (Enfield 2009; Schegloff 1984). Depictive gestures, especially, also display visible correspondence with grammatical categories. That is, static gestures construe nominal objects and their descriptions, while motioning gestures construe actions and processes (Kok and Cienki 2016: 76–77). Also, gestures are inherently selective of the ways and means of visualizing content, and therefore rely on their metonymy to construe specificity relations in speech content (Mittelberg & Evola 2014; Mittelberg & Waugh 2014). Gestures can thus display paradigmatic relations in how they broaden, narrow, or generally interpret the visualization of a referent (e.g. holding a virtual cup as opposed to depicting its shape), or in resolving ambiguities or

vagueness in speech (e.g. when pointing to an object to specify it; cf. Kok & Cienki 2016). Also, given their basic temporal interplay with speech and body movement (Mondada 2018), gestures can also construe syntagmatically, for example in how a gesture might refer to something previously said, or meaningfully foreshadow what is to come (Schegloff 1984; Streeck 1994). There consequently remains potential for an exploration of gesture and construal in terms of implicit and explicit forms of intersubjective alignment.

3.5.2   *Intersubjectivity in gesture*

Using a CG framework for gesture invites an analysis of gesture in terms of the construal relations that depictive forms enact in the formulation of projected meaning. From an enactive perspective, depictive forms in gesture display valence relations with the discourse ecology, and are thus transformative of meaning and not merely reflective of it. What the cited research shares is the exploration of the experiential motivations of recurrent gestures or gestures that construe conceptual content, e.g. as visual displays of underlying image schemas or motor routines. However, intersubjective and intercorporeal explorations of construal in gesture continue to be pending (but cf. Meyer, Streeck, & Jordan 2017).

It is not surprising, perhaps, that a potentially fruitful area of research into gesture, construal, and intersubjectivity has been with studies into the construal of perspective. Ishino (2007) in particular notes the intersubjective nature of deictic gestures, by reporting on perspective shifts where addressee location changed the direction where a gesturer pointed. Olsher (2004) also reports on a case where a participant used gesture and gaze in lieu of speech to reference a previous conflict with a peer, but in such a way as to avoid explicitly expressing that conflict, illustrating the anaphoric and meaning-laden nature of embodied actions. In their

analysis of a multiparty discussion of regional locations in China, Harrison et al. (2018) examine how gesture occasions intersubjective re-alignment, and Cuffari and Streeck (2017) examine how gestures in an auto-body shop demonstrate fundamental intercorporeality, i.e. how they manifest shared embodied practices between auto-mechanics and their customers. Indeed, from a phenomenological perspective, as Talero (2012) surmises, all gestures, even metaphorical gestures of abstract content, inherently involve intersubjectivity in that their mere performance in interactional space invites a shared analysis of depicted or deictically referenced concepts (262). As will be illustrated in the empirical chapters of this study (Chapters 5 and 6), intentionality, intersubjectivity, and intercorporeality conspire in shaping construal in depictive formulations for explanation and discussion. Furthermore, the analysis demonstrates the nature of these as distinct but interrelated phenomena, which through gesture bring forth a world for mutual analysis between people in talk.

3.6 Summary

The purpose of the current chapter was an exposition of the philosophical and theoretical underpinnings of this thesis by exploring the phenomenological notions of intentionality, intersubjectivity, and intercorporeality. Such a synopsis entailed developing the concept of intentionality in terms of direct perception and the ecological affordances for communicative actions. It followed from this entailment that cognition must also be viewed enactively, that is, as involving a priori sense-making dispositions inherited by world, body, and social interaction. In turn, as intersubjective beings, people naturally seek to re-align mutual sense-making through language. In viewing language as an embodied phenomenon, it follows that corporeal intentionality entails the sense making capacities of body positions and hand gestures towards such intersubjective alignment. Taking into account the CG framework,

where meaning is equated with conceptualization, ecological and enactive cognitive abilities shape the formulation of utterances through embodied conceptualization. I posit then that through an understanding of the structure of utterances, i.e. construal, we gain insight into the intersubjective motivations of gesture as enactive sense making in the ecology of a speech environment. The next chapter expands into an analytical methodology that bridges an ecological-enactive CG with intersubjectivity in CA, through the broader analytical approach proscribed in microethnography (Streeck & Mehus 2005; Streeck 2013).

Chapter 4 Methodologies

4.1 Research design

This chapter describes the methodology developed for the distinct empirical settings selected for the current study. As the data collection process involved my collaboration in the CAWSE corpus, the chapter addresses how empirical material that was collected for CAWSE was used for this thesis. Since the process of video data collection ran parallel to my research, it was important that the data be dually relevant to both this current thesis and the needs of the corpus. This duality entailed keeping the research data-driven, while also being open to opportunities for data collection. The various challenges to building a multimodal corpus at a university campus meant that iterative processes of conceptualization were involved in all areas of construction—material, ethical, and human (cf. Stevens, Chen, & Harrison 2020). With respect to the research undertaken for this thesis, various guiding methodologies were converged in order to contend with the multiple layers of contextual reality. In turn, this convergence allowed for the operationalization of the analytical steps required to balance a data-driven collection approach with a research focus on depictive gestures in the L2 classroom. Table 4.1 summarizes the procedures taken as analytical stages.

Table 4.1 Stages of research design

Stage	Guiding questions	Procedure	Guiding methodology
1	What kinds of student interactions will include examples of depictive gesturing?	collection & selection of empirical material	- Microethnography/CA - Multimodal Corpus Linguistics - CAWSE project goals
2	Does the empirical material demonstrate sufficient evidence of depictive gesturing?	observation of video data	- Video Analysis - Gesture Studies

3	What is the turn-organizational and interactional ecology of a selected case?
	 - What depictive methods does a student use in their explanation?
	- Is there evidence of gestural transformations within and across discourse events?
	- What can these transformations reveal about construal as a cognitive practice?
		selection & analysis of a single case	- CA
			- CA-SLA/Ecological tracking single case
			    - tracking method 1 (Complex-Systems corpus)
			    - tracking method 2 (Group Discussions corpus)
			- Cognitive Grammar

4	What generalizations can be made with respect to the interactional ecology of depictive gesturing in the corpus?	prototypicality analysis	- CA, CA-SLA - Cognitive Grammar
5	Taking into account the general ecology of interaction for construal, how do specific participants use multimodality/corporeality as a resource for construal?	extended examples	- comparative CA - Cognitive Grammar

I chose peer interactional settings because of my interest in the ways interlocutors build meaning face-to-face. In terms of peers-in-interaction, the "collaborative, multiparty, and symmetrical participation structure" (Blum-Kulka & Snow 2004, cited in Philp, Adams, and Iwashita 2014: 3) of peer-led discussions

aligns with this study's interest in gestural and verbal practices in context, in that they involve multiple "participants working toward a common goal" and with minimal interaction from the teacher (*ibid*.). The settings that are the focus of the empirical analysis involve two distinct activities within the genre of small-group, student-led discussions (O'Connor & Snow 2018). These consist of 1) an elicited explanation task and 2) a rehearsal task for academic oral skills assessment in the form of multiparty group discussions. The core goals in each of these settings are somewhat distinct in each task, but nonetheless the interactants display orientation towards a goal by the verbal and visual resources in the discussion (Seedhouse 2004). With respect to gesture, a reason to focus on interaction settings was because the gestures in these settings are less rehearsed, in contrast to individual presentations or monologues where the speakers have been given prior instruction on gesturing as a public presentation skill (for example by counting with the fingers in the air when points in an argument are given).

The chapter sections roughly follow the stages involved in the research design (cf. Table 4.1). Section 4.1 describes the overarching microethnographic approach taken as the study's guiding methodology, aligning the theoretical and analytical frameworks which underwrite this thesis. The section specifically describes how microethnography can bring into alignment conversational analysis (CA) with the pluralistic methods developed for the empirical study of gesture and cognition. Sections 4.3 and 4.4 pertain to the units of analysis and micro-analytic methods for studying those. This leads into Section 4.5, which describes the CAWSE corpus and the process of discovery in developing the topic of the thesis, along with the approach to collecting the video recordings of the participant students at the research site. Section 4.5 concerns ethical issues related to video recording at the research site and a

discussion on relevant validity and reliability issues pertaining to this thesis. Section 4.6 deals specifically with the ontology and epistemology of gesture, i.e. the description of gesture that is used in this study, and how gesture is understood to be meaningful. Section 4.7 begins with a description of the procedures for transcribing and annotating the video recordings and the data analysis procedures that were employed beginning from observational CA to a single-case analysis, which further specifies the study's research questions and aims. Section 4.8 briefly summarizes the chapter with a view towards the empirical analysis.

4.2 Converging conversation analysis and cognitive grammar via microethnography

In this section I expand into an analytical methodology that bridges an ecological-enactive CG with intersubjectivity in CA. I seek to do this by appealing to the shared origins of each of these approaches in phenomenology, to recover and align their distinct views on intersubjectivity and meaning. While CG identifies meaning as the joint embodied experience of interlocutors in communicative events, CA views meaning in terms of the practical achievement of social actions. However, each of these approaches is underpinned by a usage-based theory of language that presumes the inherently social character of meaning-making practices. How this pans out, as intersubjectivity, is somewhat different for each approach. CG (and more broadly Cognitive Linguistics) understands intersubjectivity as immanent and pervasive in social interaction. CA, while also presuming the pervasiveness of intersubjectivity for language, has tended to make explicit how intersubjective alignment functions as the driving force for social action, thus as an achievement of the organization of turns-at-talk constructed by the participants themselves (Garfinkel 1967; Sacks et al. 1977). I submit that from an ecological-enactive framework the divide between CG's

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epistemic assumptions and CA's inductive methodology can be bridged. With CA's strict inductive principle restraining assumptions about the cognitive processes that underlie and motivate language activity, CG's rubric of construal as focal adjustment can be specified as not only inherent to but also motivated by intersubjectivity. I further suggest in the next chapter that an analysis of gestural construal should consider the nature of gesture as a *cognitive practice,* as understood within the broader framework of microethnography (cf. Streeck & Mehus 2005).

4.2.1   *Microethnography*

At a fundamental level, microethnography is the study of the social, semiotic, and cognitive practices that speakers use in conversation to understand one another (Streeck & Mehus 2005). Microethnography employs exogenous material such as field notes and material artifacts along with video recordings of talk-in-interaction. While the core analytical apparatus developed out of the ethnography of communication and CA, microethnography can be further supported by perspectives on ecological cognition, given a mutual rejection of 'in-the-head' theories of cognitive processes in favor of situated perspectives on meaning making, learning, and action (Streeck & Mehus 2005: 389; cf. Streeck 2013).

Microethnography emerged out of a plurality of approaches in the late 1960s and early 1970s, namely ethnography, context analysis, interaction studies and nonverbal behavior studies (Streeck 1983; Erickson 1992). According to Streeck (1983), researchers converging on education, anthropology and linguistics needed an approach that improved upon "data analysis and sampling in the ethnography of communication by incorporating fine-grained analyses of microbehaviors involved in the enactment of communicative events" (9). These microbehaviors, it was believed, could expose underlying influences on inequality and prejudice in the classroom, and

thus microethnography began with a strong critical agenda (Devos 2016; Streeck & Mehus 2005). As a research approach that focuses narrowly on phenomena that "normally go unnoticed" (Streeck 1983: 13), "microethnographic studies seek to combine the exhibition of organizational processes in face-to-face interaction with the pursuit of applied issues, e.g. inequality, social stratification, and learning, for the most part in educational settings" (*ibid*: 9). By focusing on the pursuit of *learning* in this thesis, I attempt to bring into alignment the analysis of multimodal construal as cognitive *practices* that have impact on learning on a micro-level scale, i.e. learning as demonstrated by change in the short term (Ellis & Barkhuizen 2005; Markee 2000; Melander & Sahlström 2009).

Given this focus on embodied action and behavior for learning in interaction, I chose a microethnographic approach as appropriate for the investigation of the ways depictive gestures enact dimensions of construal. In terms of gesture as a research concept, various embodied practices in heterogeneous modes of meaning making tend to become ambiguously subsumed within the notion of gesture (Kendon 2008). Moreover, gesture is not an isolated or easily abstracted phenomenon, but given that gestures are embedded within talk, gestures "can index, construe or treat as irrelevant, entities in the participants' surround" (Goodwin 2000b: 1489), and is therefore a highly contextual and ecological phenomenon. Hence an appropriate analytical methodology aligns the interactional and cognitive dimensions of embodied communicative action (Bloom et al. 2005: xvi). Furthermore, a microethnographic research design is amenable to the study of cognitive practices (such as gestural construal), as long as their relevance to the participants in interaction is shown to be "actively constructing what they do" (Erickson 1996: 287). This constraint for relevancy—as displayed and oriented to activities—is inherited from the rigorously

empirical requirements of CA, developed in the late 1960s and early 1970s by sociologists attempting to refine methods for the understanding of social order (Heritage 2009: 301).

Following from the phenomenologically informed ethnomethodology of Harold Garfinkel (cf. 1967), CA understands participants in interaction as *themselves* employing methods for the organization of their talk. These methods can be seen as recourse to establishing the common ground of intersubjectivity, taken by ethnomethodologist and CA scholars to mean the pursuit of mutual understanding through talk and the displayed accountability of social conduct (Clift 2016: 64; Garfinkel 1967: 4, 30; Schegloff 1991: 151). Thus, CA was not only developed for researchers to conduct analysis of social conduct through interaction, but also as a method for highlighting people's own analysis of each other's talk. Erickson (1996) specifies CA's contribution to microethnography as having "emphasized the emergent aspects of interaction over institutional ones—the contribution of improvisatory activity of moment-by-moment sense making of participants in extremely informal situations of communication" (286). Erickson makes this point in view of institutional settings specifically, where presumably more formal language has been shown to likewise demonstrate improvisatory practices (cf. Drew 2002; Drew & Heritage 1992). Accordingly, classroom research that combines the contextual observations and participant concerns of ethnography with the microanalysis of video recordings can be used to study these improvisatory practices in the learning process.

In specifying the emergent plus improvisatory nature of human activity, microethnography aligns with a dynamic ecological perspective by concentrating on the various practices that participants craft in making the talked about world mutually comprehensible. Thus human social practices are viewed as constituting the landscape

of meaning making, creating the "immediate ecology of relations between participants in a situation" (Erickson 1996: 284). As Garcez (2015) explains,

> Based on the view that social interaction occurs within constraints of what participants agree is the situation they are in, microethnographies demonstrate empirically the subtle ways in which participants (re-)arrange their alignments toward one another and (re-) frame their communicative actions accordingly. (3)

Microethnography has been used to study various practices within their local contexts. Streeck's body of research has employed microethnography in various settings, such as the study of the social order of peer interaction (1983), the question of gesturing as communication (1993, 1994), the ecological and material contexts out of which gesturing emerges (2009b, 2010; LeBaron & Streeck 2000), and the practices of gestures as cognitive devices for understanding concepts (1995, 2005). In a particularly novel analysis, Streeck (2017) used video recordings at an auto-body shop to closely examine meaning-making through gesture, gaze, posture, and talk as the participants navigate the world of the shop.

Other microethnographic studies have largely focused on the classroom and the power dynamics at play in student-student and teacher-student interactions. In one of the earliest microethnographic studies, Smith & Geoffrey (1968) used video recordings of a middle-class teacher and his urban school pupils as a basis for reconceptualizing the cognitive processes involved in conducting teaching. Erickson (1976) likewise analyzed gatekeeper interactions in job counseling sessions to understand how a non-visible notion such as school failure can be made displayable in talk. More recently, Bloome, Carter, Christian et al. (2005) took a holistic approach in examining the daily life of teachers and students at one school in order to understand the construction of their identities within specific communicative events such as classroom reading tasks.

The shared approach in all of these studies is the empirically grounded orientation to participant practices in talk as situated within a richly resourceful material environment, hence they are heavily sensitive to the ecologies out of which communicative and cognitive phenomena emerge. While this thesis focuses on the minute details of utterance construction for the purposes of discovering micro-behaviors in learning practices, I hope that future research can extend itself to the more critical social issues to which these holistic approaches aspire (cf. Garcez 2015). For this thesis, microethnography uses CA as the method for discovering participant orientation to what I refer to as cognitive practices in gesture. How this is done procedurally is described in section 4.5, but it entails CA's distinctive empirical methodology as described in 4.2.2 below.

4.2.2   *Conversation analysis*

Chapter 3 examined the possibility of bringing an ecological-enactive perspective on cognition into alignment with Cognitive Grammar, particularly with the notion of construal as the imposition of perspective onto utterance formulation. However, the question of how to analyze such a phenomenon through empirical means remains unspecified. Therefore, this section will be devoted to exploring what a CA methodology can bring to the analysis of multimodal and corporeal construal as an emergent, improvisatory cognitive practice, and how it is made displayable through the interactive goals of the participants.

CA is used in this thesis as an analytical apparatus for discovering interactive cognitive phenomena and for the empirical verification of these as communicative practices. Given that certain exogenous contextual factors bring to bear onto the video recordings retrieved from the classroom settings, the analysis of the interactions are on the order of an applied CA approach (Antaki 2011; Lester & O'Reilly 2019) as it

relates to the study of second language learning environments (cf. Markee 2000; Richards, Ross & Seedhouse 2012; Seedhouse 2004). While a tension exists between CA as a purely data-driven approach focused on everyday language, and possible institutional constraints with potential contextual factors (Lester & O'Reilly 2019: 19), using CA in this manner can yield fruitful results when the particular constraints of its method are taken into account. Another way that this current study demonstrates an applied approach is in what Antaki (2013) calls *foundational* applied CA, where CA is brought into a particular field of study for the purposes of redefining theoretical constructs or clarifying problematic issues (3).

CA is motivated by making apparent through its analysis the pursuit of intersubjective alignment that drives how interlocutors build their utterances into the social actions they wish to create, and not in how categories and contexts of social actions act as a priori impositions of discourse (Heritage 1984b: Ch. 8; Schegloff 2007). The context of social action is viewed as an *achievement* of the sequentiality, progressivity, and interruptive mechanisms of talk which reveal conversants' own analysis of the matters at hand (Goodwin & Duranti 1992; Garfinkel 1988; Peräkylä 2016). As Schegloff (2007) points out, regardless of the setting of the interaction, the CA analyst must resist the misconception that "the work of analysis is done when a bit of data is recognized as belonging to some category, and the category term is applied to the data fragment", an activity more apt for a taxonomy than a comprehensive explanation of conversation (252). On the contrary, the research must consider the two-fold nature of the term *analysis* in conversation analysis, that is, in that it not only refers to a method for social scientists to understand action formation through talk, but also, and firstly, to inspect how participants themselves analyze what

they are doing to the purposes of their own making[2]. Given that for CA conversational actions become meaningful within the interactive goals of the participants, naturalistic data is essential in order to understand the empirical realities that motivate and guide people's behavior (Mondada 2013). It is also crucial that the analyst foster a "conversation analytic mentality" (Hutchby & Wooffitt 2008, paraphrasing Schenkein 1978), i.e. an interpretive disposition towards the objects of analysis, "a way of seeing, [rather] than a static and prescriptive set of instructions which analysts bring to bear on the data" (88–89). Nonetheless, such a way of seeing can be parsed into systematic steps passed down from the literature. The remainder of this section will be devoted to describing CA's fundamental focus on the sequentiality and progressivity of talk that drive intersubjective alignment, and the practices of realignment when progressivity is perceived as halted.

4.2.2.1   Turn-taking, sequencing, and progressivity

Generally speaking, the analyst should endeavor to discover the social actions that are accomplished and conducted through sequences of talk (Clift 2016). This entails first transcribing and examining stretches of naturally recorded data to highlight the turn-taking environment of the selection, i.e. the actual sequence of talk-in-interaction in which linguistic activity builds conversational actions (Hutchby & Wooffitt 2008: 72; Schegloff 2007: xiii, 255). CA's primary unit of analysis is therefore the *turn-at-talk*, series of which compose the very structure of talk (Lerner 1996: 238). As Schegloff (2007) explains, the turn-at-talk is the essence of conversational progressivity:

> It is the organization of the practices of turn-taking that is the resource relied upon by
>
> parties in talk-in-interaction to *achieve* these outcomes routinely: they talk singly—

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[2] Hence one can make the distinction between *conversational analysis* as referring to people inspecting their own talk, and *Conversation Analysis* as the research method and paradigmatic field of inquiry (cf. Garfinkel 1988).

that is, one at a time; and each participant's talk is *inspectable*, and is *inspected*, by

co-participants to see how it stands to the one that preceded, what sort of response it

has accorded the preceding turn. (1, emphasis added)

To this end, observation of conversational actions should identify, through

transcription, features of the turns such as where turns begin and end and their

composition in terms of overlapping talk, silences or pauses, audible breathing,

laughter, along with the vocal features of relevance: stress, enunciation, intonation,

and pitch (Hutchby & Wooffitt 2008: 72). The transcription shouls also include gaze

direction, facial expressions, body movements and postures, and corporeal gestures

(Goodwin 2000b; Selting 2013).

A reiterative process, however, is part of the CA analysis (ten Have 2007). The

analysis should reevaluate transcriptions for patterns of phenomena that can be

described in terms of their sequential occurrence. The analyst makes observations

regarding the organization of interactive sequences, making note of minimal

sequences of address and response called *adjacency pairs* (Schegloff 1968), as well as

sequences that build up to these, or *pre-sequences* (Schegloff 1980). Adjacency pairs

are classic illustrations of the interactional ecology of talk in that utterances are only

conditionally relevant on their uptake by a recipient. That is, "given the initial

condition of a first pair part being uttered, the second part of that pair is then relevant"

(Hutchby & Wooffitt 2008: 45). For instance, a greeting can only occur if it includes

both parties to the interaction; it is *completed* not by the initiator but by the recipient

who treats it as so. The conditional relevance in turn-taking therefore implies

particular organizations of turns that are preferred. Preference organization refers to

the ways that the participants treat each other's utterances as either aligning with one

another's understanding of the *preferred* response, or changing the trajectory of the

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interaction because of an unwanted, unexpected, or *dispreferred* response (cf. Pomerantz 1984). Preference organization is relevant to the construction and accomplishment of the intentionality of utterances, whether in their goal-orientation or meaning-orientation[3]. The analysis, then, can either begin from the smallest observed unit of turn-taking or from larger ones that appear evident in the stretch of data or transcript (Schegloff 2007: 255).

4.2.2.2   Turn and utterance design

An analysis rooted in CA views the outcomes of interaction as achievements, co-constructed by interactants through their mutual orientation to the business at hand. Fundamental to this notion is that intersubjectivity drives talk in "trajectories of action" (Clift 2016: 64), or *sequences*, and these need to be understood as what their speakers construct them to be, hence their susceptibility to being inspected by the addressees or recipients of talk. Turns, then, bear the mark of their utterance and recipient design. As Drew (2013) explains, "turn design refers to how a speaker constructs a turn-at-talk—what is selected or what goes into 'building' a turn to do the action it is designed to do, in such a way as to be understood as doing that action" (132). Thus, another way of understanding utterance formulation is in terms of the features of design that form a speaker's enactment towards their communicative goals.

These features of turn-taking make talk a highly intersubjective activity. The sequential and progressive nature of turns-at-talk is how "the participants display their understandings of the state of talk for one another" (Heritage & Atkinson 1984: 11). If we take these sequences to be comprising the corporeal and material resources that participants use to bring the talked-about world into view, we can begin to observe

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[3] By goal-orientation and meaning-orientation I refer to the phenomenology of intentionality that was explored in Chapter 3, and the implications for the direct perception of affordances (cf. Scarantino 2005)

how utterances as formulations enact the pursuit of intersubjective alignment. To this end, as Schegloff (2007) emphasizes, analysis, rather than merely describing the resources of talk in interaction, elucidates how "[communicative resources] are filled out by the particulars that constituted that achieved event and relate it to what has come before and what interpretive shadow is cast on what follow" (252). This notion of the before and after of specific utterance features is motivated by a phenomenological understanding of the speaker-addressee ecology. Enfield (2009) calls this the *enchronic* progression of conversational time, following from phenomenologist Alfred Schutz's notion of interactive progressivity (9). In enchronic progression, each utterance bears the mark of intentional intersubjectivity in having a previous utterance as motivation for its formulation: a *because* motive which simultaneously projects into a forward relation, its *in-order-to* motive (*ibid*.).

Thus, a related feature of the progressivity of talk is *projection*, a viewable element which anticipates some completion or transition within the unfolding utterance (Sacks et al. 1974: 707). Speakers can project in a variety of ways, often in overlapping and interruptive talk, and quite frequently corporeally in gesture and even gaze direction (Auer 2005; Sacks et al. 1974; Schegloff 1984; Streeck & Jordan 2009; Stukenbrock 2018). What matters is that some kind of element appears relevant and analyzable by interlocutors as having bearing on the future trajectory of the talk. Schegloff (1984) defines projection as encompassing:

> how and when earlier parts of turns, turn-constructional units like sentences, sequences, whole conversations, and the like adumbrate, foreshadow, or project aspects of possible later productions […] For turn-constructional units in particular, the notion of a 'projection space' is concerned with both the span in which some element of talk is 'in play' before being produced, and with the evidence of that which a speaker's turn may make available to its recipient. (267)

Gestures exhibit high degrees of projection in that their trajectories of configuration often occur before a corresponding word or phrase, thus anticipating possible meanings sequentially verbalized (cf. Schegloff 1984). Gestures can likewise be held during speaking to anticipate or maintain the saliency of an utterance's pragmatic function (Cibulka 2015; Ferré 2010; Harrison 2010; Mondada 2006, 2007). Given the difficulty in robustly interpreting gesture forms as exhibiting depicted meaning without the verbal aspect, since Schegloff's (1984) initial account little research has been conducted about the ability of the hands to project imagery (but see Streeck 1995; ter Bekke, Drijvers, & Holler 2020 PREPRINT). Thus an important analysis in this thesis will be to show how in formulations of gestural sequences participants find ways to anticipate problematic interpretations of their explanations and thus project salient imagery as their talk unfolds, in which a salient practice is that of *repair*.

4.2.2.3   Repair

Repair is another important focus in CA that will be crucial to understanding gestural practices in this thesis. A natural feature of talk is the interruption of its progress when some kind of trouble occurs within the talk's unfolding. The conversational actions participants take to remedy trouble is called *repair* (Schegloff, Jefferson, & Sacks 1977). Repair has three main features in its sequence. There is first the source of the trouble, the repairable, which is often a linguistic element that is produced by a current turn's speaker halting the progress of talk. Secondly, there is the identification of the repairable by a participant, and thirdly there is the solution. Repair is interesting for cognitive and interaction researchers alike because it can provide an interface between cognition and interaction (Albert & de Ruiter 2018; Bailey 2004), revealing a great deal about participant inferences and assumptions about a) what counts as trouble, i.e. what needs to be repaired, and b) how to repair it. Such inferences further

reveal what utterances were intended to say and project into further sequences, especially in that, as Schegloff et al. (1977) note, "nothing is, in principle, excluded from the class 'repairable'" (363). Likewise, as repairs invoke speaker analyses of communication and miscommunication, they are a special site for the study of intersubjectivity (Schegloff 1992).

For second language researchers, repair is closely associated with the ubiquity of miscommunication or communication breakdowns (Seedhouse 2004), and how learners attend to trouble reveals what they consider to be challenging aspects in their language development. Examples of trouble might include mis-articulation or incorrect word usage, a missing word or term that invites a word search, hearing trouble, or simply a failure to understand (Schegloff 1987). It follows, then, that repair is often understood in terms of communicative strategies that are employed by speakers as resources to remedy breakdowns in the contiguity of talk.

Repair may be typologized into four possible turn-taking sequences. Speakers can initiate repair (self-repair) and either continue to remedy the trouble or allow another interlocutor to do the repair. Conversely, the addressee may initiate repair (other-repair) and likewise continue with the repair or have that repair taken up by the speaker. Self-initiated self-repair occurs when the speaker is the source, identifier, and the solution of the trouble. In self-initiated other-repair, the speaker is the source and identifier of the repairable, but the addressee provides the solution. In other-initiated repairs, the recipient either identifies or reacts in some way that the speaker interprets as troublesome, from which either the speaker or the addressee may provide the solution. Solutions can come in the form of cutting off the current utterance and restarting, immediately correcting a noticed mistake, or reformulating a previous utterance (Jefferson 1974). Reformulations will often attend to the repairable by

simply omitting it, replacing it, transforming it or its organization in some way, or through parenthetical utterances (Kitzinger 2013).

Relatively few studies have explored repair in gesture, except when it is employed as a resource to repair verbal trouble (Burch 2014; Goodwin & Goodwin 1986; Gullberg 1998, 2011; Seyfeddinipur 2006; Streeck 1993). In such cases, for example a missing word, communication breakdowns occur that appear to halt the progressivity of talk. A gesture can be used as either a solution (for instance to 'replace' the missing word with a hand shape in place of the missing entity (Gullberg 2011) or as a stopgap to display an ongoing trouble-solving effort such as a word search (Goodwin & Goodwin 1986; Streeck 1993). The study of gestures repairing gestures is less frequent. Harrison et al. (2018) analyzed one case of gestural repair during a multiparty conversation between several Chinese students and their North American classmate at a coffee shop. In the conversation, one of the Chinese speakers was attempting to locate a particular city by using the surface of the table as a map, to which she pointed in order to locate various cities and regions in relation to each other. When her classmate continued to display confusion, one of the other interlocutors intervened by virtually, i.e. gesturally, turning the map in orientation to the classmate. Thus the egocentricity of the original speaker's depiction was repaired by a depiction of virtual handling of the imaginary map, in which case the repair involved a certain transformation of the design of the map.

Intersubjectivity, perhaps to a greater degree than adjacency and turn design, is demonstrably immanent in repair, because repair practices make visible the inferences and assumptions of what counts as communication between interlocutors. As Schegloff (1992) highlights, supposed breakdowns in communication are not a result

in problems of intersubjective alignment, but are recognizable because of the recognizable intersubjectivity of social actions.

A related aspect to repair is repetition, which has important implications for the saliency of functions in gesture (Goodwin 2018; Streeck 2009a), for it also makes visible to a certain extent the accountability of the previous iteration. How repetitions and transformations in them account for utterance design will be explored in section 4.3.

4.2.3   *Conversation, gesture, and cognition*

For the study of gesture and other embodied actions, a CA methodology is not so clear-cut, given that often times gestures are not attended to by the participants except as a feature of the initiating utterance (cf. Rasmussen 2014; Schegloff 2007: 11). Nonetheless, given CA's holistic approach to examining all of the resources participants put in play for building conversational actions, a wide set of CA research has been devoted to studying gestures as they emerge in interaction (Mondada 2006, 2007, 2013, 2014; Schegloff 1984; Streeck 1993, 1994; *inter alia*). Within an analysis itself, steps can be taken in attempting to understand how gestures are meaningful for the participants in talk-in-interaction. The analytical approach taken in this thesis describes how the participants orient their gestures in accomplishing the instructional goals of their given tasks, keeping in mind how they themselves perceive the meaning of their gestures to be. Following from his enchronic approach, Enfield (2013) suggests a four-fold source of gesture meaning. One can look to i) the speech that co-occurs with hand movements, ii) a stimulus prior to the utterance where the gesture occurs, iii) the following response to the utterance, either by an addressee or the same speaker, and/or iv) the formal characteristics of the gesture itself. This last point coincides with the notion of formulation, explored in Sections 4.3 and 4.7. In brief, I

propose that a formal analysis of gestures as formulations of depictions gives access to the corporeal inferences made by participants about what counts as a depiction in their explanations, the intersubjectivity of which is made explicit by subsequent reformulations.

Additionally, how a CA approach can be used for gestural construal as a cognitive practice remains to be ratified. Already, however, various cognitive linguists have begun to advocate for a conciliation between CL (specifically CG) and CA (e.g. Etelämäki & Visapää 2014; Fischer 2015; Zima & Brône 2015). As Etelämäki (2016) points out, "both of these lines of linguistic research have their roots in phenomenology, whose primary focus is on the structures of conscious experience", noting that, "They draw, however, from differing lines of phenomenological studies" (102). Furthermore, cognitive linguistic investigations into intersubjectivity in language have become progressively reliant on natural empirical data (e.g. Etelämäki & Vispää 2014; Rybarczyk 2015).

From the perspective of some scholars in CA, the analysis of certain aspects of cognition has been gaining ground in the last decade or so, mostly through a respecification of cognitive processes as practices (e.g. Deppermann 2012; Eskildsen 2011; Kasper 2009). Prior to this, Discursive Psychology (DP) emerged out of CA and initiated a debate as to whether cognitive processes can be empirically verified at all (Molder & Potter 2005; cf. Antaki 2006; Schegloff 2009). A full account of DP would be beyond the scope of this thesis, but to summarize its analytical approach to cognitive processes, DP aims at the analysis of psychological states by examining phrases such as *I think, I feel, In my opinion*, and others like these (Molder & Potter 2005). In this thesis, however, by looking at gestures, there is no pretense to explicit psychological terms in depictive utterances (unless sequentially organized in the

exposition.) More recently, some researchers in CA have begun to examine cognitive processes as displayable (e.g. Deppermann 2012; Goodwin 2000a, b, 2003, 2018; Streeck 1995, 2009b, 2018). Goodwin's work in particular has inspired a breadth of research on the interactivity of semiotic resources within an ecological cognitive framework (e.g. Harrison & Williams 2017; Jensen & Pedersen 2016; Pedersen 2015), by invoking natural affordances that solicit interaction. Jensen and Pedersen (2016), for instance, draw on Goodwin's (2000a) notion of communication as whole-bodied activity in how emotional responses are achieved between medical practitioners and their patients.

4.3   Units of analysis: construal in formulations

By casting utterances as formulations of construal, an analysis can gain insight into the relationship between the structure and function of the elements of formulation. Conversely, identifying construal in its dynamically contextual shaping of formulation provides insight into the basic intersubjectivity that construal relies on to be meaningful. This section therefore explains how formulation and reformulation are operationalized in this thesis.

4.3.1   Formulation and reformulation in talk

Broadly, a formulation is the product of the communicative impulse which, somehow, processes information for conveyance in interaction (Kendon 2004). In the flow of spoken communication, gesture and speech are "an integral part of what a speaker does in fashioning an object, the utterance, that is shaped to meet the expressive and communicative aims and requirements of a given interactional moment" (Kendon 2004: 111). In descriptions and explanations in particular, formulations are the ways that speakers orient to a topic-at-hand through "a relationship of aboutness"

(Deppermann 2011: 118), with a variety of choices, pragmatic concerns, relevancies, and inferences (*ibid*.). Speaker choice in formulation aligns with the view that gestures are derived from manipulatory experience (Streeck 2002, 2009b), in that there is an element of craft and selection in utterance construction. Formulations are contingent upon the interactive context to the degree that they maintain the flow of discourse, and are necessarily recipient designed (Enfield 2011; Kendon 2004). In other words, they offer a way of "seeing things" (Deppermann 2011: 118) and can therefore be related to Langacker's (2008, 2015) notion of how imagination functions for construal.

It follows that *reformulation* refers to the ways that formulations are repeated, redesigned, and possibly transformed (Goodwin 2018; Heritage & Watson 1979; Schegloff 1972). From a linguistic standpoint, reformulation refers to a reiteration of a previous formulation, and the various changes and repetitions that occur within that reiteration. This can be seen, for instance, when a speaker repeats their explanations several times (cf. Crowder 1996; Fischer 2003; Kupetz 2011). From a conceptual perspective, reformulation refers to the way that a speaker attends to a bit of previously uttered talk by clarifying, specifying, or elaborating on it (Gülich 2003). The conceptual dimension lies in the separation between a topic of talk and a subsequent explanation, description, or general elaboration of that topic. Hauser (2011) submits a similar notion in viewing same-speaker elaborations as displaying awareness of possible aspects of a category, which occurs in episodes of ad hoc categorization. While categories possibly invoke different types of knowledge (e.g. cultural, standardized), participants in talk make these categories identifiable to each other in how they formulate their utterances. In his analysis of how speakers guide their recipients to identify a particular person, Hauser (2011) argues that

"generalization can be understood as an inherently sequential practice of categorization through which, as part of the reflexive relationship between the generalized-from and the generalized-to, relevant aspects of a person or people can be specified" (185). Schegloff (1972) takes a similar approach in conceiving of formulation as "the places in a conversation where objects or activities are identified; there are multiple possibilities for formulating such places, and therefore involves speaker choice" (80). The crux of formulation for Schegloff is therefore speaker selection and how speakers construct an utterance in order for it to be comprehended as referring to something. Similarly to Gülich's (2003) notion of reformulation, Schegloff's definition rings of the conceptual linkages that are involved in the ways that speakers elaborate on their referents, i.e. how a referencing formulation stands in place of the referent itself. What each of these views share is that through formulation design speakers can make observable, and thus analyzable, their own analyses of what they are talking about by "talking these into being" (Heritage 1984a: 237). Therefore, a related notion to reformulation, and one that is particularly salient in gesture, is repetition.

4.3.2 Repetition in gesture and talk

In gesture studies, repetition refers to the usage of a particular hand form more than once in discourse, often associated with discourse cohesion (Bressem 2014, 2021). Bressem (2014) distinguishes between *iteration* and *reduplication* in gesture, where iteration refers to when formal components of a repeated gesture such as hand shape, movement and position do not change (1642). Reduplicated gestures, on the other hand, are those that repeat in a new position, change direction of movement, or both (*ibid*.). These types of repetitions involve movements that occur in sequence, such as when a speaker slams a fist repeatedly in the air (iteration) or when someone depicts

how something moved side-to-side (reduplication). Gestures can also be reiterated in later points in discourse, and thus display cohesive imagery, what McNeill (2000) calls *catchments*. According to McNeill (2000), catchments provide discourse cohesion by establishing and maintaining topical continuity throughout a single speech event. In McNeill (2005), he gives the example of a participant describing the location of rooms in a house, who repeats forms depicting the rooms to refer to them as she describes the house. Through the combination of speech and gesture she establishes entities in the description, for instance by placing her right hand over her knee while uttering downstairs room, and placing her left hand, extended up above while uttering upstairs room. The speaker is then able to refer to these entities through gesture as she explains how the staircase spirals up from one room to the other (McNeill 2005: 165–170). In a formal sense this thesis is concerned with reduplication, but for uniformity in terminology I refer to the repetition of a verbo-gestural sequence as reformulation, in the sense that an array of aspects of a multimodal utterance or sequence is retained. I avoid the term catchment due to the psycholinguistic underpinning that McNeill ascribes to this concept, but reviewing how catchments are applied for semiotic analysis has been useful. In the L2 context for instance, Smotrova (2014) studied catchments to analyze recurrent forms in teacher instructions, which were then observed to be mimicked in the students, thus interpreted as demonstrating understanding and learning (or in some cases revealed misunderstandings that could be directly addressed.)

In multimodal reference and reformulation, repetition can often mean that elements of a description are rearranged and thus rarely reiterative in an exact manner (Hoetjes, Krahmer, & Swerts 2015: 161). For instance, Tabensky (2001) found that gestures and utterance content could be decomposed and recombined, or used at

different points in a conversation in rephrasings by an interlocutor (cf. also Nemirovsky & Ferrara 2012). In sequences, depictive gestures involve the use of a variety of gesture forms, methods, and techniques in combination to realize their intended visualizations (Müller 1998, 2014; Streeck 2009b). When the same speaker repeats gestures in a new context their semantic cores can also form the basis of new analogies (cf. Stevens & Harrison 2019).

Goodwin (2018) conceives of refashioned repetitions as reuse, or "transformative repetition", (24) which involves the incorporation of previous communicative elements into a new utterance. "Repetition creates iconic ties across utterances: visible reuse of the same or closely similar elements, which are now seen to occur in multiple utterances by the same and different speakers" (*ibid*.). Through reuse, interactants organize and build their actions in talk. It entails taking resources, continually in flux of social and material change through time, and transforming them as they are brought again into interaction, and therefore the transverse of reuse is decomposition—the separation or partitioning of an utterance in order to accommodate or incorporate a transformation. For example, in describing how an aphasic man communicates with his caretaker, Goodwin (2018) draws attention to the ways that reuse and decomposition are used for the transformation of meaning: "the words used to construct a clause, and then *rearranging* and adding to those parts to create a new utterance that is simultaneously different from what [the caretaker] initially said, but *inherited* from it" (13).

4.3.3 Construal and formulation

By observing transformations of previous formulations, one can gain access to possible alternative construals. The paradigmatic plane of construal can be observed in alternate formulations that are repeated and reiterated at different points in time.

Syntagmatic relations are revealed in elaborations of the topic-at-hand, and in utterance design in sequence. Reformulation therefore subsumes several descriptive practices that become refracted in the prism of intersubjectivity, into what I call formulation design in transformed repetition. As explained above, formulation is the designed utterance which purports to index a reference. This is done through what Gülich (2003) calls treatment procedures, which construes a referential relation between a topic-at-hand and its specification through illustration. Using Gülich's (2003) analysis, reformulations as elaborations of referents can be observed in practices of illustration and exemplification. In her corpus of explanations, for instance, she observed how speakers metaphorize, exemplify, concretize, or invoke scenarios for the purposes of illustrating a topic-at-hand. Figure 4.1 visualizes the notion of formulation as intersubjectively shaped by the speaker's assumptions and analysis of the referent in the form of treatment procedures (following Gülich 2003) and by recipient design.
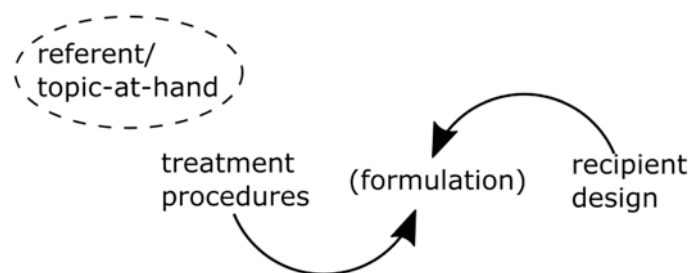
Figure 4.1 Formulation of reference

Formulations are the product of speaker construal in the design of the linguistic/gestural utterance with correspondence towards a co-participant to talk.

When formulations by speakers are attended to by other speakers, further practices of reformulation can be involved, such reuse or repair. Figure 4.2 visualizes this process as progressivity in formulation, interactivity, and response. A possibly imagined

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referent or topic-at-hand becomes formulated through treatment procedures and transformed by the occasioning of interactive actions. Thus the progressivity of formulation is a dynamic process which, through the interactivity of participant talk, refracts into possible responses intervening in the design of the previous formulation, observably into repair of trouble, transformed formulation or reformulation, or repetition.
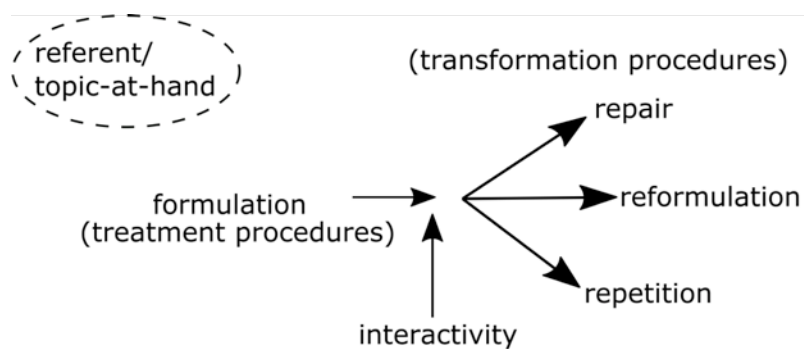
Figure 4.2 Process of reformulation

The process of spoken illustration involves formulation as shown in Fig. 4.1, with intervening interactions occasioning possible responses. When considering both paradigmatic and syntagmatic construal, these responses refer to both the previously iterated formulation, and the topic-at-hand, thus doing double duty in construal.

I take three approaches through which the analysis attempts to account for alternative construals in sequences of depiction. The first includes same-speaker repetitions and repair during single episodes of exposition, which calls for what can be called a *microgenetic* analysis of incremental change. I also analyze same-speaker reiterations *microlongitudinally*, i.e. in expositions given to new speakers and in later turns. Finally, reformulations of the topic-at-hand are analyzed in same-speaker as well as collaborative elaborations, as observed in adjacent turns at talk. These distinct variations on reformulation demonstrate the different possible ecologies of construal that occur in the tasks studied for this thesis.

4.4　Micro-analytic methods of conversational ecology

Taking CA's empirical validity into an ecological analysis of language means being able to follow phenomena through trajectories of the discourse landscape that unfolds through the sequences of talk-in-interaction. By *discourse landscape* I mean tracking affordances and participatory sense-making into reformulated utterances, and the ways of conceptualizing and observing learning through change and the empirical veracity of doing this type of analysis. I therefore take the view that the reflexivity of utterance design (i.e. formulation) sets up affordances and constraints to which participants are accountable in the interaction and subsequent utterances. The methods developed in this study are designed to investigate how the reuse of elements from a previous utterance not only demonstrate cohesion across utterances and across interlocutors, but also how these initiate transformations in the talk which further initiate variable participation frameworks in the interaction. Two distinct tasks are examined, the Complex-Systems (C-S) corpus, which uses a referential communication task (cf. Krauss & Weinheimer 1966), and the Group Discussions (GD) corpus, which involves long episodes of 9- or 12-minute multi-party peer group discussions (these corpora are explained in more detail in Section 4.5 below.) The precise methods involved in the analysis of each corpus will be exposited in their respective empirical chapters. However, each of these share certain basic approaches to reformulation. For instance, the C-S corpus lends itself to both microlongitudinal and microgenetic analyses, while the GD corpus lends itself to microgenetic analysis. This section explains these micro-analytic methods more explicitly.

To study changes in sequences of exposition, I applied a microlongitudinal analysis (MLA) following Greer (2016). MLA was adapted from Markee's (2008, 2011) learning behavior tracking method developed to account for longitudinal

second language learning from an emic perspective (Markee 2008: 405; cf. Lee & Hellermann 2014; Markee & Kasper 2004). The prospect of developing a longitudinal methodology in CA for studying learning has been highly desirable but also problematic (Markee & Seo 2009; Schegloff 2009). Markee's (2011) method entails identifying a 'learning object', i.e. a word, phrase, syntactic structure, or practice, and "documenting every time [it] occurs in different speech events" (2011: 605). A longitudinal study in CA must therefore consider how changes in formulations reflect changes in participants' own inferences, reasonings, and stances towards each other's interactive talk (Lee & Hellermann 2014: 764–765; Kunitz & Skogmyr Marian 2017: 510), thus embracing CA's notion of learning in terms of socially distributed cognition (Seedhouse & Walsh 2010). Taking a longitudinal approach also entails that a degree of reflexivity is involved in stably identifying the replication of phenomena, given the potential for reiterations to be recontextualized and thus ephemerally linked to a previous iteration when used in new environments (Schegloff 2009).

So far, MLA inspired and proto-MLA methodologies have been used to study mainly verbalized aspects of learning in the classroom, for instance in the learning of lexical items and their variations (Firth & Wagner 2007; Markee 2000, 2008; Markee & Seo 2009). Markee's (2000) early study on the sequential order of spoken definitions of L2 learners demonstrated the importance of tracking the repair work involved in participants learning new vocabulary. Over the course of a classroom lesson, a student progresses from not knowing the word *coral* to elaborating on its meaning and defining it for others, through various interactions with both teacher and peers. As Markee (2000) illustrates, each usage event of the word involves a sequence of an array of strategies implemented by all of the co-participants in reaching mutual understanding of the new word, its meaning, and usage in immediate contexts (107–

113). Markee (2008) later refined the method for longitudinal analysis of learning objects over longer periods of time, specifically to track an L2 participant's usage (and avoidance) of the word *prerequisite* over the course of a semester-long intensive English language module. Other studies that resemble this approach have examined the ways speakers reformulate in order address salient aspects of a identifying category (Hauser 2011), to test recipient response (Hopper 2005), and for changes in communication strategies in L2 interaction (Burch 2014). Within the sociocultural approach, microgenetic analysis from a Vygotskian perspective has been employed to study changes in the learning of vocabulary (Gánem Gutiérrez 2008; Rosborough 2012), and play in children's language (Cekaite 2018).

Recently, longitudinal studies in CA have been used to track various learning objects, including the learning of vocabulary or lexical items (Hellermann 2008; Kunitz & Skogmyr Marian 2017), classroom interactional competence (Lee & Hellermann 2014), as well as organizational competence and strategies for orienting into specific types of sequences by a pharmacy student (Nguyen 2011, 2018), and even behavior in a student's desire to avoid using a troublesome word (Markee 2011). Greer (2016) makes the distinction into longitudinal and micro-longitudinal analyses in terms of the time-span during which a learning object is tracked. He remarks that, "what constitutes a longitudinal approach in CA may take place across minutes rather than years, so long as the focal participant is involved in comparable episodes of interaction" (80). For a micro-longitudinal analysis in the context of the classroom, participant behavior is tracked across several iterations of a task. To be able to observe these changes, the analyst must account for the transformations that an item undergoes, and thus there is a relationship between how utterances are formulated, and how they become transformed in a *re*-formulation. Furthermore, the tracking

analysis demonstrates how speakers are intersubjectively accountable to their addressees in the design of their turn at reformulation.

Thus a distinction between microgenetic and micro-longitudinal analysis can be operationalized in the following way: in this thesis, microgenesis refers to the incremental changes of learning phenomena within each trial or iteration of a task, such as lexical or grammatical changes or adjustments in gestures made during one speech event. Comparing these phenomena in a micro-longitudinal analysis means analyzing their re-emergence in subsequent trials, within which microgenetic contingencies will also be brought to bear on learning phenomena. By comparison, a longitudinal analysis would consider the same learning phenomenon over longer periods of time, in new settings and contexts. Table 4.2 compares the different possible scales of analysis.

Table 4.2 Scales of analysis in tracking formulations

Type of analysis	Time span / increments
Microgenetic	over a speech event or conversation / seconds, minutes
Micro-longitudinal	over several trials / minutes, hours
Longitudinal	across different settings / days, weeks, years

Research on microgenetic and longitudinal reformulations of gesture have been rare, although recent studies by Eskildsen and Wagner (2013, 2015) have examined gesture-speech couplings in the learning of vocabulary items. In these studies, the use of a particular gesture was tracked as it co-occurred with a new vocabulary item, thus providing support, for the analyst, of the learner attending to the same learning object across distinct classroom lessons. Tabensky (2001) likewise examined what she

termed *rephrasings* of target language coupled to gesture, and taken up by interlocutors in mimetic fashion, and Pine, Lufkin, Kirk, and Messer's (2007) study on semantic temporal asynchrony has shed light on the micro-dynamic timing of gesture and speech. Taking a more integrated multimodal approach, Melander's research (2009, 2012; Melander & Sahlström 2009) has examined learning in terms of incremental change in various settings, including children's classroom and aircraft pilot training. Such an integrated approach has also been favored by Deppermann (2018), who takes a holistic approach to longitudinally tracked phenomena within instructional contexts.

Deviant or atypical interactions can also provide insight into how people conceptualize meaning in utterance formulation, for instance when human interactants are confronted with non-human entities. Several studies have explored reiterations in human-robot interaction (Fischer 2003) and human-computer interaction (Hutchby 2001) to evidence speaker inferences on what counts for conversational norms. In Fischer's (2003) study, human participants were tasked with directing a robot to move by typing instructions, but were often met with error messages, given the strict command prompts of the robots to which the humans were not privy. The reformulated instructions demonstrated a tendency towards simplification, along with instruction-relevant changes in directions, e.g. *turn to the left* would be simplified to *left* (Fischer 2003: 50). Thus reformulations accounted for the participants' folk theories and assumptions about their robot recipients, specifically for what counts as comprehensible input for the robot (Fischer 2003: 51). Hutchby (2001) examined human interaction with computers and likewise reported various tendencies in how human interactants conceptualized understanding for their recipients, who were artificially intelligent flight-information agents. For instance, participants were found

to persist in norms of conversational turn taking such as pause length between utterances and inferences about recipient comprehension. Through their interaction with the computer, however, the human interactants were forced to learn new normative constraints for conversation and information giving. Likewise, by examining conversational patterns in the corpus of human-computer interaction, researchers in artificial intelligence are better able to predict human-machine interaction and design more human like machines (Hutchby 2001: 162–165).

In view of this research, this current study proposes to analyze sequences of explanation where verbo-gestural depiction is employed as the primary modality for the explanation. By taking an approach which triangulates embodied actions in the mobilization of a usage-oriented conceptualization, depictions are analyzed as emerging from the demands of the task as set forth and set in motion by the explainers themselves. Such an approach therefore demands that a global perspective is taken in the micro-analysis of locally situated phenomena: in other words, in how the unfolding of the task gives rise to the depictions that are further analyzed in this study. The remainder of the chapter provides details on the data, participants and analysis of gesture for this study.

4.5   Data Design

This section describes the approach to the empirical material through the development of the multimodal corpus CAWSE. The details of this process for the CAWSE project, and where its aims dovetailed with the investigation for this thesis, will be described in section 4.5.1. Section 4.5.2 is devoted to describing the participants and discussing how to characterize their particular use of English. Section 4.5.3 describes in more detail the settings and tasks that were ultimately chosen as sites for exploring depictive gesturing in interaction. Finally, section 4.5.4 involves a discussion on how

to conceptualize the interactional language of the classroom tasks as it appears in this study's empirical material.

4.5.1   CAWSE and topic development

A project that ran parallel to this thesis was the construction of the multimodal academic English corpus CAWSE. As the project was initiated in order to make empirical material available for researchers interested in education, language, and classroom interaction, I benefitted from the unique opportunity to collaborate in designing the corpus as well as using gathered data for my research. Therefore, the empirical settings for this thesis are located within the research site of a Sino-foreign university campus in China, where English is the language of instruction for all academic and administrative operations. As a contributor to the corpus, my role was to locate potential sites for video-recordings of students in interaction, as well as to attend discussions regarding corpus construction, ethical concerns, and any other matters. I was also involved in transcribing video data and training interns for project tasks.

Collecting the empirical material for this thesis involved a two-fold process of discovery in selecting tasks that would be suitable for both the CAWSE project and my specific research objectives into depictive gesturing. As the project aimed to collect samples of student language, it was decided early on that an opportunistic approach would be required in order to gather as much material with as little interference into daily classroom activity as possible. Nonetheless, it was important to develop a corpus collection strategy that met the demands of corpus linguistic research, e.g. searchability, uniformity, and reliability (cf. Adolphs & Carter 2013). Meanwhile, the topic for this thesis evolved from two initial sources: a previous research project examining the gestures of a philosophy lecturer (Stevens & Harrison

2019), and a pilot study that I conducted for ascertaining student gesturing for the CAWSE multimodal corpus.

In Stevens and Harrison (2019), we studied the gestures of a lecturer as he explained and illustrated abstract concepts. The analysis showed that during moments when concepts were exemplified and analogized, the philosopher displayed a richness of dynamic, representational gestures. From microanalyses of several illustrative sequences, we noted that embodied conceptualizations specific to the speaker's philosophical framework appeared salient in distinct gestural forms, which could be exhibited in disconnected stretches of depiction. The philosopher's gestures exhibited a great deal of planning and patterning along philosophical lines, and through interviews we learned that they were partly designed and partly improvised as part of the philosopher's explanations.

With the development of the multimodal component of CAWSE, the opportunity emerged to explore embodied conceptualization practices in the gestures of non-experts, i.e. the students at an EMI university campus. A pilot corpus was developed which became what I refer to here as the Complex-Systems (C-S) corpus, described in section 4.5.2. In brief, for the C-S corpus a task was developed to be used in an extra-curricular conversation practice session that students attend for peer-led activities and for feedback on their English. The pilot corpus was developed for CAWSE in order to ascertain the level of gesturing performed by students in interaction. As the data that was compiled met the requirements for naturalistic L2 English usage in an academic setting, the CAWSE team decided to include the pilot corpus as part of the multimodal data set that makes up the larger corpus. For the thesis, I further narrowed the scope of investigation into depictive gestures performed during verbal explanations, as based on preliminary observations of the videos and

subsequent data collected in different classroom settings. Details of the distinct empirical settings used in this thesis are described in section 4.5.2 below.

4.5.2 Data settings and tasks used for the current study

Given the nature of the opportunistic data collection for CAWSE, it became clear that certain aspects of the research focus for this current study would be shaped by the particular settings of the corpus. For the multimodal corpus, the CAWSE team chose to include classroom interactions, in both traditional teacher-led settings and student-led English practice sessions. The particular parts of the corpus selected for this thesis include the C-S pilot corpus and a collection of academic oral skills assessment in the form of group discussions around a given topic, here called the GD corpus.

To gain better understanding of how to approach classroom settings and to ascertain the possibility of recording depictive gesturing in interaction, I developed a pilot corpus of video recordings of student interaction during student-led English conversations sessions, called *Chat-Ups*. Chat-Up sessions are part of an awards program at the university, created to provide students with opportunities to volunteer for building their academic profiles. The Chat-Ups are designed as a type of peer-assisted learning task (Philp et al. 2014) where upper level students design and conduct English practice sessions for the preliminary-year students. The Chat-Up sessions are coordinated by an Academic English support center on campus, managed by a senior tutor who recruits volunteer undergraduates from years 2 to 4 as leaders.

The pilot study involved two sessions with the same volunteer student. Permission was given by the Chat-Up coordinator to contact the student and observe two of his sessions. An activity was designed which would be in line with the speaking goals of the sessions, but which would also engage students to explain complex concepts and processes. The activity drew from previous semi-experimental

research where representational gestures were elicited during science explanations (see Kang, Tversky, & Black, 2015; Cooperrider & Núñez 2009); I collected short (2- to 3-paragraph) entries of descriptions from textbooks in the sciences and humanities. Each entry was accompanied by a diagram, and described a process, for example, osmosis or the evolution of abstract art (the activity instructions can be found in Appendix A). Each student was given a different entry and instructed to read and understand it as best they could. For instance, they were encouraged to use their mobile phones for translations or for looking up definitions.

In execution the task moved forward in rounds: students would read and then explain their extracts in pairs or in groups of three. After the first explanation, the student teacher re-organized the seating arrangement and the participants proceeded in this way for a third or fourth round, depending on time. The student teacher marked stopping and starting times for each round and provided feedback at the end of the session. My own participation during the sessions was limited to explanation of the general research goals in language and education (without reference to my interest in gesture) and attending to the recording equipment with a research assistant. Informed consent forms were given to every participant, including the student volunteers (ethics issues are described in Section 4.6.) Given the uniformity of task-type and English usage in the recordings, the resulting data-set was included in the CAWSE corpus. For this thesis the corpus was labeled Complex-Systems, following Kang et al.'s (2015) use of similar stimuli in their study.

The Group Discussion corpus comes from video recordings of an academic skills discussion task conducted by the English language support center at the university campus. Students at the support center take a compulsory module designed for learning academic discussion skills. The CAWSE team identified the skills

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module as a potential source for multimodal corpus material. Rehearsals simulating the conditions of the assessment were video recorded, instead of the actual assessments, in order to protect the intellectual property of the support center, given that the test questions may be reused in subsequent assessments, thus avoiding the possibility of accidental dissemination to future students.

For equipment, we used Panasonic HC-X920M Hi-Definition camcorders at 1080p resolution and Sony ICD-PX240 mini audio recorders. Students sat in groups of two to three participants, with tripod-mounted cameras pointing at each table. In the case of the C-S corpus, a separate camera was handled by one of the researchers to follow the student teacher to capture their interaction with students. In the GD corpus, a camera was used to record the teacher as she or he initiated and terminated the task, and when the teacher gave feedback afterwards. Each of the two corpora were gathered into a larger corpus of peer interaction that includes other classroom tasks video-recorded for CAWSE, e.g. normal peer talk in the classroom and individual oral presentations[4], but only the C-S and the GD data-sets are used for this thesis. Tables B-1, B-2, and B-3 summarize the videos collected for the two corpora (see Appendix B).

4.5.3 *Approaching and conceptualizing talk in the EMI classroom*

Seedhouse (2004) lays out three properties that analysts need to consider when approaching language oriented institutional settings. The first is that language, in this case English, is both the medium and target of instruction. Secondly, participants make analyses, i.e. assumptions, about what constitutes fulfillment of the task or aspects of the task. There is consequently a reflexive relationship between pedagogy

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[4] The bulk of the CAWSE corpus is composed of written coursework and audio recordings and transcripts of oral proficiency assessments in the form of teacher-student interviews (cf. Chen et al. in prep).

and interaction in the L2 classroom, and participants continually bring to bear their own analyses of the pedagogical focus onto their language in use. That is, part of the explanation for why a particular utterance and embodied action are made is because the participant is attempting to contend with the given task. Therefore, participant assumptions and contentions have impact on the language that is produced in these interactions. Seedhouse (2005) asserts that "the linguistic forms and patterns of interaction which the learners produce are normatively linked in some way to the pedagogical focus which is introduced" (191). Finally, the teacher's evaluation of some kind of output of the interaction is a necessary contingency of the educational context. This is a direct consequence of the normativity of students' interaction in the task, and also has impact on their language. In other words, the *raison d'être* of the task is to provide a basis for the instructor's evaluation. This property will have different ecological impact depending on the task itself. For example, sometimes tasks are created in order to warm-up the class for discussion and interaction. Other tasks are geared towards sharpening skills for assessment, while some tasks, such as oral presentations and group discussions, are designed as assessments in and of themselves.

The tasks that are analyzed in this study involve different characteristics with respect to their degree of assessment by the instructor. The C-S activity as a task (explored in Chapter 5) was designed to elicit multimodal explanation between students, and provide basis for feedback by the peer instructor. Therefore, the goals of this task are more inherent to the task itself, i.e. the task is already accomplished if the students engage in the explanation using English. In contrast, the group discussions analyzed in Chapter 6 bear the burden as assessments (their being rehearsal sessions notwithstanding). Therefore, as will be noted in the analysis, the normative organization of these discussions has interactional impact on the ecology of the task's

unfolding, and is empirically observable and publicly displayable between the participants by their orientation to a specified marking rubric.

For this thesis, the analysis involved narrowing onto sequences of interest and then broadening out to examine the ecological context of the sequence. This meant I first had to identify sequences of interest that involved depictive gesturing, and then broaden the scope by taking into account the task goals and the orientations to it that the participants make.

Previous studies on the links between gesture and explanation used various methods to select units of analysis. For example, in their study on primary-school students in science classrooms, Roth and Lawless (2002) digitized video clips from longer films of classroom sessions, segmenting episodes into "communicative situation[s] in which a speaker uses gestures in addition to language to articulate something about the topic at hand" (290–291). Kang et al. (2015) conducted a semi-experimental study where participants explained complex systems (e.g. circulatory system, rock cycle) to observe whether speakers gestured differently when explaining to either children or adults. The researchers segmented the verbal message and coded descriptive phrases in order to quantify the correspondence between gesture type and information type (Kang et al. 2015: 18). In studies focused on descriptions of pain, Rowbotham, Holler, Wearden, and Lloyd (2016) made selections of the speaker's talk when they gestured while discussing pain. The gestures were then coded according to the level of specificity in the verbal message.

For the empirical material of this thesis, I was able to segment data according to the stopping and starting points of round segments or discussion. Thus episodes were identifiable as consisting of a complete pedagogical task, where beginning and end times were set by an instructor. More narrowly, multimodal sequences were observed

consisting of units of gesture and speech concurrently oriented to each topic-at-hand, thus amounting to a multimodal explanation. Given that classroom interactions may contain any number of sub-interactions, discourse levels and speech acts (Seedhouse 2004), I chose to focus on sequences of explanation orienting to concepts in the domain of the task-at-hand, i.e. that are directly inquired about in the task. The analytical procedures that I implemented for the study are given in Section 4.7.

4.5.4   *The participants, their language, and their gestures*

All participants are speakers of English as a foreign language studying at a Sino-foreign university campus in China. The vast majority of the participants are Mainland Chinese, though there is a small minority of non-Chinese students as well. Each set of corpora have participants from distinct academic levels: 1) undergraduate, preliminary year students in the Complex-Systems corpus, and 2) pre-Master's students studying in an EAP summer session (pre-sessional), in the Group Discussions. The undergraduate students fulfilled their English proficiency requirement for preliminary entry into a UK university, whereas the pre-sessional students either did not fulfill the language requirements for post-graduate study, or selected to attend the program to improve their academic English skills, though I did not have access to the motivations behind the attendance of the pre-sessional students.

As for the students themselves, identity research converges on the process of Chinese-English bilingual identity that mainlanders undergo (Gu 2010ab; Xue & Han 2014; Zhang 2018). This process entails a three-part negotiation between the instrumentality/admiration of English, the conflict with English perceived as a foreign encroachment on culture, and finally acceptance and integration of English as a new dimension to national identity (Gao 2014). As articulated by Gu (2009), English language learners "[establish] a legitimate position in an imagined global community"

(p. 150). These conclusions, however, are taken from the subjectivity of the students' own perceptions about their learning. Based on historical analysis, Gao (2015) categorizes the process of English learning for mainland Chinese into four dispositions towards language learning: 1) faithful imitation, 2) legitimation of the 'China English' user, 3) the conceptualization of language as a locus of play and creativity, and finally 4) Gao's own Bahktin-informed interpretation of 'dialogical communication', where the L2 user maintains a dialogue of respect and reflection which nurtures and enriches both English and Chinese.

In the analysis of participant multimodality for this thesis I take for granted that the English that is used, regardless of any *native* speaker perception of their level, is in a process which is developing towards their proper ownership of the language (Higgins 2000). Such a view aligns with the CA perspective on emic analysis, in viewing how the participants themselves orient to the language they produce. As Schegloff, Wong, & Olsher (2000) contend, whether the participants to interaction are native or non-native speakers of a language has no bearing on the analysis until they make it relevant in some way, either by orienting to the language, or by some more explicit means.

There is also the question of the participants' gestures, particularly the question of potential Chinese gestures and any cultural significance these bring to bear on speaking. Studies in the context of Chinese language seem to suggest that Chinese speakers do gesture differently compared with languages such as English and French (Nicoladis, Pika, Yin, & Marentette 2007; So 2010; Hou & So 2014). That being said, this is not a study on the cultural factors of gesture. As Streeck (2009b) suggests, the notion of identifying culture specific gestures within a language community is problematic in that, unlike a language which may have more codified and

conventionalized norms, to say that certain gestures or gestural practices "belong" to a culture in the way a word belongs to the lexicon of a given language is to commit the category mistake of confusing culture with artifacts (37–38). Therefore, it is perhaps more appropriate to discuss gesturing as an anthropological phenomenon, that is, as "one of the 'prosthetic' devices which human beings have fashioned and continue to fashion" (Streeck 2009b: 38) vis-à-vis our nature as human beings.

Finally, characterizing the participant gestures as 'second language' or 'interlanguage' gestures can also be highly problematic for many of the same reasons. There is no clear boundary between using the hands to communicate as a result of a so-called deficiency in language fluency or simply as part of a person's natural repertoire of movement behavior (cf. Gullberg 2013). Nonetheless, it continues to be a productive enterprise to examine the language, corporeal or otherwise, of language learners as they navigate and negotiate meaning in locally situated contexts (Burch 2014; Gullberg 2006; Kasper 2009). Moreover, some studies have reported differences in the forms and uses of gestures between learners and native speakers. Kida (2008), for example, reported that L2 speaker gestures were more prominent and larger than the same gesture produced by the same speaker in their L1. McCafferty (2006) also noted the ubiquity in L2 speakers of what he termed syllabic gestures— schematic, amorphous hands in the air continuously beating along with the rhythm of speech. Depictive gestures have also been studied in their frequency relation between L1 and L2 speakers (e.g. Stam 2006). Nonetheless, points of comparison between gestures in English and Mandarin are avoided here in favor of viewing the context of English as an academic lingua franca.

4.6 Ethics and validity

This section provides an overview of the ethical procedures and considerations made for collecting and processing the empirical material that was used for this thesis. Given that data collection for my research was collected in parallel with the CAWSE corpus project, I first outline in Section 4.6.1 the steps that were taken with the CAWSE team to ensure the ethical treatment of the participants and the recordings made in the classroom environment. I then discuss issues on reliability and validity in Section 4.6.2. Considering that this project rests on qualitative assumptions of data analysis, the discussion will center around validity issues as done in CA and gesture studies.

4.6.1 Ethical considerations

Ethical procedures in accordance with the university and UK polices were followed by the CAWSE team, the process of which is described in detail in Stevens et al. (2020). With respect to this thesis, the empirical material I selected comes from video recordings in which I collaborated for the CAWSE classroom corpus. For the recordings used in the C-S corpus, consent was first obtained to approach the coordinator of the English support center, who then contacted selected peer instructors leading the Chat-Up sessions. It was only after these peer instructors gave consent did I email them and request to observe and record their sessions. Before the recording, I sent information and consent forms to the peer instructors to email and inform the participants who had signed up for the next session. Upon arrival to the session, the peer instructor and I verbally informed the participants of the CAWSE project and provided consent forms in both English and Mandarin in order to provide the necessary clarity on the project's subsequent research (Mondada 2014). Given the requirements for the CAWSE project and its future procurement as an online corpus,

agreement from the participants was required for their authorization to allow their images and voices to appear in conference presentations, workshops, and other research/educational settings, and for the recordings to appear on an online platform.

Only consenting groups of participants were recorded, and non-consenting participants were removed electronically from the recordings or avoided from recording if possible. The procedure for the GD recordings was almost the same, although ethical liaison was conducted through the module tutor directly and consent was obtained during the first weeks of the 5-week English pre-sessional to record all classroom sessions. When it came time for the rehearsals used in the GD corpus, only those groups involving consenting participants were recorded.

After the recordings, post-processing involved anonymizing audio and video by muting students' and teachers' names and any information written in view of the camera. For purposes of intellectual property rights, presentation slides were not recorded, or they were obscured from the recording.

4.6.2   *Validity and reliability*

As Peräkylä (2016) points out, "The aim of social science is to produce descriptions of a social world—not just any descriptions, but descriptions that in some controllable way correspond to the social world being described" (413–414). In turn, while CA has been fundamental in demonstrating the interactional contingencies which accomplish the organization of talk, perhaps its major contribution is the empirical objectivity that analysts bring to bear on their interpretations. CA relies on a "turn-by-turn proof procedure" in order to validate its claims, in demonstrating through detailed transcription how participants themselves orient to each other's talk (Sacks et al. 1974: 728). It is through these orientations that interactants publicly display their understanding of each other's talk along with the interactional relevance of their

actions (cf. Schegloff 1996). The proof procedure is intended to provide transparency between analysis and observation by grounding the analysis in the sequences of talk in the observation and transcription process. To this end, I have attempted as much as possible to adhere to the rule of transparency in the analysis by demonstrating how the participants make their formulations interactionally relevant, keeping in mind that different responses evince differing degrees of participant understanding (Moerman 1988).

Nonetheless, given the methodological problem of using a psychological construct such as construal in the analysis, some interpretation comes into play at the level of discourse (Moerman 1988; Waugh et al. 2007). In turn, practitioners in CA have continually reassessed possibilities in accounting for categorical and meaning-making processes in interactionally consequential ways (e.g. Antaki 2004, 2006; Deppermann 2011; Hauser 2011; Kitzinger 2006; Kasper 2006, 2009; Maynard 2011; Mondada & Pekarek-Doheler 2004), which expands the presumption of what is relevant to the formatting of interaction. By taking an enactive approach, one can demonstrate "that the individual can have a place in the conceptualization of interaction, without compromising the idea of the autonomy of social interaction" (De Jaegher, Peräkylä, & Stevanovic 2016: 7). That is, that individual processes and practices can be shown to be interactionally relevant if understood from an enactive perspective of meaningful action. While such a proposal is more closely linked to the demonstration of interactive processes in the autonomy of meaning making, it can, as I argue in this study, be supplemented by a view towards intersubjective construal as directly integrated with interaction. Furthermore, through ethnographic information, the analysis of cognitive practices can be supplemented by, inter alia, target linguistic or classroom knowledge (e.g. Burch 2014; Markee 2011), personal or professional

relationships between the participants (e.g. Rybarczyk 2015; Waugh et al. 2007), protocols for instruction (Williams 2006), or wider cultural and professional frames of knowledge (Goodwin 2000a). As Waugh et al. (2007) argue, a certain degree of ethnographic information is needed in order to "better interpret what the participants are saying and what it means to them" (122). For this study, I used the stimuli materials for each task as background information in order to clarify terminology that the participants were using in their talk.

Another method for attaining validity is through the use of detailed analysis of single cases in comparison to similar ones in a corpus. The procedures for a single-case analysis in this thesis are explained in Section 4.7.2.2. In brief, as it relates to questions of validity, the single case operates as both a point of comparison and as a deviant case analysis. Furthermore, when the sample of cases is minimal, such as for this study, limited or single-cases can be used for demonstrating the reality of practices in interaction (Maynard & Clayman 2018: 131; Peräkylä 2016: 420–421; Watson 2008). The analysis in these instances should strive to ascertain not what is generalizable but what is possible, that is, on showing "how the specific practices are made possible, by the participants skilful (sic) use of the linguistic and interactional resources" (Peräkylä 2016: 422). Keeping the ethnographic and idiosyncratic reality of case analysis in mind, a degree of heterogeneity in generalizability thus becomes manifest, given that even in larger corpora analytical attention to the details reveals both order and idiosyncrasy in how parties to talk co-construct their usage events (Lester & O'Reilly 2018: 199–200).

4.7   Data analysis

This section describes the analytical stages as outlined in Table 4.1. After the multimedia recordings were collected for the CAWSE corpus, speech was transcribed,

and both speech and gesture units were annotated in the ELAN[5] annotation software (Lausberg & Sloetjes 2009). From these collections I proceeded to observe the data for depictive sequences of interest. After observing several patterns of depictive phenomena, I selected a single participant from the C-S corpus and a single discussion in the GD corpus for the empirical analysis of representative cases (Hutchby & Wooffitt 2008; Seedhouse 2004). The data was worked through in two ways, using ELAN for viewing and manual transcripts for description. Annotations of gestures were made in ELAN so that I could keep track of changes in forms, but I also used printed transcripts for manual annotations in detail. Through manual annotation, I aimed to "animate" for further descriptive detail of participant actions (cf. Macbeth & Wong 2016; Mondada 2013) and prepare them for use in this thesis. The procedures for analysis went as follows:

1) Full transcription and segmentation of gesture units:

   a) CAWSE speech transcription inputted into ELAN speech segments.

   b) Gesture units identified and annotated in ELAN.

   c) CA transcription of speech, gesture, and gaze adapted from GAT2 transcription style (Selting, Auer, Barth-Weingarten et al. 2011), Mondada (2018), and Kendon (2004) for manual analysis.

2) Gestures further annotated in ELAN:

   a) Phase structure annotated in ELAN, following Bressem & Ladewig (2011), Kendon (1980, 2004), Seyfeddinipur (2006).

   b) Form-based annotation adapted from Bressem, Ladewig, & Müller (2013), McNeill (1992), and Stickles (2016), supplemented by Streeck's (2008) methods of depiction for written descriptions of gesture actions (cf. Table 4.3).

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[5] Available for free download at the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands, URL: https://tla.mpi.nl/tools/tla-tools/elan/

3) Single-case analysis for each of the selected episodes in the corpora.

4) Prototypicality analysis for comparisons and generalizations.

5) Analysis of other episodes of interest in each corpus.

4.7.1   CAWSE transcription and annotation

With the video data, the CAWSE team first transcribed speech manually and inserted it into the ELAN annotation software, followed by segmentation of gestural activity in the software. ELAN provides the ability to create segments on a horizontal timeline, which synchronize with a video stream. Transcriptions can be inserted onto these segments, either by writing descriptions or with user-created vocabularies, thus enabling, for example, the coding of typologies in each segment. By visualizing the beginning and end of a segment, this process also provides an idealization of temporal phenomena that may not be visible, such as turns in speech interaction. With respect to phenomena that are visual, the segmentation amounts to an interpretation of beginning and endpoints of an operationalized analytical unit.

Speech transcription: Speech transcription was first done by the CAWSE team using conventions developed to capture the specific features of the participants' language (Chen & Zhou 2017). A native speaker of American English (me) and a Chinese speaker of fluent English (a full-time research assistant) completed and crosschecked the speech transcriptions. Speech was segmented into turns and overlaps, where the speaker who commits the overlap begins a new segmented turn.

Segmentation of gestures: I identified gestural activity and segmented it by *gesture unit*, following Kendon (1980). Gestural activity can be gleaned from observation of speaker behavior. When speakers gesture, they begin from a state of rest to a state of

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gesticulation, and they continue to gesture before returning once again to a state of rest. Within the gesture unit, gestures can be observed behaving in distinct *phrases* (Kendon 2004), i.e. complete sequences of individual gestures entering into and out of movement. In each gesture phrase, the gesturer motions in a *preparation* phase towards the primary *stroke* phase of the gesture and can either prepare for another stroke or begin a *retraction* phase to a state of rest. Gesturers might also *hold* hand shapes before or after the stroke stage. Gesture unit boundaries, for units and phases, were segmented aided by the frame-by-frame functionality in ELAN, moving at increments of 40 milliseconds per frame. To segment the onset of a gesture unit, I relied on a change-of-state method, where the segment is marked at the beginning of a change of state of the hand—change of position, palm orientation, or shape of the fingers, often accompanied by blur in the video stream (cf. Bressem & Ladewig 2011; Seyfeddinipur 2006).

For analysis of the explanation episodes in this thesis, I adapted the CAWSE transcriptions into the GAT2 (Selting et al. 2011) system developed for interaction research, and Mondada's (2018) system for displaying multimodal activity. I also annotated gesture, adapting Kendon's (2004) system to visually display gesture-speech synchronization. Tables 5.2 and 5.3 in Chapter 5 provide the conventions used for reading the transcripts in this thesis.

4.7.2   *Analytical procedures*

4.7.2.1   Identifying and describing gestures

To observe for depictive gesturing, I operationalized depictive sequences as involving gestures that were "coordinated to thematic content" in talk (Streeck 2009b: 179), and thus distinct from other kinds of gestures that interact specifically with more

pragmatic matters of conversation. I avoided using typologies to identify gestures in favor of a praxeological approach, motivated by how typologies tend to freeze gestures into categories. Duncan (2008) warns against the use of strict gesture typologies as they can constrain the understanding of the role gestures play in interaction and obscure their multifunctional nature. Others note that gestures juxtapose functions and meanings, primarily due to their visual, spatiotemporal nature (Hassemer 2016; Wilcox 2004). Taking a praxeological perspective (Streeck 2009b, 2013), depiction is understood as the means by which images in the air are achieved by their gesturers, the methods by which they craft these images (Streeck 2013: 681).

For this thesis I merged three distinct practices under a rubric of depictive gesturing: i) manual *depiction* of imagery for described verbal content (Enfield 2009; Streeck 2008, 2009b); ii) *ception* or *thinking-by-hand*, when gestures coincide with giving form to abstract concepts or emotional states (Streeck 2006, 2009b); iii) and the *diagramming* of relationships in the air with the hand (Enfield 2009: Ch. 6; cf. Tversky & Kessell 2014). Thus, while gestures can be distinguished by their coordination with the content of talk, from concrete to more abstract, the notion of depiction that subsumes these practices describes similar acts illustrating "the world beyond the present encounter" (Streeck 2009b: 85). Streeck (2009b) identifies a distinction between depiction and ception not only by the speech content but also by how gesturers orient interlocutors to their hands. For instance in initiating a depiction, speakers will often coordinate their gaze and speech by looking at their hands and uttering a deictic expression such as *like* or *like this*, or simply by turning away from their interlocutors towards a space in front of them (Sidnell 2006; Streeck 2009b: 94). Thinking-by-hand gestures are often observed "in the background" as speakers talk about abstract content, often looking away or looking at their recipients, but not often

at their own hands (Streeck 2009b: 151–152); likewise with gestural diagrams that appear to trace relationships in the air (cf. Enfield 2009: Ch. 6). I grouped these under depictive gesturing because though they may have correspondence with different speech content (respectively concrete objects and actions, concepts and emotions, and relationships), they all emerge within speaker attempts to make an imagined state of affairs visible[6] (Sidnell 2006; cf. Langacker 2015). Additionally, the coupling of speech and gesture serves for speakers as a way of multimodally stipulating a thing they wish to bring to attention (Sidnell 2011: 137). How these sequences were identified in each corpus is described in the respective analytical chapters (5 and 6).

After identifying sequences of depictions, the analytical procedure moved to describing the forms and methods of depiction that the gesturers used. I attempted to maintain objectivity in the descriptions of gesture by using a form-based analysis which describes the configurations of the hands, as proposed by the Linguistic Annotation System for Gesture (LASG: Bressem 2013; Bressem et al. 2013). A form-based system describes gestures according to anatomical forms and geometric movements, instead of naming gestures according to corresponding speech or what the object or action that the analyst interprets from visual observation (Bressem 2013: 1080). I also consulted Bressem and Ladewig (2011) and Stickles (2016) for further descriptions of forms and gesture phases. These descriptions correspond roughly to the configuration of fingers, palm orientation, palm shape, the location of the hand in space, and direction and shape of movement, and corresponding activity with both hands.

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[6] Although, to be sure, it is impossible to formally depict abstract entities given that they lack figurative correspondence, thus an abstract referent's relation to proposed imagery remains symbolic (Voltolini 2015: 12–13), though this fact doesn't preclude our ability to depict the symbol which we take for representing the abstract notion, such as a depiction of a blindfolded woman holding a balance to represent Justice (but see Elpidorou 2016).

To describe gesturing more closely with the practice of depiction, I follow Streeck's (2008) methods of depiction. As Streeck observes, depiction is achieved by an array of different body movements and hand configurations, rather than merely discrete deployments of single iconic gestures. Depiction involves "a repertoire of habitualized postures and actions that a pair of human hands, socialized in a specific place and into a specific set of forms of life, has learned to perform" (286). These methods as described by Streeck (2008) are provided in Table 4.3.

Table 4.3 Methods of depiction
Adapted from Streeck (2008: 292–295)

Abstract motion	The hands convey movement attributable to a previously mentioned entity or action.
(En)acting	The practical action of the hands that evoke doing some activity, e.g. turning a key or maneuvering a steering wheel.
Bounding	The fingers or palms of the hands hold space to show an object's extension, such as width or length, to varying degrees of precision.
Drawing	The hand becomes a utensil for drawing (e.g. a pointed index finger), where the motion leaves a trace of the drawing to be imagined.
Handling	Objects are depicted by how they are used, or by simply configuring the hand to shape how it is held. Modulation of motor action can insinuate object features. Ubiquitous in gesture due to everyday activity of the hands (picking up or moving things, wiping away, etc.)
Making	The hands act as if fabricating, molding, shaping, assembling, or composing something in some fashion.
Marking	Annotating features onto virtual objects and surfaces previously depicted; often appears in sequence following the virtual placement of an object, e.g. a map surface.
Modeling	Configuring the hands to resemble a talked about thing, either through presentation of the hands or by motioning of the hands 'as' the thing, e.g. moving the hand about as if it were a car driving down a hilly road.
Model-world making	Meta-representational of building a virtual world as the stage of a depiction, often through other methods.
Scaping	Using the hands to brush or scrape away a virtual terrain, or to "brush into existence a set of denoted entities".
Self-Marking	Using one's own body as the surface for depicted entities, e.g. using the arm to represent a surface in order to depict intricate carvings, drawings, or locations.

Table 4.3 (cont.)

Pantomime	Imitation of the bodily acts of other living beings, e.g. running or jumping. Handling can be a kind of pantomime if the entity is salient in the depiction, e.g. mimicking the moves of a basketball player.

In addition to methods for achieving depictions, the gesture analysis involved abstracting the consequent visualization that the depictions made. Hassemer (2016) refers to this abstracted aspect of gesture as the *gesture form*, which directly relates to the geometric shapes that gestures appear to trace in the air. As Hassemer (2016) explains, "Gesture form is the spatial information conveyed in a gesture, abstracted away from the complex information of the gestural articulator moving through space" (8). Hence a distinction can be made between articulator form (the shape of the body parts doing the gesture), the methods of depiction afforded by the articulator form, and the gesture form, the geometric figure(s) evoked by the gesture. Nonetheless, there is an assumption that is made about what the interlocutor's see, if anything at all, and therefore gestures, rather than representing through a static image, actively constrain a visualization of a referent *as if* it were the referent itself, what Müller (2016) calls the *object of gestural practice* (217). While the description of gestures in terms of the methods of depiction draws attention to the practice of active sense-making, the analytical procedure is rooted in uncovering the affordances which make possible the depictions themselves. Objects of gestural practice, whether entities or actions, are the achievements of the internal ecology—the anatomy and kinetics of the hand, the methods of depiction, and resulting imaginary forms created. Figure 4.3 illustrates the internal ecology of depiction which theoretically parses out the various affordances in the depictive formulations.
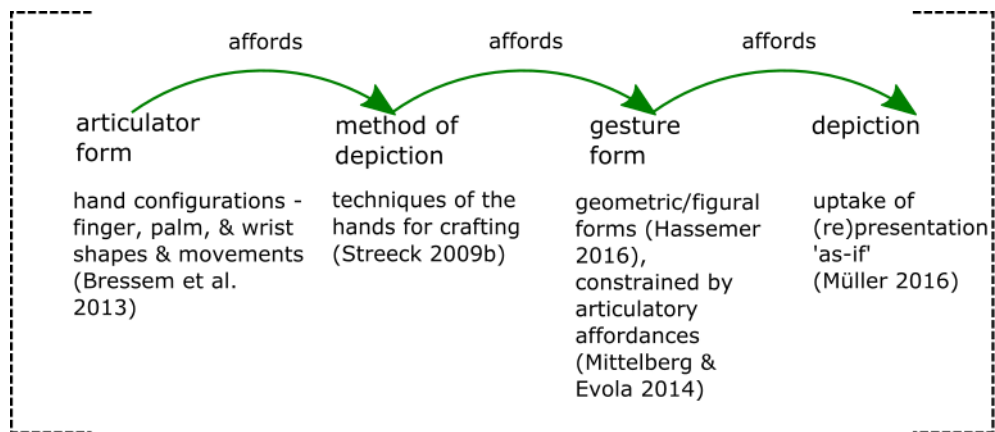
Figure 4.3 The internal ecology of manual depiction

Depictions are achievements of various practices and processes. The
articulation of the hands into forms enables their craftwork in
fashioning the imaginary forms, constrained by the hands themselves,
and received in the interaction as presentations of the depictions.

Granting that various cognitive, contextual, linguistic and other constraints
motivate the impulse to manipulate the hands in these ways (Harrison 2018),
internally a depiction is the achievement of various sequential elements. For example,
drawing a line in the air is contingent upon the affordances of the gesture. If I draw a
line with my index finger, the anatomical elements of my hand are configured in a
particular way to achieve that: fingers, palm orientation, hand shape, movement, and
the space in front of me. This configuration both constrains and enables my use of the
hand as a drawing tool to draw an imaginary line. This imaginary line is the gesture
form. However, the gesture is not complete as a gesture in interaction until it is taken
as if it were a gestural object of depiction. For instance, I may draw a line to depict
the trajectory of a movement, or the contour of a round object. The difference
between gesture form and the gestural object is that the form refers to the pattern
created in the air, but the gesture itself is what the observers take it to be. How this
relates to the analysis is that it allows one to see how changes in these elements
successively afford further changes and thus afford new construals. Each element in
the ecology of a gesture creates the conditions for the next.

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4.7.2.2   Analysis

After narrowing the scope to depictive, multimodal explanations, I carried out various observations on the data to explore different methods of analysis. These analyses were conducted for the purpose of discovering candidate phenomena, until finally opting to do a single-case analysis using CA methods (Hutchby & Wooffitt 2008: 114–122; Mondada 2011; Schegloff 1987; Seedhouse 2004: 39–42) of selections from each of the corpora. As Hutchby and Wooffitt (2008) describe, "Single case analysis involves looking at a single conversation, or section of one, in order to track in detail the various conversational strategies and devices which inform and drive its production" (114). Seedhouse (2004) likewise advises that after observing for patterns in a data set the researcher needs to examine in detail a single instance of a phenomenon of interest "in order to explicate the emic logic or rational organization of the pattern uncovered" (39). Thus the analysis should endeavor to account for the "sequential environment in which [a candidate phenomenon] is produced, and the sequential implications which operate on the next turn" (Hutchby & Wooffitt 2008: 120). In other words, a first analysis traces the ecology of the phenomenon as situated within the enchronic environment of layered motives, which can then be used as a point of comparison to other related phenomena in the data sets. I proceeded to make selections of candidate cases, the analysis of which provided a basis to the discovery of salient features of the structure of the interactions. This micro-analytical process is outlined in Table 4.4 below.

Table 4.4 Steps in the micro-analysis

Step	Procedure
1	Adaptation of CAWSE transcription to CA.
	Annotation of gestures
2	Examination of transcript for turn-taking behavior: Marking of beginning and end points of participant explanations and discussions according to their own orientation to these and to the continuity of their talk.
3	Identification of recipient actions: overlap, gaze direction, body movement, and gesture; identification of possible first speaker reactions.
4	Identification of trouble and repair and comparison to previous iterations.
5	Identification of recurrent uses of gesturing and depictive sequences, and their transformations in the reformulations.
6	Discourse level analysis of the alternate construals in the reformulations.
7	Prototypicality analysis comparing single-case to the rest of the corpus.

The final analysis towards answering my research questions involved the ecological dimensions of construal in further asking: How does the interaction and sequential environment towards intersubjective alignment afford or constrain the construal of 1) the topic at hand and 2) the formulations and reformulations of utterances designed to achieve the task? This final analysis involved careful interpretation of participant assumptions and inferences (i.e. their own analysis) of what counts as what they appear to be doing in their conversational actions.

4.8   Summary and view towards the empirical chapters

In this chapter I explained the methodologies which take into consideration the ontological and epistemological assumptions that have so far been outlined in thesis. I then proceeded to describe the research design and procedures for the analysis of the depictive sequences of interest in this study. In a nutshell, the methodology entails a data-driven approach—both in data collection and analysis. The primary focus of analysis is on the phenomenological notions as enacted through the construal of

depictive utterances. Chapters 5 and 6 to follow correspond to the empirical analysis of the two corpora exposited here. Chapter 5 undertakes an analysis of reiterated explanations to focus on alternate construals in reformulated verbo-gestural utterances. To expand on the analysis, Chapter 6 uses a collection of academic group discussions to explore how multiple participants engage in the analysis of each other's talk.

Chapter 5 The Ecology of manual depiction: construal in explanation

5.1 Introduction

This chapter explores construal and manual depiction within the context of elicited explanation. To explore intersubjectivity in multimodal construal practices, the analysis uses a referential communication task (Krauss & Weinheimer 1966; cf. Clarks & Wilkes-Gibbs 1986) that was developed as a pilot corpus for CAWSE. The repetitions of depictive sequences within the task provide evidence for the observation that speakers tailor the construal of their embodied explanations for their recipients and for construction of the task. In other words, manual depictions are the *achievement* of intersubjective and intercorporeal construal. Based on the analysis, I propose that speakers depict for intersubjective visualization of the topic-at-hand. To achieve this, they orient to their depictions by manipulating construal dimensions in three ways: i) depictions project and delimit epistemic arenas in which construal relations are tailored for the purpose of specific structural aspects of the depictions, ii) depictions, as part of the explanations, invite participatory frameworks for co-analysis of the topic-at-hand, and iii) speakers refashion their depictions to anticipate previous trouble.

The chapter is divided as follows: the remainder of section 5.1 provides background on the explanation and the elicitation task that was used. Section 5.2 presents findings of the overall structure of the C-S task by first reporting on a global view of depictive gesturing in the corpus (5.2.1), followed by a prototypicality analysis of interaction of the task (5.2.2). Section 5.2.3 deals with how participants prototypically oriented to the topics of their explanations to contextualize them, and 5.2.4 gives an overview of how participants oriented to their depictions in the corpus.

Section 5.3 provides an analysis of spoken and gestural reformulations in a single-case. Specifically, a participant whose task was to explain the chemical process of osmosis is examined for the ways that she develops her depictions in her three trials at explanation. In providing a close analysis of a single case, a comprehensive view of reformulations in depiction can be given, which serves as the basis for the analysis of specific examples from the corpus. Section 5.4 looks at other explanations and how explainers handle contingencies of interaction in their depictions, namely, trouble in explaining abstract concepts (5.4.1), strategies for accommodating transformations in depiction (5.4.2), and for precise diagramming (5.4.3). These findings are discussed in light of the notion of manual depiction as a communication strategy in section 5.5, with a conclusion and summary of the chapter.

5.1.1 *Spoken explanation*

Explanation, broadly defined, refers to a spoken or written account that seeks to clarify something and make it understood. When people explain face-to-face, however, the object of explanation is not often in view, but must be evoked through talk. Explainers might have recourse to a variety of explanatory strategies such as verbal and visual examples and illustrations (Bobek & Tversky 2016), or detailed descriptions of salient elements. Explainers often make use of analogies to build comparisons (Roscoe & Chi 2007), and may employ elaborate depictive gestures in these analogies to build coherence across analytical frameworks (Stevens & Harrison 2019). In the classroom, learner explanations are often deductive in nature, in that they are derived from theoretical principles or processes which seek to demonstrate understanding of general concepts (cf. Keil & Wilson 2000: 6). There is therefore a conceptual aspect to explanation that learners become entangled in, between elements in the explanation and the topic-at-hand. As Bobek and Tversky (2016) indicate:

When explaining something new, learners may have to think carefully about the relationships between elements in the process and prioritize the multitude of information available to them. Generating explanations may require learners to reorganize their mental models by allowing them to make and refine connections between and among elements and concepts. (2)

This is perhaps why face-to-face explanations are unified, multimodal acts of meaning making (Bavelas & Chovil 2000), involving the body in various methods to depict, diagram, and elaborate for the purposes of clarifying their message (Enfield 2009; Kang et al. 2015; LeBaron & Streeck 2000). Therefore, the conveyance of information is not a one-to-one mapping process of information to expression, but involves the explainer selecting and organizing multiple elements into a coherent, temporally sequential whole. Explainers in the classroom, then, need to exploit not just linguistic and material resources, but also cognitive abilities that can be articulated through language. These abilities involve how explainers perceive and adapt to the changing explanatory environment, e.g. task requirements, interlocutor interventions, and the sequential unfolding of the explanation itself. To observe for these changes, this chapter analyzes recurrent depictions of various scientific and abstract concepts in peer explanations.

5.1.2   *Referential communication tasks and MLA*

To examine the recurrence of depictive form features in reformulated explanations, I use a corpus of explanations that I helped design for the CAWSE multimodal corpus. The task resembles a *referential communication task* (RCT: Krauss & Weinheimer 1966) that was used experimentally to investigate changes in verbal reformulations (cf. Clark & Wilkes-Gibbs 1986). The use of a trial format in the RCT provides the analyst with a basis for comparing a speaker's multiple formulations of the same

content. From the perspective of the speaker, trialing provides a way to receive information from interlocutors about the effectiveness of their message (Krauss & Weinheimer 1966: 344; cf. Brennan & Clark 1996). For teachers it creates a scenario to observe learner development in a second or foreign language (Yule 1997). From a cognitive and functional linguistic perspective, the RCT also provides a way to access alternative construals and instantiations of utterances, given the multiple formulations of the same content, thus providing a way to track paradigmatic variation in transformations of morphosyntactic, gestural, and prosodic formatting.

Perhaps the most well cited RCT study from an interactional perspective is Clark and Wilkes-Gibbs's (1986) paper on reference as a collaborative process, in which speakers (called *directors* in the task) were required to describe tangram figures to a listener (the *matcher*) who then matched them. By having participants conduct the activity over multiple trials, the researchers were able to gain a picture of cross-sectional behavioral patterns. For instance, they found that director descriptions tended to become simplified (reduced) over several trials, in terms of using fewer words and less convoluted phrasing. The researchers also reported on the heavily collaborative process of description formulation, in the ways the directors exhibited self-initiated and other-initiated repair. For instance, when matchers displayed trouble, directors would reformulate their utterances, and subsequently implement these reformulations in the next trial. Thus reiterated reference is a useful way to demonstrate the collaborative processes and participant practices of constructing descriptions in conversation.

In the C-S task used for this study, participants were given a text and corresponding diagram, which was then explained verbally to another participant. After a trial of explaining, each participant switched partners for another two or three

rounds. The task was scaffolded so that for the first trial the participants could use the text during their explanation, but afterwards were asked to explain from memory. Though it was suggested that they could use their hands and face during their explanations, they were not privy to any research focus other than collecting recordings of English for the corpus, nor did they always choose to gesture. Participants were debriefed after the recording and informed of the opportunity to rescind their consent.

The semi-experimental set-up of the C-S task was designed to prompt re-explanation and to elicit multimodal resources (cf. Casasanto & Jasmine 2012; Cooperrider & Núñez 2009; Kang et al. 2015; Stickles 2016: Ch. 5). However, since the task was given during an actual classroom activity (a peer-led 'Chat-Up' session at the university's English support center), it was the role of the peer-instructor to conduct and manage the task as he saw fit, and also leave time for feedback in his classroom. Thus the task transpired in a semi-natural way as it would under the institutional conditions of the Chat-Up activity (cf. Seedhouse 2004). In addition, the resulting corpus of C-S explanations provides a setting for the observation of how speakers might redesign their recipient-oriented utterances when they are faced with new listeners, something which is common to students and teachers alike.

The analysis follows a *micro-longitudinal* methodology as drawn from CA-for-SLA (Greer 2016; Markee 2008, 2011), comparing each initial formulation of salient items in both talk and gesture with subsequent iterations within the same session of the task. The analysis seeks to demonstrate how a speaker's gestural depictions are contingent upon the immediate ecology of task interaction. In a micro-longitudinal analysis, a learning object is identified as the phenomenon that undergoes change (cf. Section 4.4). Greer (2016) adapted this approach to phrasings and interactional

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orientation of how a learner asks questions in a task. Likewise, Fischer's (2003) study resembles an MLA approach in how participants reformulated their instructions to a robot. In the C-S corpus, the use of the RCT afforded observations of changes in various ways, both interactional and in specific items such as words and gestures. However, as was observed, capturing the learning object was not always simply a matter of identifying structural changes (i.e. lexical/gestural morphology), but also in changes of enchronic and syntactic placement.

5.2 Interactional order of the C-S task

5.2.1 *Global view of depictive gesturing in the corpus*

The C-S corpus consists of 25 participants taking turns at explaining a topic stimulus over a series of three (n=30), or four (n=24) trials, comprising 16 sets of trials totaling 54 trials at explanation. For this study I selected 9 participants for closer analysis, given that they use depictive sequences in at least two of their trials, with 5 participants depicting in all of their trials at explanation. All of the participants but one (t=3, 5%) displayed manual gestures in at least one of their trials, and 26 out of the 54 episodes exhibited depictive gesturing (48%). In the other 25 episodes (46%), participants either gestured for speech handling and fluency, and/or pointing to the stimulus (n=26, 48%), or used inscription (n=2, 4%), i.e. crafting drawings on a paper (cf. Stutzman 2017). However, in both of the inscription episodes the speakers used depictive gestures in their first trial. The 26 episodes of manually depicted explanations involved 12 speakers using depictions in at least one trial, but 9 of the 12 reformulated their depictions at least once (i.e. they depicted in at least two trials). The other three depictive episodes were accounted for in the two aforementioned pre-inscription cases, and one case of an explainer using a depictive sequence of just two gestures in one trial.

For clarity of organization, I identified each extended turn of explanation as an episode, coded according to task topic in chronological order. Given that each participant explained the topic in several trials, I assigned each episode cardinal numbers in the order of their recording. For example, the second session's three trials of *osmosis* are referred to as *osmosis2.1*, *osmosis2.2*, and *osmosis2.3*. To distinguish participant roles, I refer to the speaker doing the explanation as *explainer*, and the recipients as *listener(s)*. Table 5.1 summarizes the sets of trials selected for this study (cf. Appendix B, Tables B-1 and B-2 for an overview of the C-S corpus).

Table 5.1 Participants selected for depictive reformulations.

Listed in order of their recording.

Participant[7]	Topic	Depiction in trial
Ivy	*osmosis1.1*	No
	osmosis1.2	No
	osmosis1.3	Yes
	osmosis1.4	Yes
Jim	*tectonics1.1*	No
	tectonics1.2	Yes
	tectonics1.3	Yes
Amara	*geography2.1*	Yes
	geography 2.2	Yes
	geography 2.3	Yes
Claire	*osmosis2.1*	No
	osmosis2.2	Yes
	osmosis2.3	Yes
Emma	*evolution2.1*	No
	evolution2.2	Yes
	evolution2.3	Yes
Hua	*flower2.1*	Yes
	flower2.2	Yes
	flower2.3	Yes
Isabella	*Wittgenstein1.1*	Yes
	Wittgenstein1.2	Yes
	Wittgenstein1.3	Yes
Jing	*Idealism1.1*	No
	Idealism1.2	No
	Idealism1.3	Yes
	Idealism1.4	Yes
Victor	*Idealism2.1*	Yes
	Idealism2.2	Yes
	Idealism2.3	Yes

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[7] All names are pseudonyms. Following standard practice at the research site, pseudonyms are in English, but some students choose to keep their Chinese names. My use of pseudonyms in the examples reflects this variety of choice.

As can be gleaned from Table 5.1, the episodes varied in the materiality of their topics, i.e. either concrete or abstract. Of the 9 reformulating explainers, 6 involved depictions of concrete systems, i.e. processes of scientific phenomena. The concrete systems described were *flower reproduction*, *the water and rock cycles*, *osmosis*, and *tectonic plate formation*. The other three involved descriptions of abstract content pertaining to the philosophical concepts of *Idealism* (n=2) and *Wittgenstein's mental worlds* (n=1). As observed in other studies on explanations of processes (e.g. Kang et al. 2015), how participants attended to the materiality of the explanations varied. For instance, within a depictive diagram of flower reproduction (*flower2.3*), the term *reproduction* may be accompanied by an abstract analogical gesture of the hand moving back and forth. Conversely, concrete illustrations could be observed in explanations of abstract topics, such as to exemplify the illusory reality of walking in the forest (*idealism2.2, 2.3*). For this reason I refrained from categorizing the explanations beyond depiction by gesture.

Following initial observations of depiction, I opted to do a single-case analysis (Schegloff 1987; Hutchby & Wooffitt 2008; Mondada 2011) of a selection from the corpus to identify candidate phenomena of focus. Analyzing single episodes gives the analyst a detailed picture of "the various conversational strategies and devices which inform and drive" the production of a prototypical speech event (Hutchby & Wooffitt 2008: 114). In the C-S corpus, I wanted to explore the nature of reformulated depictions, and how particular depictions were repeated in subsequent explanations. Given the reiterative nature of the C-S task, I concluded that a microlongitudinal analysis would be appropriate to test a trajectorial approach. After viewing the data various times, I settled on an explanation of the chemistry concept of *osmosis*, as given by a year-1 student Claire (cf. Table 5.1). This case was chosen because of the

longer sequences of depiction that Claire displayed and the clarity of changes in subsequent trials of her explanation. Thus, the general aim of the analysis was to account for the changes in Claire's verbo-gestural depictions. Through this analysis I identified patterns in her orientations to various aspects of the explanation that involved the following phases:

(1) Negotiation and/or selection of turn

(2) Verbalization of the topic of the stimulus (contextualization)

(3) Sequence organization and turn-design in explanation

(4) Closing of the explanation

Following Markee (2000), I then examined how other participants in the C-S corpus oriented to these aspects for a prototypical overview of the interactional ecology of the task.

5.2.2 *Prototypicality of the task*

Generally, explainers could be observed orienting to the same four sequential moves as in *osmosis2*, i.e. a turn allocation, a contextualization that verbalized the topic of the stimulus with a spoken definition (i.e. *x is y*: cf. Markee 2000: Ch. 7), an explanation of the topic through installments of the subtopics or examples, and a closing move at the end of the explanation. Following a turn allocation phase, explainers initiated their turns by verbalizing the topic with a definition. This was done in two ways, either within the same tone group or by a clear natural division between naming the topic and its expansion through a spoken definition, which occurred by overt display such as a pause, gaze change or posture shift. Definitions within the same tone group were analyzed as occurring within the same move. After

these initiating moves, the task unfolded with the explainer devoting a single turn to elaboration and illustration of the topic. In Section 5.3 the construal of content within these phases is analyzed in a single case.

Some general patterning of pragmatic organization in turn allocation and closings of the explanations were also observed, but an extensive analysis is beyond the scope of this current study. Briefly, turns at explanation were oriented to in two ways: participants either negotiated their turn selection, so the subsequent explainer took the floor when the first completed theirs, or the peer-instructor would come to the table and allocate first, second, and/or third explainers. Explainers then completed their turns either voluntarily or because the instructor ended the trial, leaving some explanations cut off in mid-turn. I observed two general strategies for marking completions voluntarily: explainers either a) verbalized the end of their turn (e.g. *that's all*) or b) stopped talking, thus leaving the listener(s) to infer the end of the turn.

Naturally, explainers rarely developed their explanations free of trouble or interruption. Rather, listeners often attended to the explanations by taking the floor for questions, comprehension checks, and even to divert to their own topics (cf. Schegloff 2007). These interventions are what make up the analysis of co-participant interactivity in the collaborative achievement of the multimodal explanations. A key aspect of listener contribution is in how they shape the trajectory of the explanations through expansive insertions that afford new sequences of interaction. For instance, by displays of comprehension, either lack of it, or demonstrations of comprehension in multimodal paraphrases. Explainers could then be observed orienting to co-participant interventions through either giving indications to continue, or as occasions for repair and respecification of depictions in the current explanations. In subsequent trials, explainers could be observed refashioning their depictions according to

previous co-participant intervention, displaying in their reformulations an intersubjective understanding of possible trouble spots (cf. Schegloff 1992, 1997). From these observations, a patterned trajectory of interactive affordances could be seen (A refers to explainer, B to listener):

A: Explanation

B: Co-participant interactivity (e.g. discourse marker, question, repair initiator)

A: Repair/re-formulation

Which when traced into the next episode can be parsed in the following manner:

A: Reformulated explanation

A: Comprehension check or other communication strategy

B: Preferred/dispreferred response

A: Continuation/reformulation

Sometimes changes followed an alternative trajectory, as follows:

A: Explanation

A: Comprehension check or other communication strategy

B: Co-participant interactivity

A: Repair/reformulation

A: Repair/reformulation in next explanation

Within these reformulations, the changes in gestural forms were then analyzed retroactively by comparing transformations in the previous trials. The basis of the analysis was the cognitive linguistic notion of construal, i.e. changes in gesture form were observed as accounting for changes in how the depiction was to be imagined for the purposes of explanation. Following this analysis, speakers were observed orienting to and mobilizing construal in three ways: i) in the design of their depictions to establish enchronic reference point relations, i.e. in the formal and praxeological details of their sequential hand configurations (cf. fig. 4.3); ii) in the calibration of construal dimensions for accommodation of same-turn repair; and iii) by intersubjective projection of possible trouble in new-turn redesigns of the depictions.

5.2.3 *Contextualizations in the C-S corpus*

This section provides an overview of topic contextualization in the C-S corpus. When speakers attend to matters in talk, they typically orient to them by making them relevant in some way in their discourse (cf. Goodwin & Duranti 1992; Gumperz 1982). In institutional settings such as the classroom, the discussion of topical matters is normally understood to be achieved by the teacher assigning the topic or task (Ellis 2003; Sert 2015). It is often also the case that students spontaneously digress towards a problem word or phrase (Markee 2000; Swain & Lapkin 1998) or task-irrelevant talk (Seedhouse 2004). Therefore, as Seedhouse (2005) points out, how tasks transpire in actuality is not transparent in their design, and indeed, even topics in such cases require that they be "brought about" (Auer 1992: 5, 27). In this section, how the participants oriented to verbalizing the topic of their explanation will be described. I report on cross-sectional findings as gleaned after a single-case analysis of Claire in *osmosis2* (explored in detail in section 5.3). I observed how explainers oriented to the topics of their task stimuli by attending to salient items of the explanations. It became

clear that topic contextualizations were not as direct as merely explaining the stimulus. Explainers needed to secure the context of their explanation in relation to the topic, and in the C-S task, explainers and listeners alike typically formulated their topics using an *about* move structure to align their explanation with a definition.

What follows are examples of topic contextualizations found in the C-S corpus. Transcription conventions are provided in Table 5.2, adapted following GAT2 minimal transcription (Selting et al. 2011) and Mondada's (2011) guidelines for representing simultaneous action with speech.

Table 5.2 Conventions for transcription of talk and interaction

[ ]	Overlapping talk
=	Contiguous talk (latching)
wo:rd	Lengthening of sound
wo-	Truncated speech
.	Abrupt final intonation
(.)	Brief pause of less than 0.5 seconds
(#.#)	Estimated pause (longer than 0.5 seconds)
↑↓	Sharp rising or falling in pitch
>words<	Sped up speech
$words$	Smiling while talking
£words£	Laughing while talking
≈words≈	Nodding while talking
°words°	Whispering
/words/	Estimated orthography of local pronunciations
{*words*}	Standard orthography of local pronunciations
{zh=*hello*}	Translation of Mandarin Chinese
(*laughs*)	Descriptive events or behavior within speech
(xx xx)	unintelligible speech
→	Lines selected for textual analysis

Reformulations given in the about-move structure manner were generally stable, but with clear variation, as in example (5.1):

(5.1) *heart1*, Anita

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[1] erm my essay is about the human heart
[2] my article is about the our heart
[3] er the article is about human heart
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Here the explainer shifted from an objective construal in the predicate in [1] ('the human heart'), to an intersubjective one in [2] ('our heart'), then back to an objective one in [3] ('human heart'). These coincide with the shift in ground from objectively construing her role in the explanation ([1] 'my essay', [2] 'my article') to subjectively construing, i.e. taking for granted her role, in [3] ('the article', cf. Langacker 2008). Thus we see how subtle deviations have potential to become salient forms, but that shifts in complexity were not always made on the basis of a previous iteration (cf. Bisang 2015). As in previous RCT studies (cf. Clark & Wilkes-Gibbs 1986), often the more general or simplified construal emerged in the later trials, as in example (5.2):

(5.2) *geology2*, Amara

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[1] my article is about er three cycles involve er
    involve our earth
[2] my article is about the three cycles in the earth
[3] my article is about geography
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Syntagmatically the *about* move construes a reference point relation (Langacker 2008). In a contextualization, the reference to the topic functions as a schematic place holder for the most general referent in a series, in this case the speaker herself, and the

first target is the predicate which functions as a more specific entity, thus instantiating a figure-ground relationship (Goodwin & Duranti 1992: 9–13). Therefore, the verbalized contextualizations of the explanation can be understood as construing a domain where everything that comes after it is embedded within that domain, in this case the rest of the explanation. Gestures can also be recruited for enacting reference point and figure-ground relationships, examined in the next section. Unlike Clark and Wilkes-Gibbs's (1986) and Fischer's (2003) data, a patterning towards more sophistication in the contextualizations did not generally become simpler in terms of number of words and grammatical phrasing. This is more clearly observed in contextualizations where the participants engaged in exchanges co-attending to trouble, as in example (5.3), where the participants used language alternation into their L1 to give assessments about the task.

(5.3) *evolution1*, Sophia

[1] Sophia and Jing

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08 SOP:    er: this article is about the (.) er: eve- evolution
09         of (.) biology (.) er in the earth
10         and (2) er: (2) it's intro- er:: (5)
11    →    it's 咋说呀(.)这太难了(2)这全是生物(.)我就(.)我就没学过生物
                {zh=hey, yeah (.) this is too difficult (2) it's
                 all animals (1) i've never studied biology}
12 JIN: →  my topic is about idealism  (0.5)
13 SOP:    什么啊 (.)
                {zh=what?}
14 JIN:    idealism [philosophy]
15 SOP:             [can you   ] (0.5)
16         philosophy 的 (laughs)
                    {zh=possesive particle}
17 JIN:    非常陌生的话题 (1.4)
                {zh=very strange topic}
18 SOP:    oh: (0.5)
20 JIN:    理想主义
                {zh=idealism}
21 SOP:    yeah (1)
22 JIN:    什么都看不懂
                {zh=can't understand anything}
23 SOP: →  er it's interesting (17.7)
                            +looks down at paper
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24          er yeah (.) and evolution (.) en is a (.)
25     →    process from er simple to complexity (0.4)
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[2] Sophia and Helen

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13 SOP:    this article is about the: evolution (.)
14         of the: biology in the earth (2)
15     →   understand↑
16 HEL:    ≈yeah≈
17 SOP:    yeah (.) and: er it's (.) er it's in- introduc- that
18         (.) it's a process (.) of the: (2) er of the biology
19         from the si- from simple to: er complexity (2)
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[3] Sophia, Jim, and Ivy

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47 SOP:    this article is about the law of increasing
48         complexity of the er er
49     →   it means the evolution of biology in the earth (.)
50     →   such as (.) er::m (.) biology is from the cells (.)
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In her first trial (5.3[1]), Sophia's exhibition of trouble at the arrowed line (11) is given in Chinese, prompting Jing to take the turn to verbalize her topic (line 12), which initiates alignment of mutual insufficient understanding (cf. Sert 2015), with her peer (lines 13–22). When Sophia looks at her stimulus again (line 23), she augments verbally with 'process from er simple to complexity' (line 25). In the subsequent trials (examples 5.7[2] and 5.7[3]), the augmentation to the topic occurs in more integrated ways. Thus the simplification conceals interactional troubles and skillful repair work that take place in developing the topic. Also in her second trial, Sophia uses a confirmation check (line 15) before the expansion, at precisely the point where she exhibited trouble before. Thus explainers also resorted to giving their explanations in installments, i.e. partitioned into parts or sub-topics (cf. Clark & Wilkes-Gibbs 1986; Nemirovsky & Ferrara 2009).

Explanations, like all utterances, are holistic in that any of the elements can be rearranged to be re-expressed in distinct patterns and constructions. This is precisely the nature of construal, in that the synonymy of alternative construals can often

conceal slight adjustments in meaning (Croft & Cruse 2004), and likewise render non-transparent the lack of truth correspondence. In other words, alternate construals are not necessarily synonymous, given that they unfold along distinct organizational processes of conceptualization. This is exemplified in the ways that the topics themselves were oriented to, as in example (5.4):

(5.4) *Wittgenstein1*, Isabella

[1] Isabella, Ivy, and Xuhui

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001 ISA:    okay (.) so it's my turn (.)
002      →  and the topic is about inner and outer
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[2] Isabella and Jim

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002 ISA:    so me first so: er the topic of this article er (.)
003      →  it's not a article (.) maybe it's a comic (.)
004         er so the topic of the com-
005         the topic of the comic is about the inner and outer
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[3] Isabella and Anita

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006 ISA:    okay so (.) erm first i have to state that (.) er
007         i'm totally confused (.) by this (.) article (.)
008         er i don't actually know what this means because it
009         it's about (.) it's only about the (.)
010         the feeling (.) and: the desire about people
011 ANI:    er: i (laughs)
012         me too (laughs) (0.5)
013 ISA: →  and i'm not a psychologi- psy- psychologist so (.)
014         i don't know what it exactly about (0.3)
015         so i only briefly introduce to you and this article
016         (.) the article about (.) the article no sorry (.)
017         the topic of the article (.) er is not a article (.)
018         it's a comic (.) er
019         the topic of the comic is about the inner and outer
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At the arrowed line in the second trial (line 003), Isabella begins to clarify that the reading was in the form of a comic and not an article, a strategy which is repeated in the third trial. It is also significant that by the third trial the mitigation consists of

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face-saving claims of insufficient knowledge, but also projection in line 013, 'I'm not a psychologist', anticipating a topic associated with expressions of emotions.

Therefore some tendency towards a typology of interaction can be observed in the construction of ad hoc categorization (Hauser 2011) of the topic-at-hand. Specifically, trouble-free explanations demonstrate different trajectories than troubled ones, involving either recipient interaction and/or repair work (cf. Hellermann & Pekarek Doehler 2010; Schegloff 1992, 1997). Thus collaborative meaning making is achieved in distinct ways, leading to distinct strategies for orienting into the expansive, post-definitional specifications formulated in explanation and depiction.

5.2.4   *Orienting to depiction in the corpus*

As described in section 5.3.1, 26 out of 54 episodes of explanation involved some kind of depictive gesturing. Typically, explainers organized their explanations by orienting to them at the end of contextualization and definition phases within their turn at explanation. Depictive gestures were often used at the beginning of new turn-constructional units (TCUs), that is, at recognizable segments of talk (sentences, phrases, intention units; cf. Schegloff 2007). Given that explainers partitioned their turns into topic contextualization followed by a depiction, depiction sequences were organized in ways that resembled how speakers align their interlocutors for receiving their talk as listener (Goodwin 2018; Heath 1984; Sacks 1992: Vol. 2; Streeck 2009b). In other words, depictive gesturing tended to occur at the end of the topic phase to make recognizable the actions of explainers as depictions of the contextualized topic. Lilja and Piirainen-Marsh (2019), for example, reported how within instructional contexts such as in teaching people how to garden, depictive gestures occurred at or towards the end of the instructor's turn, visualizing the previous instruction. The coordination of gaze, gesture, and silence functioned to make the depictions—which

for the instructor and student amounted to a target learning object—noticeable for the learner. Likewise, in the C-S corpus, depictive sequences occurred at transition points after verbalization of the topic and into the elaboration phase, thus making them noticeable to the interlocutors as distinct moves.

To orient to depictive/explanatory sequences, explainers sometimes coordinated their gaze to their hands after a contextualization phase, but rarely used deictic expressions explicitly. Instead, explainers were observed orienting to the depiction implicitly through the construal of their utterances, such as by saying 'maybe we got two two tubes' (*osmosis1.3*) or 'if I have a big cup' (*osmosis2.3*) The terms *maybe* and *if* in these utterances serve to open the space of a hypothetical situation, signaling a cue to imagine what the speaker is saying (Langacker 2015: 135). This was not always the case even with the same speakers (compare with*:* 'I have a cup I have a big cup' from *osmosis2.2*). Oftentimes, however, explanations were seen coupled to the explanation phase without any other multimodal coordination other than body movement. The remainder of this chapter will explore these longer sequences of depiction that were observed in the C-S task by first examining depiction sequences in *osmosis2*.

5.3   Sequential analysis of reformulations in depiction: *osmosis2*

The purpose of this section is to trace the development of depictions through the interactivity of trouble and repair in Claire's explanations in *osmosis2,* demonstrating how interactional elements in concept development are sensitive to an analysis of interactive affordances. Two aspects for the affordances for depiction are analyzed: 1) recipient design in the formulation of the depictions, which includes posture shifts and multimodal sequence design, and 2) contingencies and affordances of interaction for

construal in the depictions. These will be first examined in Claire's attempted explanation in *osmosis2.1*, followed by a comparison to *osmosis2.2* and *osmosis2.3*.

As will be shown in the analytical excerpts for *osmosis2.2* and *osmosis2.3*, Claire orients to the space in front of her to enact a depictive space and make noticeable the transition from topic definition to explanation. Recipient design of the depictive sequences that follow can be observed in how she proceeds to depict the objects and processes using various strategies to bring these about. One strategy involves the manipulation of perspective in the depiction. Claire designs her depiction to enable her to enact manipulations of items in a virtual experiment. However, she also annotates these objects to depict microscopic processes that occur within them, and therefore also constructs a zoomed-in view of the experiment. Much in the way that miniature worlds are gesturally constructed to depict actors and events in a narrative (Streeck 2008), Claire visualizes salient items through gesture, amplifying certain aspects of the experiment while manipulating others as if they were normal size. Such a construction enables her participants to observe these processes in a manageable field of view in front of them. Another strategy involves Claire's use of what Enfield (2009) calls symmetry-dominance constructions (114–150). In a symmetry-dominance construction (SDC), one gesturing hand stabilizes a form while the other is free to motion and act upon it, thus enabling a hierarchical enactment of multiple layers of representation. Through a metonymic relation (i.e. a part standing in for the whole) which creates a conceptual cohesion throughout the sequence, the stable form is able to maintain a visualization while the free hand can represent processes or other entities that require temporal order to be visualized.

As will be seen, in *osmosis2.1*, Claire's first trial at explanation is characterized by trouble in articulating her topic. This trouble leads to collaborative construction of

the topic into what Claire names a *chemistry phenomenon*, and a salient element of the topic, the solute in the osmosis experiment, she conventionalizes into *sweet water*. In *osmosis2.2*, Claire is able to develop her depiction of the laboratory experiment more fully, with salient aspects of design and trouble leading to reformulations. These reformulations, along with other transformations, are given new depictions in *osmosis2.3*. Claire's formulations of her topic and of the solute in her explanations of *osmosis2.2* and *2.3* demonstrate the role of previous interactions. Analysis of the three trials illustrates how these explanations are contingent on intersubjective and intercorporeal affordances. (fig. 5.1).

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Figure 5.1 Figure diagram given in osmosis task

The transcript at this stage involves more detail in the verbal and vocal content and is thus also animated for multimodal representation, as shown in Table 5.3. Different embodied actions are represented along several tiers. The numbered line represents speech, while a line directly below it represents gestural activity, identified by (g:). When relevant to the analysis, gaze is also represented on its own tier by (z:). Underneath the embodied action tiers, the numerical sign (#:) represents figures that reproduce selected images. Written comments pertaining to participant actions that

are aligned with speech conduct are written underneath the figure tier with a + and comments in italics (cf. Mondada 2011). Speech corresponding to the reproduced images is placed underneath the images. Underlined speech in the images represents co-occurrence with gesture strokes, holds, and dynamic gesturing. The annotation system in the gesture tier is adapted from Kendon (2004) to represent gesture phasing.

Table 5.3 Annotation conventions for gesturing.
Adapted from Kendon (2004), Mondada (2014), Park-Doob (2010).

`|`	Onset/offset of gesture unit
`~~~~~~`	Preparation, retraction, body movement
`^`	Stroke
`----`	Hold
`--.--`	Beat
`^***`	Dynamic stroke with motion
`~~~`	Provisional holds/holds during preparation or retraction
`+ +`	Descriptive events co-occurring with speech transcribed on a separate tier. First + marks beginning of action, second marks end
`»`	Action continues into next line
`g:`	Tier designated for co-occurring gesture
`z:`	Tier designated for gaze
`#:`	Refers to figure or description in the transcript Attention of gaze (e.g ›*book*)
`›`	Pointing or deixis
`p→`	Palm-down/Palm-up/Palm-lateral
`PD/PU/PL`	Palm-in/Palm-out
`PN/PO`	
`H----H`	Home body position over long stretches of talk

5.3.1 Osmosis2.1

The transcript in Excerpt 5.1 reproduces Claire's initial contextualization of her topic, which she only begins after a request by her co-participant Emma. Trouble is displayed by Claire at line 089 and by Emma at line 091, which both participants mitigate through laughter and smiling.

Excerpt 5.1 Contextualization of *osmosis* as *chemistry phenomenon*
mcht1617exp18ug2[02:21.403 – 03:24.548] Participants from left to right:
Emma, Claire

Figure 5.2 Paired explainers in *osmosis2.1*

```
082 CLA:    to be honest i (1) hh (0.6)
083         hm i can't understand this [hm]
084 EMM:    [(laughs)] what what is that about
085 CLA:    er about um (2) hh (1.6) er:: (1.5) er: (2.5)
086 EMM:    what (laughs) (.)
087 CLA:    mm (0.7) er (1) what do you want to know (smiles)
088 EMM:    hh what what is the main topic about that article
089         (1.6)
090 CLA: →  er (0.8) er (0.6) chemical (0.4)
091     →  chemical $/phenomen/$ (0.5) $phenomenON$
    g:                                     +nods down+
092 EMM: →  capitol
093 CLA:    hh [er:    ]
094 EMM:       [capitol]
095 CLA:    no no no no er. (1.6) [$just wait$]
    g:                           +grabs phone, types»
    z:                            +looks at phone»
096 EMM:                         [(laughs)   ]
097 CLA:    hh (0.4) er:
098 EMM:    maybe i can tell you something about this=
099 CLA:                                            =yes=
100 EMM:    =erm because i think that [(.) our  ]
101 CLA: →                            [°oh.okay°]
102 EMM: →  article are same so so i [can]
```

```
103 CLA: →                            [chemist]
104 EMM: →   chemi-
105 CLA: →   chemistRY
106 EMM: →   chemistry [oh oh:     ]
107 CLA: →            [£chemistry£]
     z:                    ›EMM»
108 EMM:   it is about [/biolistry/ (0.6) er is]
109 CLA:               [≈mm≈                yes]
110 EMM:   about the er (0.4) growth (0.3) [of the]
111 CLA:                                   [mm]
```

Claire starts by claiming insufficient understanding, prompting Emma to initiate a contextualization at line 084 by directly requesting (cf. Al-Gahtani & Roever 2012) the topic from Claire, who fulfills the request with some trouble (lines 085, 087, 090) and self-initiated repair (line 091) to formulate the phrase *chemical phenomenon*. Emma responds with the misheard word 'capitol', after which Claire re-strategizes by requesting time, looking at her mobile phone (line 095). At line 099 Emma seizes the interim to take her turn as explainer, believing her article to be the same as Claire's. At line 101, Claire, while looking at her phone, appears to privately display a token of understanding, mouthing 'oh.okay', overlapping Emma. Though Emma attempts to continue as explainer, Claire overlaps at line 103 by privately uttering 'chemist', possibly having looked up a translation in her phone. The sequence from lines 095 to 103 demonstrates how the withdrawal into private resources was occasioned by Emma's misheard repetition of *chemical* as *capitol*.

Lines 103 to 106 demonstrate Claire and Emma's collaboration in establishing the term *chemistry*, which develops from the uttered transformations 'chemist' to 'chemistry', a re-lexicalization of the trouble-causing word 'chemical'. Despite Claire's overlap, Emma repeats part of her utterance as 'chemi-'. Claire then interrupts Emma to complete the word using a prosodic emphasis at the end of the utterance 'chemistRY'. Emma appears to receipt understanding through a repetition of Claire's term (cf. Greer, Bussinguer, Butterfield, & Mischinger 2009), affording

Claire the uptake of the receipt by laughing as she repeats the word, looking up at Emma after having been on her phone since line 094. Thus, the transformation of *chemical* into *chemistry* is shown to be an incremental and interactive process. At line 107, the transformation appears to establish a satisfactory definition for Emma, affording her opportunity to interpret the end of Claire's turn to initiate her own turn as explainer. This occurs through an *achieved similarity* (Sacks 1992) that she observes, having already explicitly proposed such similarity at lines 097 and 101. Her pronunciation of *biology* as 'biolistry' at line 107 might also be an indication of achieved similarity as a chimeric rendering of *chemistry*. In the transcript, Emma continues with her explanation until the peer-instructor arrives to return the floor to Claire who expressed that her explanation was incomplete.

In Excerpt 5.2, a similar trajectory is achieved in Claire's characterization of the solute in the osmosis stimulus. Here the term *sugar water* becomes transformed into *sweet water* through interactivity. Notice that Claire begins pointing to her stimulus as she attempts to clarify it for herself and her peer.

Excerpt 5.2 From sugar to sweet in *osmosis2.1*
mcht1617exp18ug2[06:12.146 – 06:39.910]

```
188 EMM:    so what is it about [(laughs)]
189 CLA:                        [er]
190 EMM:    (laughs) hh
191 CLA:    er let me (1) think here (0.5) think let me
192      →  think (1) er oh er this is er (.) this is water
    g:                 +moves paper towards EMM+
    g:                                     +p→figure»
193         (.) [er which]
194 EMM:        [er    ] (0.3)
195 CLA:    oh (1.4)
196 CLA:    which have $su:gar$ (laughs)
    z:                 ›looks at EMM
197 EMM: →  sugar yeah=
198 CLA: →          =yes er sugar water i think mm=
    z:                    ›looks at paper
    g:                 +p→paper+

199 EMM: →  =sugary water=
```

```
200 CLA: →                      =sugary water yes yes.er sweet water
    g:      +brings paper towards self, p→paragraph»
201         [≈mhm≈]
202 EMM:    [oh ok] ok ok
```

After establishing the term *chemistry phenomenon*, Claire is unable to elaborate with more detail about her topic while Emma has been laughing and pressing her to explain. Claire verbally requests time to think, and at line 192 shows the paper to Emma, pointing at a figure as she says 'this is water'. Emma looks at the paper, but her lack of any response coincides with Claire silently reading the paper. Claire subsequently produces a multimodal epistemic change-of-state token at line 194: an eyebrow raise with the utterance of 'oh', displaying to Emma that a new bit of knowledge has been achieved (cf. Heritage 1984b). The achievement of Claire's epistemic change-of-state is demonstrated at line 195 when she looks up at Emma as she says 'which have su:gar', smiling as she slowly utters 'sugar'. Emma appears to confirm understanding with a repetition and an agreement at line 196, enabling Claire's continuation by suggesting the nominal compound, 'sugar water' (196). Emma reuses and transforms the compound into the adjectival phrase 'sugary water' (197). At line 198 Claire repeats Emma's transformation and during the course of agreement further transforms it to 'sweet water'. As Emma displays understanding at line 200, Claire returns the paper to her side of the table. Thus in this short exchange (lines 182 to 200) a key element in Claire's topic—the solute in the osmosis experiment—is interactively constructed. Specifically, the interactivity involves repetition, reuse, and transformation as analytical strategies for word replacement to specify a term. Table 5.4 summarizes the microgenetic trajectories of these terms from *osmosis2.1*, as given by Claire.

Table 5.4 Microgenetic trajectories of terms in *osmosis2.1*.

f# refers to successive formulations

Table 5.2a Formulations of *chemistry phenomenon*

f1	→	*f2*	→	*f3*	→	*f4*	→	*f5*
chemical phenomen		*phenomenON*		*chemist*		*chemistRY*		*£chemistry£*

Table 5.2b Formulations of *sweet water*

f1	→	*f2*	→	*f3*	→	*f4*
this is water [...] have $su:gar$		*sugar water*		*sugary water*		*sweet water*

As part of tracing possible learning phenomena, Claire's successful contextualizations will be examined in how they are reiterated in subsequent episodes of the explanation task. That is, through a chronological development of Claire's contextualizations from *osmosis2.2* to its final iteration in *osmosis2.3*.

5.3.2   Osmosis2.2

Excerpt 5.1 reproduces Claire's initiation of her explanation, characterizing it as a chemistry phenomenon, conventionalized in her previous trial with Emma. While the previous explainer, Amara, is finishing her turn, Claire can be seen shifting her posture, taking in-breaths and tapping her fingers and pen on the table (lines 54–58).

Excerpt 5.3 Orienting into depiction in *osmosis2.2*

mcht1617exp22ug3[02:29.875 – 04:41.955] Participants from left to right:
Amara and Claire sit across from Hua.
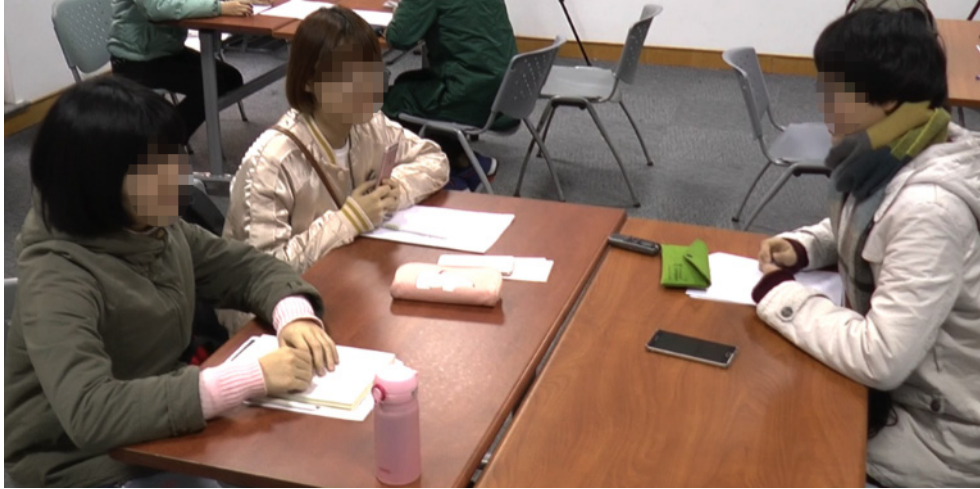
Figure 5.3 Triadic arrangement of *osmosis2.2*

```
054 AMA:   i i i too but [i can't]
055 CLA:              [oh:]
056 HUA:              [(laughs)]
057 AMA:   explain it in [english (laughs)]
058 CLA: →            [hhh]    [oh: what]
     g:              H--------H-------»
     #:5.4                 a        b
059       i should explain is er er
060    →  /chemicry/ [er phenomenon (x)]
061 AMA:              [what a chem- chem- ]
062 CLA: →  er: chemistry (1.4) er (0.8) chemistry is (1) hh er:
     z:   ›up, away        ›AMA ›away
063       (0.9) °{zh=(xx)}°
064 AMA:   [{nods} oh: yes yes]
065       [ok ok  ((nods)) yes]
066 CLA:   mm what i (1) (nods)
067       too boring i think [(nods) too boring]
     g:         +beats repeatedly pointing down at paper+
068 HUA:                    [(laughs) ok]
069 CLA:   i can't understand this (xx)

((lines 070 to 88 omitted))

089 HUA:   so turn (.)
090 CLA: →  oh er first i want to explain the the reason why i
091       want to join your group hh erm i meet you er (.)
092       when er when we have a debate competition

((lines 092 to 106 omitted))

107 CLA:   oh ok [ok mm]
     g:   +leans back+
108 HUA:       [i didn't] remember it
109 CLA:   erm (.) er what i read is er (.)
     g:            +point tapping        +
110    →  erm chemistry phenomenon
     g:       +twirls pen        +
```

```
a.                         b.
AMA: explain it in        AMA: [(laughs)]
[english]                 CLA: [oh: what] i should
CLA: [hhh    ]                 explain is
```

Figure 5.4 Mobilizing into a depictive sequence

Claire's body shift appears to orient Amara and Hua (not shown) as listeners.
She leans back (a), and then forward (b), tapping on the figure in her paper as
she begins to take her turn at explanation.

At lines 059 and 061 Claire immediately attempts to introduce her topic by defining it
as a 'chemistry phenomenon', although with some repair occasioned by her
pronunciation of 'chemicry' (perhaps a slip of the tongue combining the words
'chemical' and 'chemistry'). Claire's utterance immediately occasions Amara to
request clarification (line 060), to which Claire responds with 'chemistry', gazing at
her recipients and pausing, then repeating the term. As her recipients do not appear to
display comprehension, evidenced by the almost one second pause at line 062, Claire
turns to Amara and whispers in Chinese. Although Claire's whispering is inaudible on
the recording, Amara's reaction displaying tokens of understanding (head nods
synchronized with lengthened intonation 'oh: yes yes') may support the interpretation
that Claire whispered the Mandarin word for either *chemistry* or *osmosis*. The omitted
lines correspond to a digression sequence (cf. Schegloff 2007) where the three peers
discuss the difficulty of the task, followed by a further digression into Claire talking
about her reasons for attending the session—to reunite with Hua whom she had met at
a previous debate competition at another school. Hua's dispreferred response (cf.

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Pomerantz 1984), her indication that she did not remember the encounter, occasions Claire to resume to the business at hand of the task. Claire leans back and forward once again, tapping on the table as she did before, displaying her orientation to the task (lines 108, 109).

Two aspects of body movement can be observed in the trajectory of Claire's initiating posture shifts. The first is that for Claire, taking the turn involves some kind of body movement, i.e. adjusting into a position that indicates a change in conversational role from listener to speaker, which signals a role change for her co-participants as well. The second is that the posture shift and hand positions project the explanation space subsequent to initiation (cf. Streeck 2009a). Her depiction begins when she places the pen on the table and extends her hands, making them ready for the depiction.

Excerpt 5.3 (cont.) Claire designs the *big cup* container and its contents

```
111 CLA:     er i have a cup i have a big cup (1)
     g:      |~~^------------.------.--.---.----|
     #:5.5    a
     z:       ›hands
112 CLA:     er in this cup erm er i pour some waters [mm    ]
     g:      |~~^----------------~~~~~~^*****.-----.--------»
     #:       b                      c
     z:                                              ›HUA
113 HUA:                                             [(nods)]
     z:                                               ›hands
```

a. **i have a cup i have a big cup (1)**   b. **in this cup erm**   c. **i pour some waters**
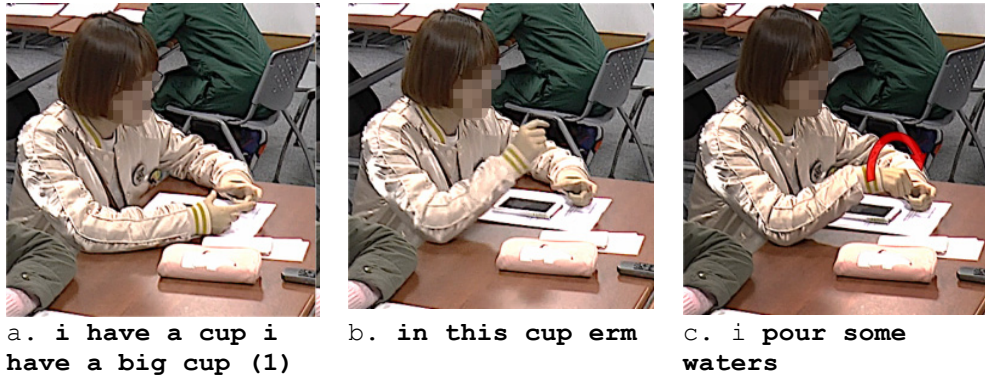
Figure 5.5 Depiction of the big cup in *osmosis2.2*

Claire (a) models the outer edge of a big cup, (b) deictically locates space inside the cup, and (c) enacts a pouring motion through an SDC.

At lines 111 and 112 Claire depicts the large beaker onto the table using an SDC sequence. In the first gesture (fig. 5.3a), the index finger and thumb of both hands are connected, thus modeling the border of a wide rimmed container or enacting a grip around it[8]. She holds the gesture throughout the utterance at line 111 of 'i have a cup i have a big cup' until uttering 'in this cup'. She uses her right hand to perform an SDC with two functions. Her hand first indexes the contents of the cup when she points into her left hand, which is depicting (half) of the big cup as she says, 'in this cup' (line 112, fig. 5.5b). She then enacts a pouring motion by adopting a closed-fist hand shape, as if holding the handle of a container, and synchronized with 'i pour some waters' (line 111, fig. 5.5c). She looks up at Hua who then displays a confirmation token at line 113.

Claire resumes her explanation as she looks down at her left hand holding the big cup form, and points into it as she says 'this water ' (line 114, fig. 5.6a). She re-

---

[8] Some methods of depiction such as modeling or transporting are difficult to parse: these gestures can be motivated by the haptic knowledge of handling objects or by the perception of their properties (Streeck 2009b). Regardless, the depictive and communicative functions of Claire's gesture appears to evoke the object's presence in the explanation. As observed in the episode, and examined in later excerpts, schematicity can be both an affordance and a trouble source. See Hassemer and Winter (2018) for a perception study that examines this point.

completes the big cup as she beats downward (line 113, fig. 5.4b), then leans back in a preparation movement (fig. 5.6c), leaning forward, rhythmically beating up and down as she says 'sugary water' with a smile (fig. 5.6d). Claire repeats the gesture at line 115 to synchronize with the syllables of her utterance, referencing the content of sugar in the container (though not depicting it.) The repetition appears to function as both a conventionalizing action and a confirmation check, evidenced by Amara's and Hua's simultaneous uptake (lines 115 and 116, respectively). They hesitatingly utter the first syllable of *sugar* by a lengthening ('su:'), before Claire interrupts at line 117, shifting her gaze to Amara, and offering the alternative term 'sweet water', while also bringing her right hand to her face displaying hesitation. Hua repeats Claire's term, 'sweet water', at line 118, which Claire treats as confirmation of understanding to resume her explanation.

Excerpt 5.3 (cont.)

```
114 CLA:    this water is.is (.) is er: $sugary water$ (0.6)
    g:   »--.~~~^----~^-------------~~~~~~^--.-.-.--.------»
    #:5.6        a    b         c      d
    z:   »hands                    ›HUA
115 CLA:    sugary water
    g:   »-.---.--.-.|
    #:   (c) (c) (c)
116 AMA: →  [su:=]
117 HUA:    [su:=]
    g:    +leans forward+
118 CLA: →     =sweet water=
    g:       +brings closed fist to lips+
    z:        ›AMA
119 HUA: →              =er sweet [water]
120 CLA:                          [yes] yes (0.7)
    z:                        ›HUA  ›paper
```

| a. this **water** | b. **is.is (.)** |
| c. **is er:** | d. **$sugary water$** |
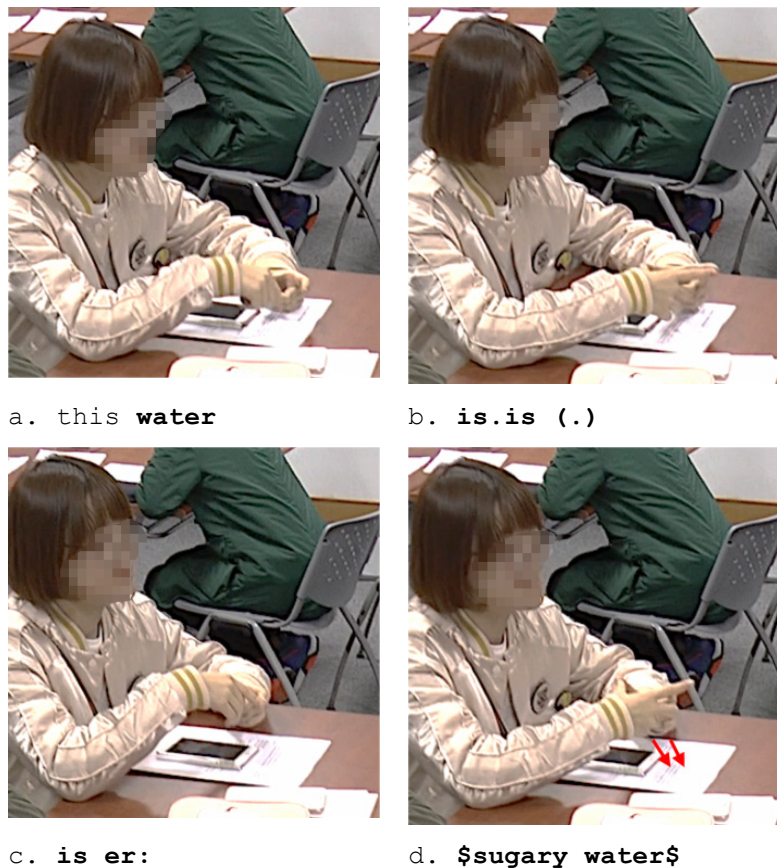
Figure 5.6 *sugary water* in *osmosis2.2*.

Claire sets up the depiction of sugar water by (a) pointing into the modeling of a big cup, (b) redepicting the cup, (c) pre-position preparation into (d) a cup-like form with beat emphasis.

As can be seen, there are various gestures involved in Claire's depiction of the containers and their contents through sequential installments. The hand shape of the big cup—bent fingers touching, and palms facing each other laterally—affords modeling which depicts a circle form to be visualized as a big cup. With the big cup visualized by the left hand, Claire can use her right hand to point and direct imagination into the cup, followed by the subsequent configuration of the right hand into a closed fist which affords the arc motion. By finally reconfiguring the big cup form with both hands, she can verbally index the contents of the cup's water, i.e. sugar, thus depicting a final imaginary form: *a large beaker filled with sugary water*.

In the ensuing sequence, Claire depicts the small thistle tube that contains a higher percentage of sugar solution. She depicts it with another SDC, characterizing the thistle tube as 'small cup', thus construing a distinction within a category of *cups*. A relationship of containment is referenced by the intersubjective verb phrase 'we put'. It will subsequently be shown how this categorization and corresponding depictions might lead to trouble later in the comprehension of Claire's explanation.

Excerpt 5.3 (cont.) Depiction of *small cup*

```
121 CLA:    mhm (.) and then we put a $small cup (0.8)$
     g:            |^~~~^***********.~~~^------------->>
     #:5.7              a   b              c
     z:                                          >HUA
```
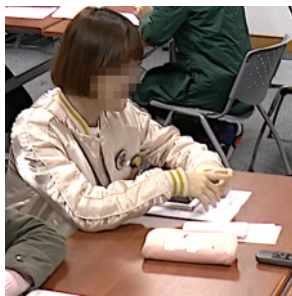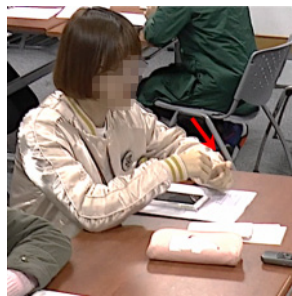


```
   a. and            b. then we put a      c. $small cup (0.8)$
```

Figure 5.7 Claire's *small cup* in *osmosis2.2*

```
122 HUA:    small cup
     g:            |^-->>
     #:5.8            a
123 CLA:    嗯对 {zh=yeah that's right} (laughs)
                              +throws hands up and
                               puts head on table
124         [yeah er mm]
125 HUA:    [yes small cup]
     g:     >>-----^~~~~~--~|
     #:           b
```

a. small **cup**   b. **yes small cup**

Figure 5.8 Hua's repetition gesture for *small cup*

```
126 CLA:    er er mm you put the small cup into the big cup
    g:    |^~~~~~~~~~~~~^--------------.-~^~~~~~~~~~.---.--»
    #: →  (5.7c)       (5.7a)              (5.5c)
```

At line 121, Claire reuses the big cup form (fig. 5.7a) but quickly configures into an SDC, her right hand, configured into a grip form, placed into the half big cup depicted by her left hand as she says 'then we put a' (fig. 5.7b). At the onset of uttering 'small', she quickly depicts a new cup form, both hands curling the fingers, right hand on top of left hand molding a small round hole synchronized with the utterance of 'cup' and a smile, thus forming a new cup form (fig. 5.7c). Hua takes up Claire's construction, smiling and gesturing in turn, forming her own visualization of the small cup (line 120, fig. 5.8a). After some laughter occasioned by Claire's L1 confirmation at line 121, Hua repeats her multimodal composite of the *small cup* (line 123, fig. 5.8b).

At line 126 Claire provides a transformed repetition of the previous utterance, inserting the preposition 'into' after put, clarifying her previous formulation and this narrowing its visualization. However, the complexity of the verbal message creates a visible mismatch in her gestures (cf. Breckinridge Church & Goldin-Meadow 1986). As she hesitatingly begins the utterance, she depicts the small cup, but reconfigures

into the *big cup* gesture as she says, 'put the small cup'. When she says 'into', she begins an SDC using the right hand enacting the pouring motion as in figure 5.5c. However, from the perspective of an observer, a mismatch occurs by her depicting a previously encoded gesture for *big cup* while uttering, 'put the small'. Having depicted the small cup only during her hesitating start, an observer would have to mentally hold the visualization of the small cup as she motions into the half big cup. Hua's *cup* gestures, in turn, are somewhat different than Claire's, both in location and configuration. Hua's thumbs and index fingers are only partially connected, and she uses the same table-level location as Claire's big cup. These gestures appear to resemble a hybrid between Claire's *big cup* and *small cup* gestures, so that between the two interlocutors mismatches abound.

The precision of the *small cup* gesture becomes further confused in Claire's depiction of the membrane that allows the solute to enter the large beaker through the diffusion process in osmosis. In this sequence, Claire depicts the membrane, characterized as 'paper', at the bottom of the thistle tube, and uses a dynamic SDC to depict how the solute enters the thistle tube through the membrane. Her verbalizing of 'small cup' becomes juxtaposed with various gestures, as well as the introduction of a new stable form—a depictive gesture constituted by two hands at chest level, finger and thumb rounded (as in the big cup gesture), not connected but set apart, and synchronized with the utterance of 'paper' (fig. 5.9c.).

Excerpt 5.4 Depiction of membrane separating thistle tube from beaker
mcht1617exp22ug3[05:01.712 – 05:15.260]

```
135 CLA:    hh er and er and er go thr- er in the bottom of
    g:                      |^~~~~~~^---------^******--»
    #:5.9                        p→air  a         b
136        the small cup we have er paper can like er
    g:     »--------~~^-----------^*----.---.---.-----»
    #:            (5.6a)          c
137        something through it
    g:     »^***************»
    #:     d
```
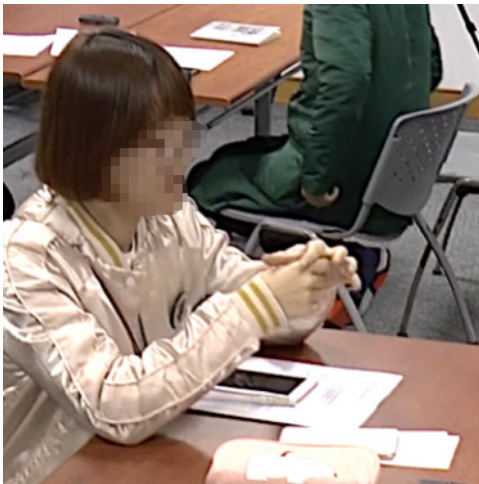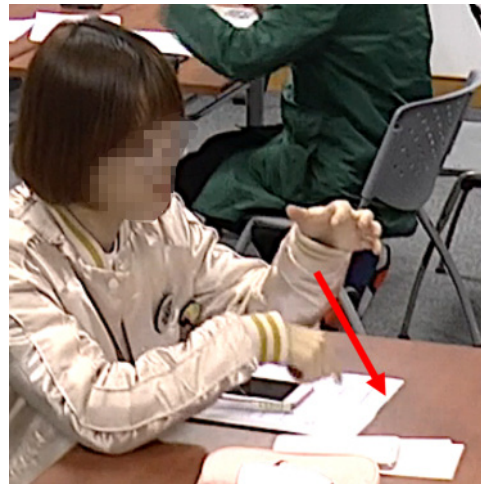

a. **er in the** / small **cup**   b. **bottom of the**

c. **er paper can like er**   d. **something through** it

Figure 5.9 Depiction of the membrane as *paper*

At line 135, Claire points into midair as she begins to utter the verb phrase 'go thr-' before quickly self-repairing into a locative preposition, 'in the bottom'. As she

says, 'in the' she briefly depicts the small cup (fig. 5.9a), but then configures into an SDC, left hand holding the half-cup form while the right hand points down to the table as she says, 'bottom of the small cup' (fig. 5.9b). Here she appears mindful in sustaining the *small cup* half-gesture, reforming it in its full version after uttering 'small cup' (line 136). However, the depiction of *small cup* is synchronized with 'we have er'. She quickly configures her hands into the new stable form depicting the membrane, as she utters 'paper can like er' (fig. 5.9c). The excerpt ends at line 137 with another SDC to construe the permeability of the membrane—left hand holding a *cup* form, right hand in an index point configuration and motioning up and down as she says, 'something through' (fig. 5.9d). Thus Claire designs the depiction of the membrane using a combination of previously depicted forms—the cup configurations and SDCs.

Claire resumes her explanation by depicting the effect of the osmosis experiment, that the sugar in the small thistle tube will diffuse into the large beaker, thus increasing the amount of water in the thistle tube. These depictions (not shown), occasion Hua to multimodally paraphrase Claire's explanation of the increase and to check the number of cups. Hua's depiction of cups prompts Claire to multimodally repair and adjust the construal of her gestures to accommodate the repair, as can be seen in Excerpt 5.5.

Excerpt 5.5 Multimodal paraphrase affords reformulation and repair
mcht1617exp22ug3[06:13.436 – 06:58.628]

```
165 HUA:    the water in the small will increase ≈o:k≈=
      g:            |~~~~~~~^---~~~~~~~~^*********|
      #:                              5.10
```


Figure 5.10 Hua's *increase* gesture

```
166 CLA:    =er yes=
167 AMA:           =why increase
168 CLA:    er i don't know hh
169         i just i just readed [≈this≈   ]
170 AMA:                         [$oh ≈ok≈$]
171 HUA:                         [er:      ] and (.) you made
      g:                           |~~~~~~~~~~~~~~~~~.~~~~»
172         a [big cup and a small cup and er]
      g:   »~~~^-------~~~~~^----------------»
      #:5.11    a              b
173 CLA:      [≈mhm≈ er ≈yeah yes≈          ]
174 HUA:    er also a small cup (0.8)
      g:   »~~~~~~~~~~^-------~~~~~~|
      #:              c
```


a. you made a **big cup**

b. and a **small cup and er**

c. also a **small cup (0.8)**

Figure 5.11 Hua's *three cups* gesture

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At line 165 Hua is depicting the increase of water, while Claire holds her previous constructed depiction, confirming Hua's multimodal paraphrase at line 166. Amara intervenes to ask why, to which Claire responds with a display of misunderstanding (lines 168, 169). At line 171 Hua hesitatingly intevenes with a lengthened discourse marker (*er*:) to signal that she has more to say, and thus shifting topic to a summary she produces in the next turn. She mulitmodally summarizes by paraphrasing Claire's depiction of the cups through a sequence depicting three cups: a big cup, a small cup, and, as she formulates it, 'also a small cup' (lines 172–174, figs. 5.9a–c). Hua synchronizes her utterance of 'big cup' with a gesture similar to Claire's *paper* gesture (cf. Excerpt 5.4, fig. 5.7c) but at table level. The mismatching of *big cup* with the *paper* gesture affords Hua to depict the *small cup* with Claire's *big cup* gesture. Having deployed these gestures in mismatched forms, Hua is afforded Claire's *small cup* gesture to be used for a second *small cup*.

Excerpt 5.5 (cont.)

```
175 HUA:   [oh:]
176 CLA:   [(0.5)]
     g:    +turns head to the side momentarily
177        er (nods) (0.6)
178 HUA:   erm (0.6) three cup (1.3)
     g:                |^-------------|
     #:(5.12)          +3-fingers
179 CLA:   er no no no no no er (0.3)
     g:    |^****************~~|
     #:     5.12
```

Figure 5.12 Embodied negation and enumeration

Hua's gestures prompt Claire to repair and reformulate the depiction of the cups. She turns her head to the side, while Hua utters 'oh:' as a change-of-state token (lines 175, 176), recognizing Claire's display as confusion. Claire nonetheless offers continuation by shaking her head, but Claire's display of confusion appears to prompt Hua to enumerate a *3* with her fingers, a completion move of the paraphrasing sequence in the manner of simplification (cf. Björkman 2011). As Hua sustains her gestured *3*, Claire presents her two hands in a vertical palms up configuration, oscillating her hands facing Hua as she utters five successive *no's* (fig. 10). The gesture is a variation of a recurrent gesture that is typically used to construe the negation of a previous utterance by *wiping it away* (Harrison 2018: 97), where the gesturer acts as if wiping off or rubbing away a prior speaker's utterance. In this instance, Claire's oscillating hands effectively clear content on both the gestural and conceptual stages (*ibid.:* 97), clearing the surface to enable a re-enactment of her laboratory experiment. Excerpt 5.6 reproduces Claire's multimodal reformulation of the laboratory setting.

Excerpt 5.5 (cont.) Claire's reformulation following Hua's intervention

```
180 CLA:    i have a big cup and er erm (.) and
    g:   |^---------.---.---------^----------»
    #:5.13a                        +brings to chest
181         er ano- i have another small cup (1)
    g:   »~~~~~~~~~~~~~~^-.-------.---------»
    #:             b        c
182 HUA:    ≈en≈ [hh]
183 CLA:         [en] i put the small cup into the
    g:       »-----^*******************^~~~~~~~»
    #:             d                   e
184         [big cup ≈yes yes≈]
    g:   »^------~~~~~~~~~~|
    #:    f
185 HUA:    [big cup (laughs)]
186 CLA:    er (.) two cups
    g:             |^-------»
    #:             g
187 AMA:        [≈°ok°≈]
188 HUA:    oh:[kay:  ]
```

a. **i have a big cup and er erm (.) and**

b. **i have**

c. **another small cup (1)**

d. **i put the small cup**

e. **into**

f. the **big cup**

g. **two cups**
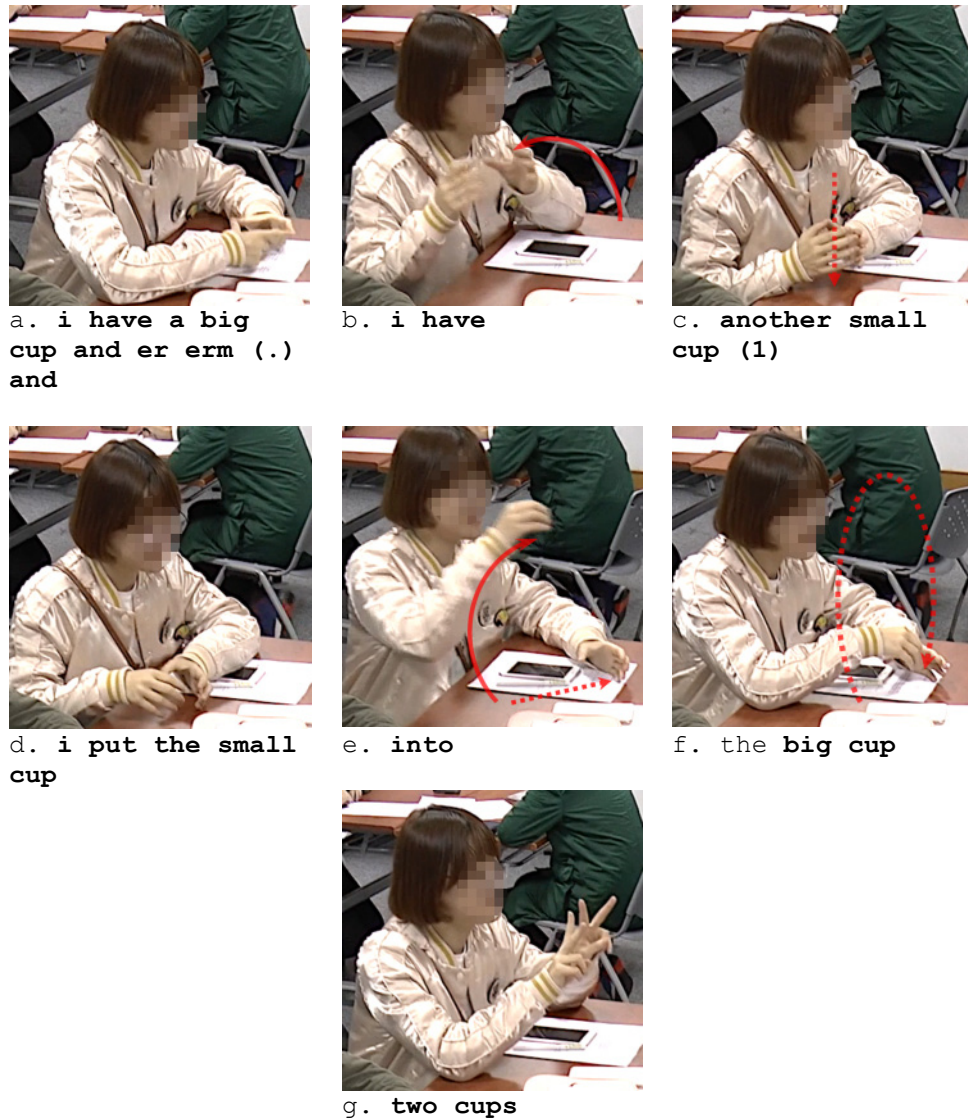
Figure 5.13 Redepiction of cups in *osmosis2*.2

In her reformulation starting at line 180, Claire initiates the turn with the big cup gesture on display at center stage, bringing it to chest level (fig. 5.11a). As she formulates the next part of her utterance (line 181) she moves her hands to the right side of center (fig. 5.11b) and configures her hands in a variation of the big cup, with all fingers connected in a dome shape (fig. 5.11c). She pauses and gazes at Hua for one second, who then provides a Chinese response token *en* at line 182. Claire repeats the response token and continues into a dynamic SDC. With her left hand in a cup

shape, she takes her right hand and enacts a grabbing motion inside of the cup (fig. 5.1d). As she says 'i put the small cup', her left hand depicts a container with the small cup indexed by the grabbing action. As she says 'into' (fig. 5.11e) she arcs her right hand (now holding the virtual object), and motions to place it into a container shape which has been previously relocated to center stage (fig. 5.11f). Simultaneously both she and Hua overlap in uttering 'big cup', once again synchronized in mutual understanding of the depiction (lines 184 and 185). Claire terminates the depiction by enumerating the total number of cups to be visualized (fig. 5.11g), both hands spreading index and middle fingers as she says 'two cups'. The doubled gesture emphasizing the explicitness of the necessary information to avoid further misunderstanding.

Claire's reformulation appears to evidence a learning process that we can now trace through Hua's re-depictions. The erroneous depiction in Hua's second gestural intervention initiates a possible Gesture Related Episode (Harrison et al. 2018). In a (GRE), participants in interaction "negotiate the form and organization of a speaker's gestures" (*ibid*.: 18). Thus, they may directly orient to a gestural space and adjust each other's gestures, positions, and/or gaze so as to more accurately visualize talked about referents. In the case of the interaction between Claire and Hua, Claire reformulates the sequence of entities in her depiction as a response to Hua's summary, and thus a communication problem becomes elevated to a repairable when Claire multimodally negates Hua (fig. 5.10). Although neither Hua nor Claire venture into each other's gestural space, Hua does make explicit her awareness of Claire having been the source of the visualization when she says 'you made a big cup' (Excerpt 5.5, fig. 5.9a). Also, Claire's employment of gestural resources in her immediate response to Hua demonstrates implicit awareness of a gesture issue with regards to Hua's

misunderstanding. That is, Claire assumes that Hua's misunderstanding is both a verbal and a gestural problem that should be rectified in both modalities. Likewise, Hua's gestural paraphrase constitutes assistance into Claire's previous gestural sequence. By providing a summary of the cups, Hua effectively affords Claire a new possibility to reformulate her depiction. Although Claire negates Hua's candidate formulation, Claire retrieves from Hua's summary the depiction of the ordering of the items. She is then able to more prominently construe the relationship between the cups as one of containment.

5.3.3   Osmosis2.3

To fully appreciate the impact of interactivity on Claire's depictions, the analysis turns to her explanation sequence in her final iteration, joined by Jane and Elsie, and reproduced in Excerpts 5.7, 5.8, and 5.9. The significant changes in this part of the extract again regard the proximity of the elements: Claire's sequence of cups and their contents of sugar is formulated in the same turn-at-talk to perhaps avoid confusion in the number of cups. The reuse of the *sweet water* gesture also indicates a strategic deployment of a previous gesture. When Claire's recipients provide her with a dispreffered response, she is afforded the space to reformulate once again.

In Excerpt 5.6, line 001 the peer-instructor points to Claire, gesturally and verbally selecting her to take the first turn. At lines 002 and 003 Claire verbally formulates her topic definition. She appears initially to reuse the frame *what I read is* from previous iterations but immediately self-repairs into an *about*-frame, saying 'this article is about' (line 002). She hesitates for a moment and finally utters 'chemistry phenomenon' (line 003), reusing the phrase constructed in her first trial (cf. Excerpt 5.1) and reused in *osmosis2.2* (cf. Excerpt 5.2). Jane confirms receipt of the definition by nodding, treating it as trouble-free in this instance, and thus enabling Claire to

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continue with her explanation. To enter into the depiction, she also exhibits various

posture shifts which project into space the forthcoming depiction.

Excerpt 5.6 Claire's *cup* depictions in *osmosis2.3*
mcht1617exp23ug3 [00:03.950 – 00:46.497] Participants from left to right:
Jane and Claire sit across from Elsie.
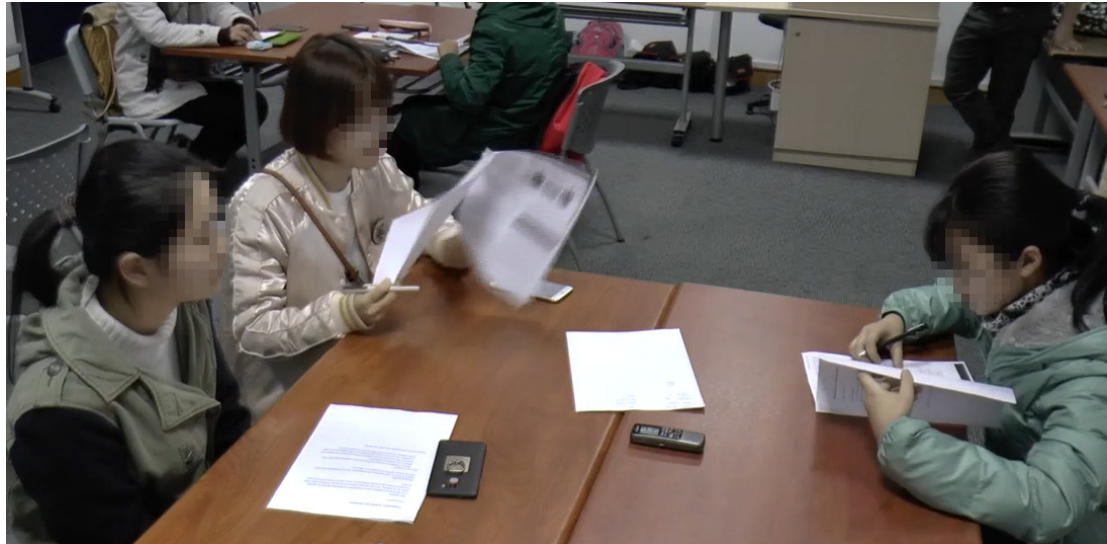
Figure 5.14 Seating arrangement for *osmosis2.3*

```
001 V01:    your team (.) er you may be the first. ok.
    g:                     +p→CLA                +
002 CLA:    hh mm erm what a- er this article is about
    g:              H----------H--------------------H
    #:5.15         a            b
```
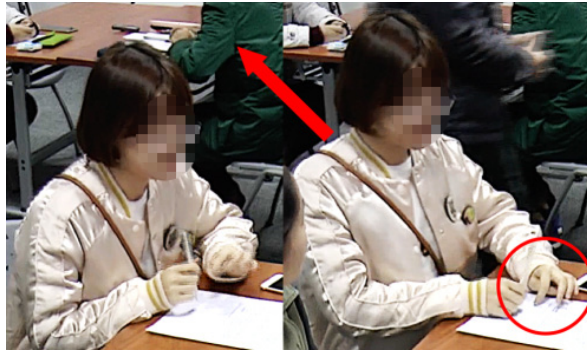
a. what a- er   b. this **article**
                          is about er

Figure 5.15 Mobilizing into explanation in *osmosis2.3*

Claire repeats the body movement and positioning in *osmosis2.3* from *osmosis2.3*, leaning back and forth and tapping the page with her index finger.

```
003          er (.) chemistry phenomenon (.) [erm    ]
      g:    H------H--------------------H------------H
      #:5.16a      b                    c
004 JAN:                                     [(nods)]
005 CLA:    if i have a (.) big cup er
      g:    H--------------|^---------
      #:    d                e
```
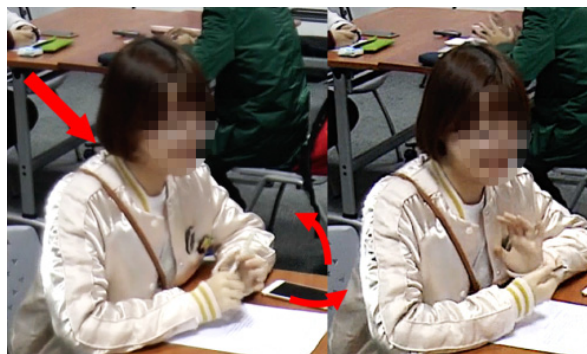

a. er (.)   b. chemistry
                      phenomenon
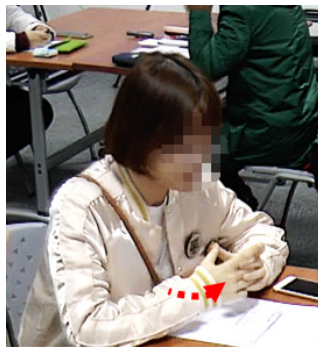
c. (.) erm   d. if i have a (.)   e. big cup er

Figure 5.16 Mobilizing into depiction, *osmosis2.3*

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In Figures 5.13 and 5.14, Claire uses body shifts to display a shift in speaker-role. She leans back as she says 'this article is about er' and taps her extended index finger on the paper (cf. Excerpt 5.3, fig. 5.4). She leans forward before uttering the topic, and as she says 'chemistry phenomenon', Claire positions her two hands in a particular configuration: relaxed flat right hand palm out slightly above her left hand, in the same configuration but palm facing up (fig. 5.14b). These configurations not only project activity of the hands, but also appear to afford the specific depictions that she constructs: half of a cup shape with the right hand (fig. 5.14c), which when joined with the left hand is pulled back as she as says 'if i have a' (fig. 5.14d), then moved forward as if to present it in gesture space as she designates it with 'big cup'.

The excerpt continues in following the trajectory of Claire's depictions of cups and their relative amount of sugar. She can be observed reformulating her model experiment, reorganizing certain elements and retaining others, until pausing the turn for a direct comprehension check at line 015.

Excerpt 5.7 (cont.) *Cup* depictions in *osmosis2.3*

```
005  CLA:     er if i have a.big cup er
     g:              |~~~~~~~~~~^-----»
     #:5.17                      a
006       in the cup er we have some some sweet $waters$=
     g:   »---------.---------.-----------------^~~~~~~-^»
     #:                                         b
007  JAN:     =hm [(nod) ]
008  CLA:         [er yes]
```

er if i have a big **cup er in the cup er we
have some some sweet**

Figure 5.17 Depiction of sugar water in *osmosis2.3*

```
009 CLA:    er and we have another small cup er in the small
     g:   »----------------|~~~~~~~~~~~~^----------------.-»
     #:5.18                              a

010         cup $we £have£ [$er er$]
     g:   »-------------------->»
011 ELS:                   [$(nods)$]
012 CLA:    another sweet waters er the sweet er
     g:   »--.---------.----.-.--------^****-.--»
013         in the sweet water in the small cup is er more
     g:   »^--------.----.-.--.----.---.---------|~~~~~~~
              +Rp→L    +small cup
014         er more sweeter er is sweeter than the big cup
     g:   ~~~~~~~~^----.-----.--.~.~.~~|~~~~~^---^------»
     #:             b                  +p→table then
                                        makes big cup
```
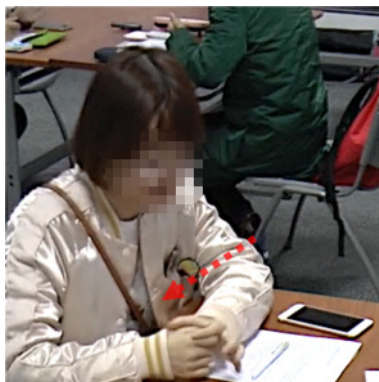

a. another small **cup**
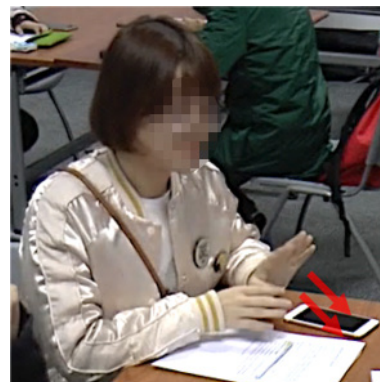
b. **sweeter er is**
sweeter

Figure 5.18 *small cup* in *osmosis2.3*

```
015         er can you understand (1.6) [erm (.) erm]
     g:   »---|~~~~~~~~~~~-----------------|~~~~~~~»
     z:         ›ELS                   ›JAN   ›down
016 ELS:                                [(laughs)   ]
```

As Claire initiates the depiction with the big cup composite (fig. 5.15a), Jane gazes at her hands. Claire holds the cup form until she announces the contents of the cup as 'sweet water', repeating the multimodal composite of smile, gesture, and speech as she constructed in *osmosis2.2* (not reproduced). In the current depiction, she gestures in a continuous fluid motion moving her right hand, palm up, thumb and index fingers in a precision grip, then opens the grip along the duration of enunciating 'water' and a smile. When Jane confirms receipt with a nod, Claire continues at line 009 to introduce the small cup. In the preparation of the small cup gesture she also relocates her hands from center stage to her right side, as she had done in her reformulation for Hua and Amara in *osmosis2.2*. She immediately announces the contents of the small cup, laughing and smiling as she says 'another sweet waters' but sustaining the small cup gesture in a hold. Elsie smilingly nods in turn. At line 012 Claire quickly deploys an SDC with her right hand, pointing into her left hand configured as the left half of the small cup, then quickly configuring both hands into the small cup as she verbally projects the contents of the water in the small cup. At line 013, as she says 'more er more', she lifts both hands in a palm down configuration from the right side to the left side in a provisional hold, then uttering 'sweeter'. Her speech here is synchronized with both hands, palms down motioning downward, a movement that seems to suggest a contrast between the left side, the home of the big cup, and the right side, depicted as residence of the small cup. Claire ends the turn with a confirmation check at line 015, requesting comprehension from her peers. She glances at Elsie in front of her, who maintains silence, prompting Claire to turn her gaze to Jane, who also maintains silence. After an almost two second silence, Elsie laughs and Claire looks back down at her hands.

Claire proceeds to repeat the depiction of the in order to accomodate a repair. In Excerpt 5.9, she can be seen enumerating the cups into one formulation.

Excerpt 5.7 (cont.) Reformulation for repair in *osmosis2.3*

```
017 CLA:    er we have two cup a big cup and a small cup=
    g:     »-------.~~~~^---.----~^---~~~~~^-----------»
    #:5.19                a          b         c
018 JAN:                                             =[cup]=
019 ELS:    =[yeah (nods)]
```


a. er we have **two cup**   b. a **big cup**   c. and **a small cup**
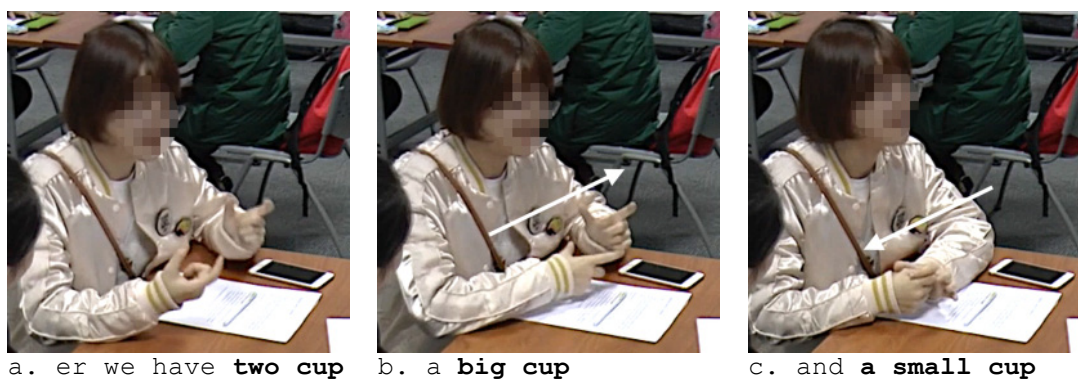
Figure 5.19 Relocation of *cups* in *osmosis2.3*

Claire's reformulation here consists of a re-sequencing of the elements. At line 019 she chooses to enumerate the cups before depicting them (compared with afterwards as observed in Excerpt 5.6). Also, instead of using her index and middle fingers to enumerate the doubly emphasized *2*, she uses thumb and index fingers, palms up of both hands (fig. 5.19a) This change in configuration appears to afford Claire to quickly use the same form to sequentially move into placing the big cup, here decomposed to make the location more salient (fig. 5.19b). She then quickly forms the small cup gesture to right-side space as in the previous repair (here see fig. 5.19c). Both Jane and Elsie receipt confirmation, Jane by repeating 'cup' and Elsie with agreement tokens (nodding with *yeah*). These confirmations afford Claire's continuation into repeating the description of sugar content in the cups by construing

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the term *sweet* on the right-side, where the big cup resides, and *sweeter* on the left, for the small cup.

In the next excerpt, Claire has reached the point where she depicts the containment relation between the two cups, in which she repeats the formulation from the repair work in *osmosis2.2*.

Excerpt 5.8 Depiction of containment in *osmosis2.3*
mcht1617exp23ug3 [01:13.063 – 01:17.928]

```
031 CLA:    we put the small cup into the (0.6)
     g:    |^***********.****.**^*******------»
     #:5.20a                       b
032         into the big cup hh [erm   ]
     g:    »-----~~~~~~~^-------------|
     #:    c             d
033 ELS:                     [(nods)]
```


a. **we put the small cup**   b. **into the (0.6)**

c. into the big   d. **cup**
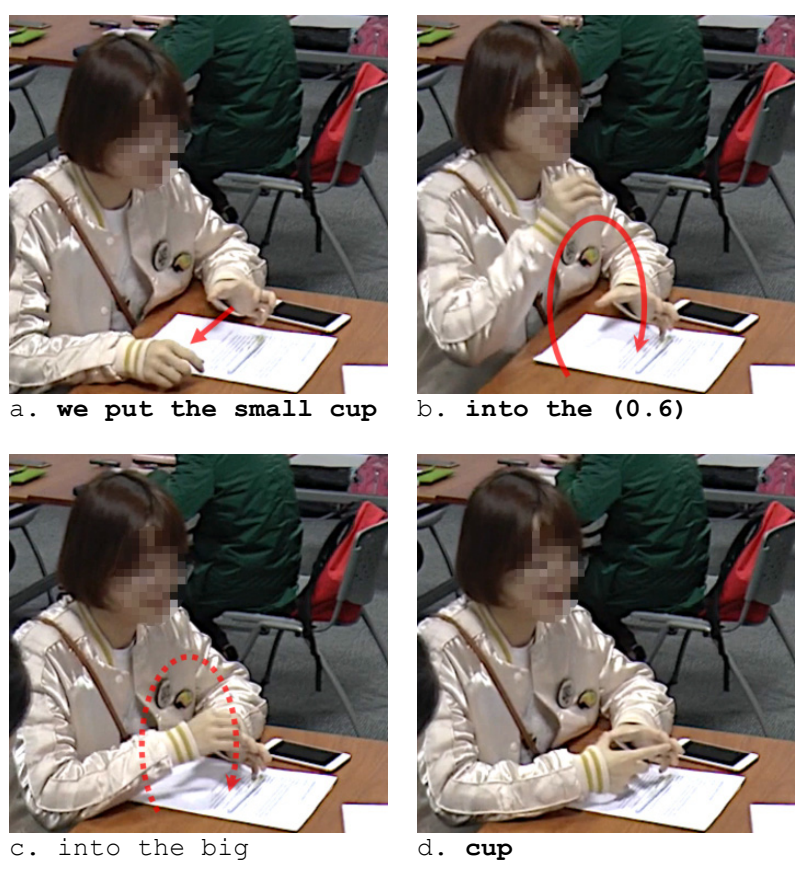
Figure 5.20 Redepiction of *cups* relationship

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At line 031 Claire uses the SDC as designed in Excerpt 5.6: locating the small cup on the right side, grabbing the imagined cup, and prominently arcing to show that it is inside the big cup, reusing the same hold at 'into' to give explicitness to the location and sequence of movement into the big cup form. The explicitness is confirmed through a quick configuration into the big cup. Elsie receipts understanding with a nod as she smiles, and Claire continues her depiction into other aspects of the osmosis experiment. Thus we see how repair in the previous iteration is reformulated in the subsequent iteration. This reformulation is achieved by partitioning the presention of the elements in a new ordering: big cup and small cup in sequence, followed by their respective sugar contents, then by their containment relation.

5.3.4   Discussion for osmosis2

To summarize the depictive practices under a rubric of construal, it can be observed that, much like Fischer's (2003) study on human-robot interaction, Claire reformulates her multimodal depictions according to shared understandings of space and what counts as comprehensible formulations, in this case involving gestural depictions. By reconstruing locations and levels of containment between the large beaker and small thistle tube, Claire narrows the field of possible viewing arrangements. In the verbal component, Claire's contextualization affords construal of the osmosis depiction, specifically the depicted items of the experiment, as pertaining to elements involved in a *chemistry phenomenon*. Her subsequent formulations of the solute then afford the salient item in the experiment. Claire continually tests out different formulations, varying from the candidate terms *sugary water* and *sweet water*. One possible explanation for Claire settling on *sweet water* is because the adjectival form will afford creating a point of comparison between the two beakers.

Having reformulated distinct gestural spaces for the large beaker and thistle tube, she is able to construe one side as *sweeter*. If she were to retain the term sugary, she may not be able to depict how one container has more sugar than the other.

In the gestural depictions, initial formulations visualize salient construals for the purpose of building the depictions. For instance, the pouring enactment that initiated Claire's depiction in *osmosis2.2* is deleted in favor of the grabbing gesture in the reformulation. The deletion might be explained because of the construal of containment that becomes problematic for the recipient understanding of the explanation, as illustrated by Hua's erroneous depiction of the three cups in her GRE (Excerpt 5.5).

The GRE recontextualizes Claire's earlier depictions as a problem of location and prominence. Claire's reformulation demonstrates her analysis of Hua's confusion as being caused by 1) the sequence of the cups, and 2) the relationship of containment. In the first case, the sequence of cups is made more explicit through deictic proximity—both cups are referenced in the same utterance, and yet temporal distance is afforded by her utterance hesitation simultaneous to her gestural relocation to the right side (fig. 5.6b), thus creating a dividing line between the two cups: *big cup* on the left, *small cup* on the right. These actions enable the careful timing of the synchronous composition of uttering 'another' coupled to the *small cup* gesture, followed by the post-stroke hold and silent pause to confirm receipt. To clarify the relationship of containment, Claire ensures to amplify the motion depicting her grasping of the small cup (construing the prominence of difference, cf. Müller 2008), and simultaneous relocation of the stabilizing left hand back into the big cup location, holding the SDC in mid-air as she says 'into', and thus foregrounding the containment relationship as she moves the depiction to the left side. Salient items in a depiction

can therefore be reused and transformed in sequences of repair to respecify depictions for the recipient.

The depictions in *osmosis2.3* similarly display attendance to previous interactivity and other-initiated repair work. The trialing format of the explanation task also affords Claire the chance to test various arrangements of her depictive sequences, and in turn optimize them for uptake, as in the rearrangement of the enumeration gestures to emphasize the number of cups in the explanation.

5.4   Other-afforded transformations

As was observed in the analysis of *osmosis2*, explanatory depictions involve a complex interplay of verbal description, manual techniques to convey imagery, and sequential organization and design. When repair is involved, this complexity makes depictions sensitive to the speaker's analysis of what caused trouble, and what needs to be refashioned in order to fulfill the repair. For instance, a repair might be a matter of changing a gesture, or a more complex redesign of a depictive sequence that accommodates the repair. That is, depictive repair is often not simply a matter of exchanging one gesture for another, but the sequence as a gestalt needs to be reformulated. This section further illustrates the intercorporeality of depiction during trouble, wherein explainers and listeners contribute to building depictions through mutual intervention. Several strategies were observed in the explanations with regards to repair: i) paradigmatic self-repair of gestures afforded by recipient design, ii) syntagmatic self-repair in the redesign of depictive sequences, and iii) re-depiction by the recipient.

5.4.1 *Idealism2: Embodied repair for confirmation of understanding*

The selection in this section illustrates how reformulations are able to account for intersubjectively motivated construals in the explanation of an abstract notion. Excerpt 5.9 reproduces the first lines of the explanation where Victor is paired with Elsie in his second trial at explaining the philosophical concept of *Idealism*—the epistemological view that postulates reality as constituted by the mind, devoid of external or material objectivity (cf. fig. 5.21). During this trial, Victor uses several examples to illustrate his explanation's thesis, that *the world of appearances is not true*, in Victor's words characterized as 'the world is not truth'. The characteristic gesturing involves a mixture of deixis and conceptual gestures to evoke abstract notions and perspectives. The excerpt in focus illustrates the enmeshment of construal and gesture in the pursuit of intersubjective alignment for understanding abstract ideas.

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Figure 5.21 Stimulus reading for *idealism2*
From Cohen (2012: 115).

Victor first characterizes his topic through an about move to indicate it as idealism (line 08), which he couples with a deictic gesture—using his pen to point to his head (fig. 5.22a). Victor repeats the gesture, using his thumb, as he sets up another about move to further specify the meaning of idealism (line 10, fig. 5.22b).

```
08 VIC:    this is part of the philosophy is about the idealism
    g:    »--.--.---.---.----.-------------~~~|        |^------»
    #:5.22                                             a
09        (1)
10        er the idealism is about er er
    g:    »~~~.~~~^~~~----|
    #:            b
```



```
a. about the idealism
```



```
b. er the idealism is
about er er
```
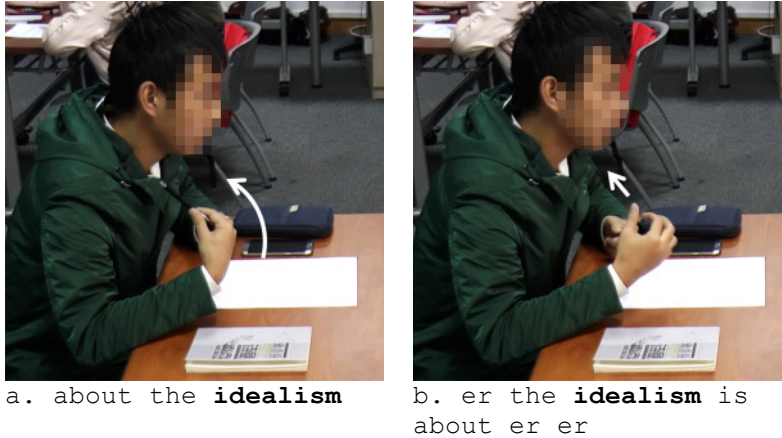
Figure 5.22 Gestural deixis references *idealism* as *upwardness*

Victor specifies the meaning of *idealism* in line 11, saying 'things that is not truth', synchronizing a palm down gesture with *truth* to composite the negation (fig. 5.23a). Elsie smiles after Victor's pause at line 12, to which Victor continues in elaborating on his previous definition, saying 'it only about your thinking' at line 13, synchronizing *thinking* with a point to the head (fig. 5.22b). Thus in these four moves Victor constructs a multimodal definition of his topic to which he will reuse in his further specifying moves.

```
11 VIC:    things that is not truth (0.3)
    g:   |~~~~~~~~~~~~~~~~----^--------»
    #:5.23                      a
12 ELS:    (smiles)
13 VIC:    it only about your: thinking (.) [er    ]
    g:   ».--.----~~~~~~~~~~-~--^----------------|
    #:                         b
                              +nod+
14 ELS:                                  [(nods)]
```


a. things that is not
truth (0.3)

b. it only about your:
thinking (.)

Figure 5.23 *truth* and *thinking* gestures

The omitted lines correspond to further elaboration and an example, during which Victor uses further installments to check understanding with Elsie, before reaching the point reproduced in the transcript where he offers a more specifying example. The focus in this section of the excerpt is on the collaborative construction of the multimodal composite for the term *dream*.

```
((lines 15 to 26 omitted))

27 ELS:    (nods)
28 VIC:    maybe another example maybe the dream (0.6)
    g:       |^-----------------~~~~~~~~~^--------»
    #:5.24       PU                       a
29       the dream [[(0.8)  ]
    g:   »~~~~.-------------|
    #:       (a)
```

```
30 ELS:                [°dream°]
31 VIC:    dream (0.7) dream the in the evening you make
    g:    |^~~~-------^****-----~~~~~~^---.--~^--~~~~~»
    #:    b           c                d    e       e
32        a dream (0.4)
    g:    »~~^------|
    g:     +nod+
33 ELS:    [(nods)]
34 VIC:    [er and]
35        and the the dream is er abstract
    g:    |^~~.-^--------~~~~~~-----^----»
    #:    PD   spread bent       p→head
36        and is about idealism hh
    g:    »----------------------»
```

a. VIC: maybe the **dream […] the dream**

b. VIC: **dream**

c. VIC: **dream**
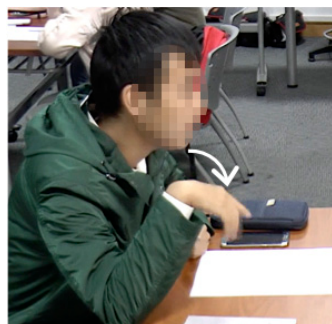
d. the in the **evening**   e. **you** make a **dream**

Figure 5.24 *dream* repetition and repair in *idealism2.2*

At line 26 Victor introduces his example by characterizing it as *the dream* coupled with a palm up beat (fig. 5.24a). He pauses before repeating the same composite at line 27 and pausing again. At line 28 Elsie whispers *dream* as she turns

her head to the side. Victor treats Elsie's repetition as a display of seeking understanding, evidenced by the way he reformulates at line 29. He repeats the term *dream* but changes his gesture to a deictic point to his head (fig. 5.24b), followed by a pause. With no response from Elsie, Victor repeats the term while changing the gesture once again by drawing a circle with his index finger pointing to his head. Instead of pausing he continues by offering another transformation as he says, 'in the evening you make a dream', coupling *you* with a self-deictic hand point and subsequently *dream* with an index finger point to his head as he synchronously nods downward. After a moment of silence Elsie confirms understanding with a head nod (line 31), which Victor reads simultaneously as an affordance for continuation, displayed by confirmation moves at line 32.

The short exchange between Victor and Elsie illustrates the interplay of intersubjective affordances in Victor's transformations of his gestures. In seeking confirmation, Victor changes his gestures, but not the term, *dream*. This change supports the interpretation that Victor analyzed a perceived misunderstanding as a problem in gesture, and not only of the term or concept. It is only after a lack of confirmation from Elsie after the third repetition of the term *dream* that Victor provides a verbal elaboration, formulating a generic scenario in which a person has a dream, i.e. *in the evening*.

How Victor subsequently reuses and transforms this embodied construct can be observed in *idealism2.3*, reproduced in Excerpt 5.10. Here Victor characterizes his topic in terms of being about *thought*, with which he has coupled with a pointing gesture to his right temple, repeated as the thesis *it's not truth, it's what you thought*. He reformulates the *dream* example several times, testing and re-strategizing the verbal and gestural formulations from the previous trial (lines 61–64). This eventually

leads Hua to intervene with a concept checking episode related to the

misunderstanding between *Idealism* and *idealism*, i.e. the psychological notion of

pursuing perfection.

Excerpt 5.10 Reuse and transformation of *dream* in *idealism1.3*
mcht1617exp25ug2 [01:49.062 – 02:12.990]

```
056 VIC: →      =yeah and the world is in your brain (0.8)
    g:         |~~~~~~~~~~~~~~~~~~~~~~~~~~~~^---------|
    #:                                    p→head
057 HUA:   the world is in my brain=
    g:     |^---------~~~~~~~~~^----»
    #:      PD              p→di-self
058 VIC:                         =yeah and er
059        it's about your thinks
060        >it's only for some thinks< (0.8)
061    →   maybe in the evening (0.3) you make a dream (1.6)
    g:     |~~~~~~~~~~~~^------|      |~~~~~~~~~~^--.------»
    #:5.25             a                b
062 HUA: → er::m a dream=
    g:            +turns head to the side+
    #:            c
063 VIC: →                 =er you make a dream (.)
    g:                      ~~~~~~~^***********---»
    #:                            p→head
064        it's not truth (0.6) er (.)
    g:     »~~~~~~~~~^****------|
    #:              d
065 HUA    so doesn't (.)
066        wait so you you said idealist but [er]
```

a. VIC: maybe in the **evening** (0.3)

b. VIC: you make a **dream (1.6)**

c.   HUA: er::m **a dream**
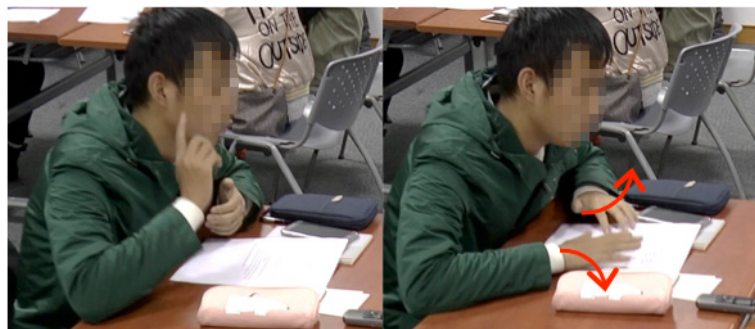
d. er you make a **dream**   e. it's **not truth**
(0.6)

Figure 5.25 Abstract sequence of *dream* in *idealism2.3*

As can be seen in the transcript, Victor provides several transformations in the way he introduces the notion of *dream* and its embodied composite. At line 056 Victor

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characterizes *Idealism* as *the world is in your brain* followed by an eight-tenths of a second pause. Hua takes up the pause at line 057 to repeat Victor's characterization, who then treats Hua's repetition as an affordance for continuation at line 058. At line 061 Victor introduces the notion of *dream* after giving the elaboration reached through intersubjective alignment in *idealism2.2—in the evening you make a dream*. Here Victor reuses his initial gesture coupled to *dream,* a palm up open hand in the manner of an offering, and adds a self-deictic, pointing with his left hand to his body. Hua displays trouble at line 062, uttering a lengthened hesitation token (*er::m*) and repeating the term *dream* with her head turned to the side (note the same reaction from Elsie in *idealism2.2*, Excerpt 5.9 line 28). Victor quickly repairs in a similar manner as before, repeating the phrase *you make a dream* and pointing to his head (fig. 5.25d), before elaborating into the example's thesis, saying 'it's not the truth' coupling *truth* with a palms down across negation gesture (fig 5.25e). Hua's confusion displays at lines 065 and 066 affords continuation by initiating a digression on the concept of idealism, thus demonstrating that she understood Victor's elaboration of *idealism* in the example of *dream*, but that she had a different conception of it in mind.

Thus, with abstract concepts, elaborations are susceptible to interactive affordances and the ways that gestures can hinge on sequential movements that visualize reference relations. These sequences also demonstrate how explainers test, retest, and/or re-strategize their formulations. In Victor's first formulation of the *dream* example in his third trial, he reused his initial strategy, the palm up beat gesture, but transformed it by coupling with a self-deictic and to the reformulation afforded in the previous trial. In other words, after testing various embodied constructions, Victor interpreted his previous trouble to be a problem of simplicity,

repaired into a more complex (i.e. information enriched) formulation. When in his

third trial Hua's display of confusion occasions Victor to adapt his formulations, he

reuses the head point with the verbal formulation *you make a dream*, and links it the

thesis, *the world is not truth*, which is brought into the explanation earlier than in the

previous trial. Tables 5.5 and 5.6 display the microgenetic and microlongitudinal

trajectories of the multimodal construction of *dream* from *idealism2.2* to *idealism2.3*.

Table 5.5 Multimodal construals of *dream* in *idealism2.2* (excerpt)

ƒ#		Type of reformulation	Construal assumption in gesture	Other-initiated interaction	Speaker re-action
ƒ1	[*dream* + <palm-up-beat> + pause]	ø	discourse level: intersubjective mutual understanding	silence	repeat multimodal
ƒ2	[*dream* + <palm-up-beat> + pause]	repetition	discourse level: pursuing emphatic alignment	whisper repeat	reformulate gesture
ƒ3	[*dream* + <p→head> + pause]	specifying	referential-locative	silence	reformulate gesture
ƒ4	*dream* + [p~twirl →head] + pause	specifying	imagistic: evoke a process	none	reformulate verbal and gesture
ƒ5	*in the evening* [*you* + <self-deictic>] *make a* [*dream* + <head-point> + head-nod]	recontextual-ization	imagistic: scenario building, intersub-jectively aligned	head nod	continuation

Table 5.6 Multimodal construals of *dream* in *idealism2.3* (excerpt)

f#		Type of re-formulation	Construal assumption in gesture	Other-initiated interaction	Speaker re-action
f1	*maybe in the evening (.) you make a [dream + <LEFT self-deictic, RIGHT palm-up>] + pause*	ø	discourse level: intersubjective mutual understanding + referential locative	repetition + posture shift	repeat multimodal
f2	*er you make a [dream + <p→head>]* *it's not [truth + <palms-down-across>] + pause*	repetition of verbal, change in gestural, elaboration	discourse level: pursuing emphatic alignment		reformulate gesture

In Tables 5.5 and 5.6, reformulations increase in complexity through paradigmatic and syntagmatic enrichment towards specificity: verbal and gestural features paradigmatically augment the *where*, *how*, and *who* of the notion *dream*, and syntagmatically tie it more proximally to the explanation's thesis. This occurs through sequential organization in the verbal formulations, by uttering the construction in relation to *not truth*, as well as gesturally through catchment, i.e. in repeating the head point which was earlier coupled to *idealism*. Thus the *dream* example functions as an example precisely because of the reference point relations constructed through embodiment. For instance, when at a later part in *idealism2.2*, the term *dream* is reused with the twirl gesture is taken as continuing and summarizing the relation

between dream and idealism. These types of relations in reference between segments of talk within the same episode will be explored in Chapter 6.

5.4.2   Osmosis1: Projection and redeployment in depictive redesign

The next example illustrates how simplification in depiction is not a matter of merely deleting or omitting information. As observed in the analysis for *osmosis2*, juxtaposing the various elements and their relations in an extended explanation involves careful attention to the elements of the depiction, and so exhibits a degree of immediacy in planning. The analysis will therefore also focus on the participant's body posture for the projection and redesign in the accommodation of specific imagery that becomes salient to repair.

The observation that speakers orient their bodies in relation to their roles in speaker- and listenership is well documented (Cibulka 2015; Deppermann 2012; Heath 1984; Mondada 2007; Streeck 2009a; cf. Streeck & Jordan 2018). In regards to gesture as an interactive activity, the mere preparation of a gesture can be considered a visible display signal of interaction (Kendon 1990). For a gesture to be configured into its presumably meaning bearing shape, the stroke, the gesturer must first deploy their arm(s) from a rest position through a trajectorial, preparatory phase into the stroke (Kendon 1980). Sacks and Schegloff (2002) term the rest position a home position in order to reference the state of distinction between movement and non-movement.

During and between preparatory phases interlocutors can demonstrate the ways that they participate dialogically in conversation. For instance, listeners may place their hands on the table while another is speaking to indicate a willingness to take the turn (Deppermann 2012; Mondada 2007). Streeck (2009a) observed the ways that speakers use *forward* gestures to project various pragmatic meanings across turns.

Cibulka (2015) examined what he calls *provisional* home positions, for instance when speakers indicate through a frozen gesture that they are waiting to resume a previous contribution, even though they have taken the role as listener temporarily. Researchers have typically shied away from examining these positions in terms of any semantic encoding, due to the difficulty in parsing out meaningful imagery in schematic forms during home and preparation phases. Nonetheless, for example, Streeck (1995) observed intermittent holds projecting conceptual gesturing in one case. Likewise, Park-Doob (2010) examined various types of holds that froze salient imagery across disfluencies and interruptions. However, since the notion of projection in gesture was first proposed by Schegloff (1984), there has been little research on semantic projection in gestural pre-positionings.

The following excerpts are drawn from Ivy's turns at explanation of *osmosis*, conducted over four trials. In her third trial, *osmosis1.3*, other-initiated trouble leads to a change in specificity relation, namely, from a more precise elaboration to a less precise one. However, Ivy does not merely change an aspect of the depiction or simplify it, but the entire sequence is redesigned in order to create the conditions for a more schematic construal of the target explanation, in this case the amount of sugar in the osmosis containers. She uses depictive gestures in her final two trials (though she deployed a single iconic gesture in her first trial.)

In Excerpt 5.11, Ivy can be seen orienting to her turn at explanation through a sequence of posture shifts that become increasingly specific in accordance with the contextualization of her topic. Throughout her trials at explaining osmosis, she characterized it in terms of the permeable membrane that constrains the diffusion of the sugar molecules, interchangeably referring to it as *osmosis*, *special material* or *membrane*. In the excerpt she introduces the topic and increasingly specifies it from

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osmosis, to *a special kind of material*, and then to *a membrane*, until she further

elaborates on *membrane* into an explanatory depictive sequence.

Excerpt 5.11 Depiction, trouble, and repair in *osmosis1.3*
mcht1617exp10ug2 [00:21.135 – 01:34.325]

```
005 IVY:    okay (.)
006         is er is maybe i can explain it to try and
007         understand this
008         er so em if /o:smei:sis/ i jus- ss- i i
    g:        H----------------------------------H
    #:5.26  a
009         can explain it to you it's a
    g:      |~~~H----------------------H
    #:        b
010         special kind of material
    g:      |^******-----~~--.------»
    #:      c                (b)
011          and we make it into a membrane hh
    g:       »--------------------------~~~~~~~~~~»
012          membrane means (.) maybe (.) mm (.)
    g:       H----------------------------------H
    #:       d
```


a. *so em if /o:smei:sis/
i jus- ss- i i*

b. *can explain it to you
it's a*

c. **special** *kind of
material*

d. *membrane means (.)
maybe*

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Figure 5.26 Depiction-initiating hand positions in *osmosis1.3*

To begin her explanation, Ivy enters into an initiation sequence starting in a rest position with hands clasped and resting on her abdomen (fig. 5.26a), as she introduces the topic as *osmosis* (line 008). She then displays an intermediate position, resting both hands on the table with fingers curled but relaxed (fig. 5.26b), from which she deploys a depictive as she says 'special kind of material', coupling *special* to an up and down motion with her right index finger. The initiation sequence ends as she begins to elaborate on the meaning of *membrane*, settling into a new home position involving both hands flat and slightly hovering over the table. From this two handed position Ivy deploys a depiction of the containers—the large beaker and thistle tube—that make up the osmosis laboratory experiment in the stimulus.

Excerpt 5.11 (cont.)

```
013       you know er we got two: two tubes (.)
     g:              |~~~~~~~^----.~~~~~~~~|H
     #:5.27                    a     b
014       one inside and one outside (.)
     g:    |^**********~~~^**-*******|H
     #:    c              d
```

a. you know er we got **two:** b. **two tubes**

c. **one inside** d. and **one outside**

Figure 5.27 Containers in *osmosis1.3*

```
015 IVY:    and the so- solution (.) maybe we know the mm
     g:      |~~~~~~~~-^.--.----------------------------»
                       +points to left hand
016         er: sugar sugar water (.)
     g:   »----~~~~~~^*******.-----»
                     +traces 'sugar'
017         and the the one (.) solute is (.) solution
     g:   »------------^~~~~~~~~~~~~~~~~~~~~~~.----
                     +(5.27a)
018         in it is (.) zero point nine percentage
     g:   »~~~~~~~~~~~~~~^************************
     #:5.28               a
019         only that zero point nine is in it
     g:   »~~~~~~~~~~^****************~~~~^----»
     #:             (a)                 b
020         and another is (.) is (.) two percent and the:
     g:   »^**********-.-.-----------^***********~~~~~~~~~»
     #:    c                          d
021         -nother one is much sweeter than this one
     g:    »^-----------~~~~~~~~~~~~~~~^----------.-»
     #:     e                          f
022         because actually (2.4)
     g:   »----------~-~-~-~----»
            +holds 2hands out and wiggles index finger
```

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a. **zero point nine percentage**

b. **in it**

c. **and another is**
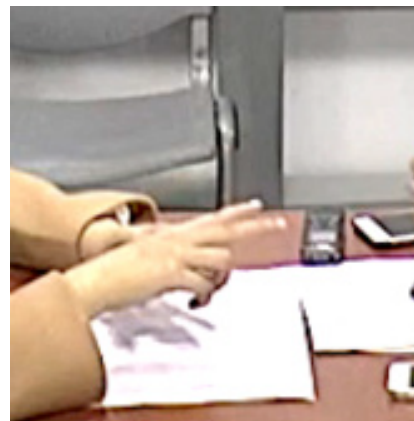
d. **two percent**

e. the: **-nother one** is much sweeter
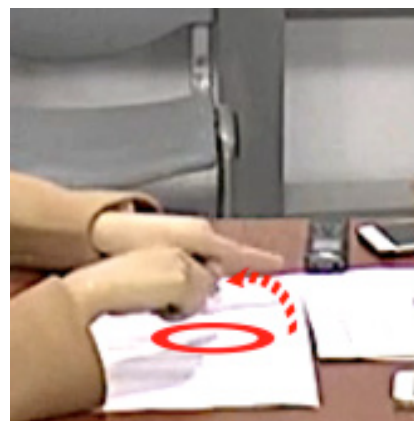
f. **than this one**

Figure 5.28 Amount of solute in *osmosis1.3*

Ivy characterizes the containers as *tubes* (line 011), and describes their relation of containment as *one inside* and *one outside* (line 012). To depict the *tubes*, she uses the index fingers of each hand to enumerate them (fig. 5.27a), which she then brings

together to trace the outlines of the tubes in the air as she describes their containment relationship (figs. 5.27b, c, d). She then proceeds to describe the contents of the tubes, stating that the first contains 'zero point nine percentage' of sugar (line 015), while also tracing the numbers *0.9* in the air with her index finger (fig. 5.28a). At line 015 she restates 'only that zero point nine' as she points to a spot in center-left gesture space to coincide with the utterance of 'in it'. Ivy then describes the other tube by referring to it as 'another one' while pointing to a spot to the right of the previously indexed spot on the table. She then says it has 'two percent' sugar (line 017), indicating with her index and middle fingers by a palm down V-shape to depict the number *2* (fig. 5.28d). As she says 'another one much sweeter than' she again points into the right-indexed spot, followed by her utterance of 'this one' coupled to her pointing into the left-indexed spot.

Thus it can be seen how Ivy employs multiple depictive devices to paradigmatically construe salient relationships in her explanation. She first outline traces the tubes as rounded objects in order to construe their containment relation, one inside the other, while simultaneously depicting their relative size to each other (this can be gleaned from the distinct amount of tension in each tracing: the small tube is traced closer together than the bigger one, which is traced with wider circles.) Ivy also uses locative deixis along the left-right axis to construe reference point relations between two distinct objects (cf. Bellugi & Klima 1982 for sign language, as cited in Haviland 1993). She then draws numbers in the air to represent the differences in solute percentage in the solution. Syntagmatically, relations are construed through the modeling of the *tubes* with her fingers, the tips of which then afford tracing the *tubes'* containment relationship *inside* and *outside* in sequential relationship to the previous

utterance. This is followed by repeated locative deixis along the left-right axis affording ellipsis which references each of the tubes and their respective differences.

At line 022, Ivy starts to continue the explanation, uttering 'because actually', but pauses for approximately 2.5 seconds as she gazes at Ken, occasioning a trouble sequence which Ivy rectifies with a new elaboration.

Excerpt 5.11 (cont.)

```
023 KEN:    so maybe you can (2)
     g:   H------------------H
     #:5.29a
024 IVY:     >no no< mm (2) okay (.) it's all right (.)
     g:    »--------~~~~~|H----------------------»
     #:                  b
```
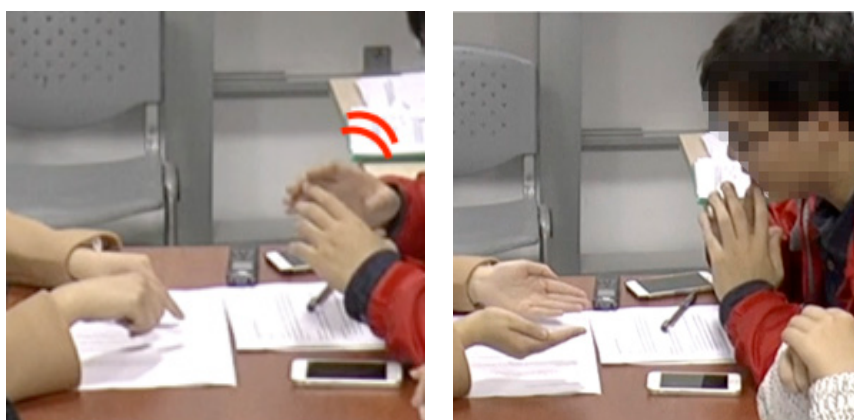

a. KEN: so maybe you can   b. IVY: (2) okay (.) it's
                  (2)   all right

Figure 5.29 Embodied other-initiating repair

At line 023 Ken treats the pause as a moment to intervene and begins to offer a suggestion, saying 'maybe you can' followed by a two-second pause. In the silence he gestures with his right hand, palm-down flat waving side-to-side (fig 5.29a), but retracts to a listening position touching his fingertips in a diamond shape in gesture space, elbows resting on the table (fig 5.29). At line 024 Ivy treats Ken's posture shift as having abandoned his candidate suggestion, self-selecting her turn to repeat her

explanation. Ivy then redeploys both hands flat over the table, but with palms up (fig. 5.29b), in contrast to her original palm-down position prior to depicting *tubes* (cf. fig. 5.26d).

In the ensuing sequence Ivy treats Ken's intervention as an other-initiated trouble-display inviting repair, evidenced by her re-description of the containers and their respective amounts of solute.

Excerpt 5.11(cont.)

```
025 CLA:    so. mm er we got two: two [bottles of:] (.) water
     g:    »H-----------------------|^------------------.--»
026 KEN:                              [mhm        ]
027 IVY:    (.) and the one is much more sweet than the (.)
     g:    »----^*******************~~~~~^------.-----.---»
     #:5.30    a                        b
028        the other one (.) [sweeter] than other one
     g:    »~~~~^*****^**------^********-.---^--------
     #:         c     (b)      (c)          (b)
029 KEN:                       [ok    ]
030 IVY:    [it means]
     g:    »^-------»
     #:    +right hand half of (a)
031 KEN:    [ok      ]
032 IVY:    the sugar in it it's more than other one=
     g:    »^**************~^*******************^*******»
     #:    d               e             (d)
033 KEN:                                        =yeah
```

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a. we got two: two **bottles of water**

b. **and the one is much more**

c. **sweet than the (.) other one**
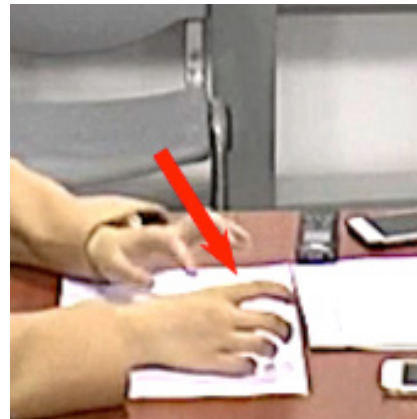
d. **it means sugar in it**

e. **it's more than**

Figure 5.30 Redepiction of containers in *osmosis1.3*

As can be seen in the excerpt, Ivy omits the depiction of percentage in the respective containers, and changes the way she depicts their containment. Taking the amount of solute in the containers as the primary focus of change, several construal

relations conspire in the reformulation of the containers and their contents. Ivy's omission of the percentage in the description is replaced by how she reconstrues the way the difference in solute is depicted. In the reformulation, Ivy continues to depict the tubes first, as this is perhaps the more common sense way to construe containment, or perhaps because the very existence of the containers was unproblematic. It is in the depiction of the amount of solute where simplification strategies occur. She changes the containers lexically from *tubes* to *bottles*, with her pre-position body shift revealing syntagmatic and paradigmatic affordances for the re-construal of containment. In the first iteration she depicted the tubes by tracing their outlines in the air, but in the re-depiction she appears to enact the handling of space as if it were the curvature of a bottleneck, as observed in the configuration of crooked fingers, palm lateral position in a curved grip (fig. 5.30a). Thus the verbal change affords or coincides with the gestural change. She maintains the configuration in her left hand as she uses her right hand to point into a spot on the right axis (fig. 5.30b), while uttering 'and the one is much more sweeter'. In this multimodal utterance she thus couples *the one* with the deictic gesture to refer to the container that has more solute. As she says 'than the other one' she points with her right hand into the curved space depicted by the left (fig. 5.30c), thus construing a reference point relation within the left-right axis. At line 030 she elaborates, indicated by the reformulation expression *it means*. While uttering 'sugar in it', she uses her left hand to point into the right hand configured as if gripping the bottleneck (fig. 5.30d). The deictic reference in this case functions to elaborate the previous utterance (lines 025, 026), referring to the right bottle as having a higher solute content than the left one, which she emphasizes by repeating the sequence using her right hand to point into the left grip shape (fig. 5.30e).

To summarize, numerical specificity is replaced by the depiction of the tubes using object handling gestures as if holding the tubes or bottles in a grip configuration. Conceptual deixis is retained, exemplified in Figure 5.30a by the two hands acting as if holding the bottles on a left-right axis, and using the pointing gestures, with one hand pointing into the bottle depicted by the opposite hand to represent the comparative contents of the bottles. Thus Ivy performs a paradigmatic change in order to align syntagmatically with her treatment of different points in space as standing in for the two bottles. The depiction of the bottleneck constrains the visualization of points in space to afford their usage in ellipsis, and thus allows the profiling of their distinction: separate points in space construe the more general notion of distinction, in turn profiling the saliency of the verbal referring expressions.

Turning to Ivy's iteration in the fourth trial, reproduced in Excerpt 5.12, her explanation follows a similar trajectory as the previous trial, taking the turn until a dispreferred confirmation check occasions a repair reformulation. However, Ivy's initial explanation and depiction integrate several transformations from the previous trial, while reorganizing others. Specifically, she segments her explanation by first defining and elaborating on the topic, then depicting the different amount of solute in the containers before depicting the containment relation between them. This leads to a confirmation check with is responded to with a question, to which Ivy answers with a redepiction.

Excerpt 5.12 *osmosis1.4* **deployments and depictions**
mcht1617exp13ug2 [00:18.135 – 01:18.150]

```
011 IVY:    ok and er article is about the (.)
    g:   +moves paper on table            +
012         mm (.) /osma- osmasis/ and i think
013         it's maybe er very (.)
014         very you haven't seen this word before
015         but i can explain it
016         is about a kind of material that (.)
017         it's only allowed the
    g:   H--------------------H
    #:5.31a
018         water (.) to go through it (.) [yeah ok]
    g:   ^---------^***************--------------
    #:   b          c
019 PHI:                                [nodding]
020 IVY:    and er we got two two two sugar waters
    g:   »~~~~~~~~~~~~~~~~~~^--------.------.---»
    #:                     d
```
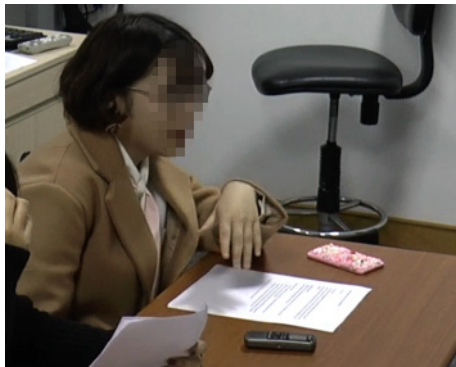

a. it's only allowed the

b. water (.)
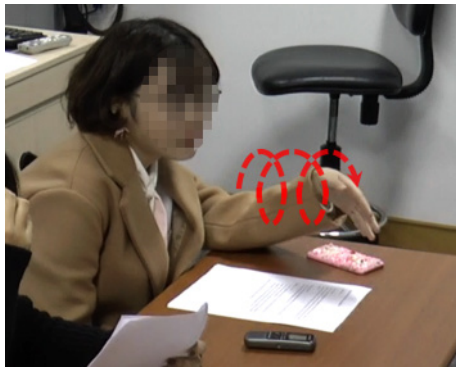
c. **to go through it** (.) yeah ok
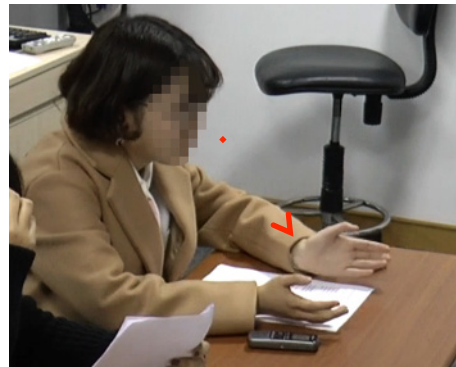
d. and uh we got two **two two sugar waters**

Figure 5.31 Initiating hand positions for *osmosis1.4*

Ivy formulates her explanation by announcing the topic with an about-move defining it as *osmosis*, followed by a specifying characterization as the permeable membrane, here calling it 'a kind of material' (line 016). She elaborates on this

characterization as 'only allowed the water to go through it', (lines 017, 018), doing a spiral motion with her left hand as she utters 'go through it' (fig. 5.31c). Ivy thus establishes a point of reference in terms of water, which then follows into her description of the containers, deploying two flat, palm-up hands to locate the containers on the left-right horizontal plane (fig. 5.31d). Ivy omits mention of the containers themselves, only referencing them as *sugar waters*. Having explicitly mentioned the solute directly coupled to her two hands ready-to-depict, Ivy is able to represent the amount of sugar using locative deixis and omit mention of percentage, such as she did in her reformulation in the previous trial.

Excerpt 5.13 (cont.)

```
021        the one is much more sweeter than the other one (.)
    g:    »~~~~^--------------~~~~~~~~~~~^-------------------»
    #:5.32    a                          b
022        it means that the /salute/ {solute} (.)
    g:    »~~~~~~~~~~~~~~~~~~~~^*****************~~~~»
    #:                          c
023        in IT is much mOre: than this one (.) ok↑ (.)
    g:    »~~~^*~~~~~~~~~^------.-----.----------------|
    #:       d            e
024 PHI:   er
025 IVY:   [ok↑ you got it↑]
    g:    H--------------H
    #:    f
026 PHI:   [nodding        ]
```

a. the **one is much more**

b. **then the other one**

c. it means that the
/solute/

d. in **IT**

e. IVY: is much **mOre than this one**
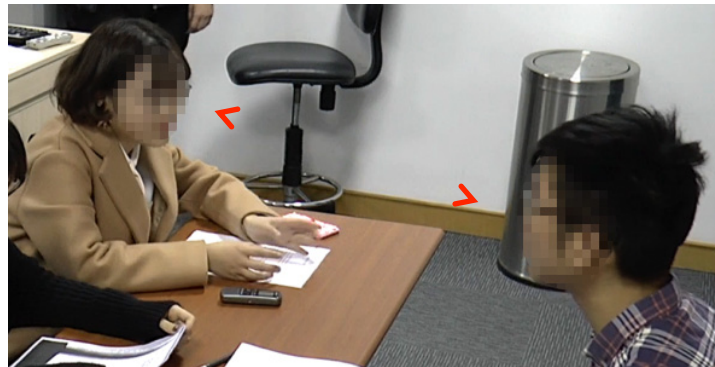
f. IVY: ok you got it

Figure 5.32 Depictions of amount of solute in *osmosis1.4*

The deictic alignment in Ivy's new reformulation replaces mention of the percentage, but she replicates drawing in the air as she says 'solute' (line 022, fig. 5.32c). She also optimizes the locative-deictic gestures, as can be seen in the sequence in figures 5.32d and 5.32e. By holding the left index finger pointed at the table as she crosses her right hand over it, she maintains the imagery of location which references the distinct containers. This then resolves back to the two-handed bottle-handling form, a home position as she checks comprehension with Philip (line 025, fig. 5.32f). With the bottle-handling form Ivy is then able to continue in her depiction using the curled fingers to demonstrate the containment relationship between the two containers.

Excerpt 5.13 (cont.)

```
027 IVY:    and we now put the the two: two tubes and
     g:     ^----.-***--.----.-----^*******---------»
     #:5.33a                          (a)
028        one got water and one (.)
     g:    »~~~~^---~~~~~~~~~~^--~~~»
     #:         +Rp→center    +Rp→Lh
029        and one got different percentage of
     g:    »^---.--------.--------------------»
     #:    (a)
030        /salute/ (.) in it (.)
     g:    »--------------------»
031        and together=and one inside and one outside (.)
     g:    »---------------~~~~~~~~^~~~~~~~~~~~~~^------|
     #:                         b              c
032        and the inside got much more /salute/
     g:    |~~~~~~~~~~^-----.------------------»
     #:              d
033        than outside (0.5) you know=
     g:    »~~~~~^--------------------»
     #:         e
034 PHI: → =$what's the meaning of salute$
035 IVY:    um ah ah ok ok ok (0.5)
     g:    »--------------------~~~~»
036        the two: (0.9) boto=two bottle of
     g:    »~~~~^---------~~^----------------»
     #:         f          g
037        two bottles of sugar water sugar [water you know]
     g:    »-------------------------^**********---------
     #:
     z:                        ›PHI
038 PHI:                                    [≈uh huh≈      ]
```

a. **and we now put the the two: two tubes**

b. **and one inside and one**

c. **outside**

d. **and the inside got much more /salute/**

e. than **outside**

f. **the two: (0.9)**

g. **boto=two bottle of**

Figure 5.33 Containment relationship in *osmosis1.4*

To depict the containment relationship between the beaker and thistle tube, Ivy once again changes her methods for explanation. As she introduces the *tubes*, she beats and holds the bottle-handling form (lines 027–031, fig. 5.33a). She then projects

a location by pointing with her two index fingers together into center space as she says 'and one inside', thereby referencing a containment relationship at the spot where she points (line 031, fig. 5.33b). Ivy next uses rim-depicting gestures (cf. Claire in Excerpt 5.2) to depict the outer container and the inner container within it (figs. 5.33c, d). When Philip asks a clarification question regarding *solute* (line 034), Ivy treats it as both a problem in the term and in the depiction. At line 036 she changes the previous term *tubes* to *bottles*, projecting distinct spaces with her two hands flat, palms up on the table which then configure into the bottle-handling gesture. She then uses this gesture to begin the same depiction of containment of pointing into the bottle-necks as she changes the term *solute* to *sugar water*.

Once again, the order of these elements is rearranged in service of the structure of the depiction, thus demonstrating how various construal dimensions partition salient elements, and subsequently become re-partitioned in different ways. Optimization of the elements occurs based on the initial home position forms, in this case two hands on the table. However, these forms serve not only to project a gesture space for interlocution, but also project imagery, and thus semantic content into the unfolding description/depiction.

5.4.3 *Geography2: Readiness-to-hand of depictive trajectories*

A final example illustrates how intermediary, schematic positions afford specific imagery in projecting that imagery through the instantiation of prominence relations in multimodal explanation. The analysis focuses on Amara's depictions of several geologic cycles, characterized by the participants as geographic phenomena (Figure 5.34 reproduces an image similar to the one used in Amara's stimulus, although in hers the phrase *hydrologic cycle* was used instead of *water cycle*). Tracing Amara's depictions reveals how her home positions and diagramming of the cycles increase in

degrees of iconicity as she goes through the trials. For reasons of space I focus here on two aspects of Amara's gesturing: her home positions from which she deploys her gestures, and her adjustment from using primarily a horizontal plane of axis, to integrating a vertical plane with three-dimensional iconic gestures. Particularly salient is how a listener's intervention in the second trial profiles a wider expansion of gesture space and iconic gestures. The analysis further illustrates how other-repair/candidate depictions, home repositionings, and ad hoc categorization afford resources for optimizing the intercorporeality of a depictive explanation.
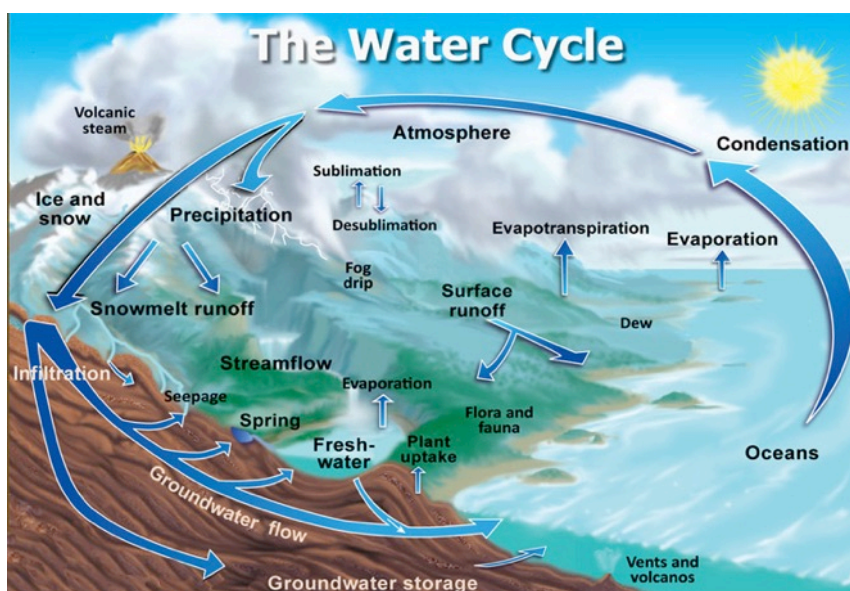
Figure 5.34 Example of image used in geography stimulus

Image in the public domain. Retrieved 31 July, 2020
https://en.wikipedia.org/wiki/Water_cycle

Figure 5.35 reproduces the trajectory of Amara's home positions in her trials at explanation. In her first trial she reads from the stimulus and examines the diagram, demonstrated by the way she maintains a position in which she holds the paper with her left hand and maintains a deictic point with her right hand (fig. 5.35a). In the second trial, Amara is no longer reading from the stimulus. She shifts her posture from an unmarked position to placing both hands on the table as she begins her

explanation (fig. 5.35b). Following an intervention from her co-participant, Amara then redepicts and repairs her explanation, deploying from a position similar to that of the first trial: left hand on the table horizontal with her body, right hand extended on the page. In her third trial, Amara begins her explanation with her hands on her lap (fig. 5.35c), from which she deploys one by one until placing both hands on the table, palms-inward, fingertips touching, forming a triangular shape (fig. 5.35d).
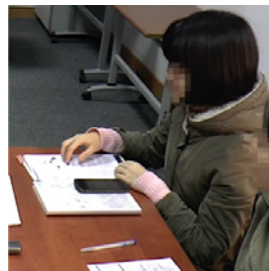
a. home 1

b. home 2.1

c. home 2.2

d. home 3.1

e. home 3.2

Figure 5.35 Amara's home positions in *geography2*

In her second trial at explanation, reproduced in Excerpt 5.14, Amara's depictions prompt one of her co-participants, Hua, to formulate two gestural paraphrases which re-orient the diagram onto a vertical plane, and another co-participant, Claire, to suggest a candidate topic, *geography*.

Excerpt 5.14 *geography2.2*

mcht1617exp22ug3 [00:02.490 – 01:23.488]. Participants from left to right:
Amara, Claire, Hua

```
001 AMA:    my article is about the (.) three important cycles
     g:    H------------------------------------------------»
     #:5.35a
002         (1) in the earth (1)
     g:           |.----.-.----|
003 V01:    sorry [(x x x x)
004 CLA:          [oh:]
```

Amara begins her explanation in a home position, as seen in Figure 5.35a, verbally

invoking the three cycles from her stimulus (line 001). After a short interruption (lines

002–004), she begins by characterizing the first cycle as 'hydrological' then to

'hydrologic' (lines 005, 006). To depict the cycle, she performs circular gestures

along the horizontal plane (fig. 5.36). The lone gesture crossing the vertical plane is

an abstract forward arc as she says 'change' (line 008, fig. 5.36b). She ends her

depiction here using her index finger oriented downward, moving back and forth

along the horizontal, lateral axis as she says 'water streams' and 'river' (line 010, fig.

5.36e).

Excerpt 5.14 (cont.)

```
005 AMA:     (1) the first cycle is er (.) hydrological (.)
     g:    |H1»
006          hydrologic means er on the water (.)
007      →  in the (.) in the earth the water (.)
     g:    |^*****-----.------.-----^~~~~~~~~|
     #:5.36a                      +abandoned gesture
008      →  er change and er (.) transmit (.) o:ver the (.)
     g:    |^********~~~~~~~~~~~~^****^**~~~~~~~~~~~~~~~~~
     #:     b                  c    d
009          water erm like (.) rain and snow (.) and er (.)
     g:     --.~~~~~~|H1»     |-.--------.--~~~~~~~~~~~~~~»
010      →  streams (.) water streams (.) river
     g:   »~~~~~~~~~~~~^*************-----^****|
     #:                 e                (e)
```
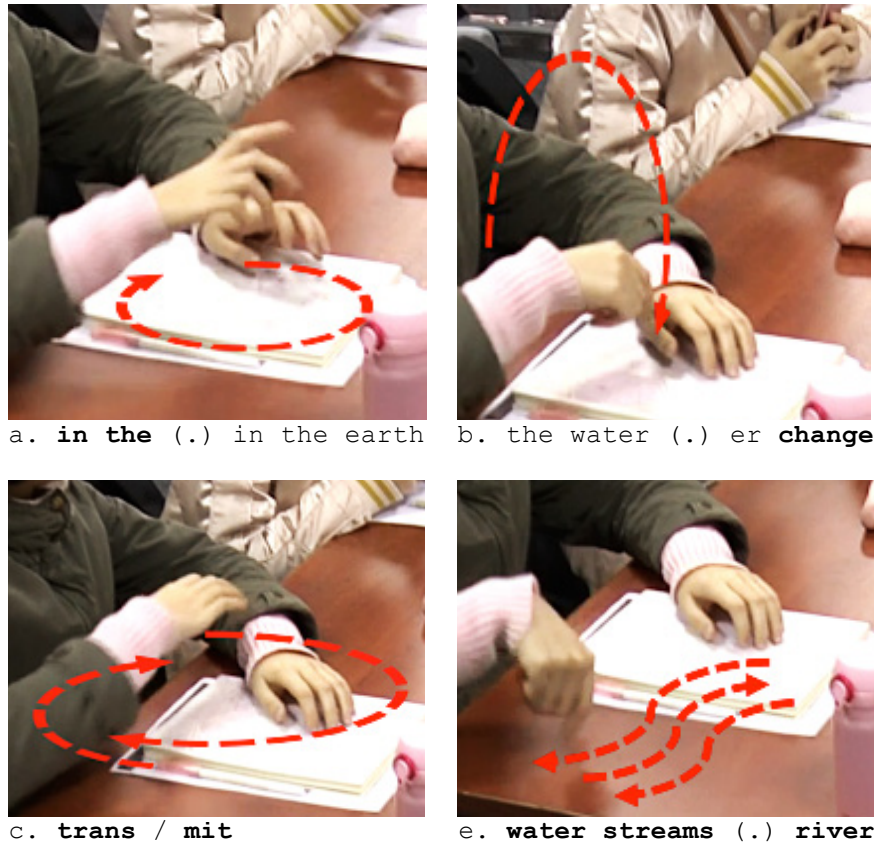
Figure 5.36 Depictive sequence leading to *water streams/river*

Amara's depiction here prompts Hua to begin a paraphrase at line 011, indicated by the reformulation marker *you mean*.

Excerpt 5.14 (cont.)

```
011 HUA:    oh you mean a system (0.5) where (0.6)
    g:              |~~~~~~~~~~~~~~~~~.~~~~~~~~
012      →  water circulate (.)
    g:      ^*****^*********|
    #:      p→dwn 5.37a
013 AMA:    decre- er (0.5)
014 HUA: →  a circle (0.5) [like a [circle  ]
    g:      |~~^************^************~~~|
    #:        b              (b)
015 CLA:                         [°oh er:°] (nods)
016 AMA:                     [°x x x°]
    g: →                     |^*******|
    #:                          c
```

226

a. HUA: water
   circulate

b. HUA: a **circle**
   (0.5) **[like a**
   circle]

c. AMA: [*whispering*]
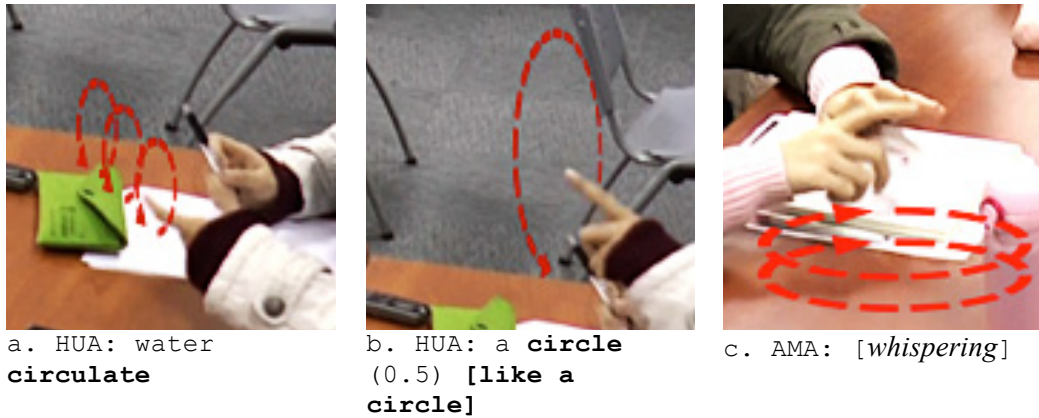
Figure 5.37 Circular gestures for *water cycle – geography2.2*

Hua introduces the term 'system' at line 011, and at line 012 performs a reduplicated circular motion with her index finger in palm-lateral orientation as she says 'water circulate' (fig. 5.37a). She pauses for a moment and Amara gazes at her as she utters 'decre-' at line 013, perhaps to say *decrease*. At line 014 Hua treats Amara's response as troublesome and repairs her gesture, drawing a more prominent circle, palm-outward and in gesture space above chest level, as she says 'a circle like a circle', repeating the gesture once (fig. 5.37b). Amara takes the interim pause and whispers something inaudible but gesturally draws circular motions with her palm down over the table (fig. 5.37c) and appears to think over the gesture as she repeats it silently.

Amara then proceeds to respond in continuance of her explanation, mitigating it in terms of her ability to explain what she knows, but offering a depictive sequence to explain the formation of water systems in the cycle.

```
017 AMA:    er i just can explain one (.)
    g:                    |~~~~~~~~^------
                              R2straight
018        er the cloud (0.5) the clouds in the sky (.)
    g: →   ~~~~~~~^----~~~|      |~~~~~~~^--~~~~~~~|
    #:            p→paper            5.38a
019 HUA:   ≈en≈
020 CLA:   (nods)
021 AMA:   (.) can form (.) to (.) form the rain and the rain
    g:     H-------.--------.------.--------.---|^***********
    #:                                         (a)→table
022        (1.4) the rain goes down (0.7) to the ocean (1.5)
    g:     ----------^***********-------***********---~~~|
    #:              (a)→table
023 AMA:   and er the water (.) in the ocean (0.6)
    g:     |H2----------.--------^***********|H3---»
024        then flow through: the river (1)
    g: →   »----|^*************---.--.---~~~|
    #:           b
025 HUA:   ≈yeah≈
```


a. the clouds **in the sky /
rain goes down**

b. then **flow through: the
river**
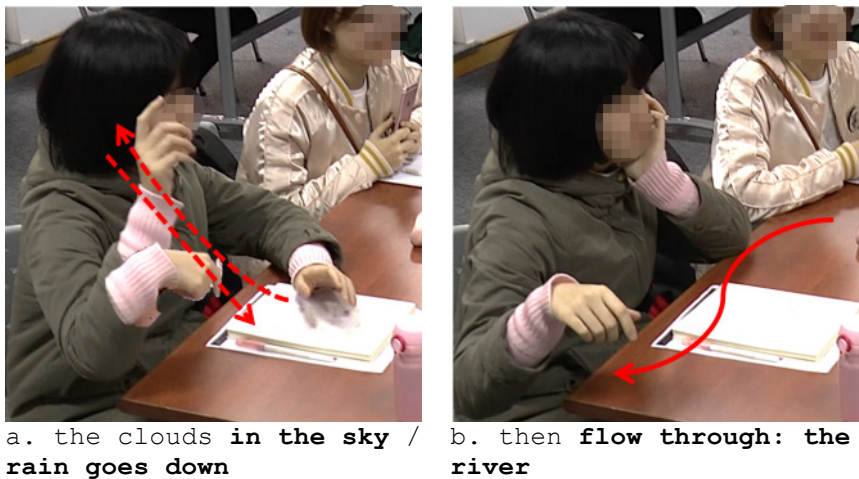
Figure 5.38 *clouds* and *flow into river*

Amara continues her description by introducing the term 'cloud' as she points on the table, pauses, then points upward as she says the phrase 'clouds in the sky' (line 018, fig. 5.38a). Using this form, she then beats along the utterance of 'can form (.) to (.) form the rain', and while uttering rain again motions pointing from up to down. She then points to the table as she says 'in the ocean' (line 023), and redepicts a variation of the river gesture as she says 'then flow through the river' (line 024). The gesture is changed from a reduplicated motion to being drawn only once, and more slowly and

longer than the previous iteration, ending further apart and thus drawing a longer imaginary line in gesture space. Hua confirms receipt at line 025, ending the gestural participation framework leading to Amara's update of her description of the water cycle, specifically by placing *cloud* into the vertical plane, and prominently drawing the line representing a *river*. In this way Amara treats Hua's paraphrase as lacking, from her perspective, some of the necessary elements needed for the depiction of the water cycle.

To conclude her explanation, Amara depicts what she characterizes as *the rock cycle*. Her gestures are highly schematic, and she uses only one depictive gesture, a palm-down over the table to depict *ground*. In this gesture she appears to evoke the terrain of ground by the flatness of her hand, resembling what Streeck (2008) calls *scaping*. Amara's redepiction here prompts both Claire and Hua to respond in ways that are relevant to Amara's subsequent trial. Claire submits a candidate generalization, *geography phenomenon* (line 042), to which Amara accepts affirmatively. In turn, Hua offers a depictive elaboration of the *rock cycle* (lines 046–050), drawing on her knowledge as an art student (line 052).

Excerpt 5.14 (cont.)

```
((lines 026 to 039 omitted))

040 CLA:     oh [you  ]
041 AMA:        [oh oh]
042 CLA:     explain the (.) geography phenomenon (.)
043 AMA:     yeah [(nods)     ]
044 CLA:          [oh ok ok  ]
045 HUA: →        [yes yes er]
     g:               |^**
     #:5.39            a
```

```
046 HUA: →    the rock is er piled by wind or [flood]
      g:      ---------------^****~~~~^**************
      #:                     b        c
047 CLA:                                      [hm  ]
048 HUA: →    to [a certain area and er form]
      g:      ^*************^***~~~~~~~~^****
      #:      d              e          f
049 CLA:         [oh yes oh oh oh:        ]
050 HUA: →    a mountain [very big (laughs)]
      g:      ^**********~~~~~~~|
      #:      g
051 AMA:                 [(nods, smiles)    ]
052 HUA:      £hh£ $i studied art in my highschool$
053 CLA:      art yes me too
054 HUA:      oh yes so we are familiar to £geography£
```
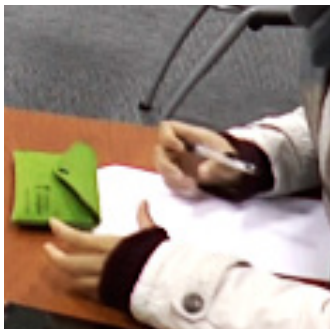

a. **er the rock is er** b. **piled** by c. **wind** or **flood**
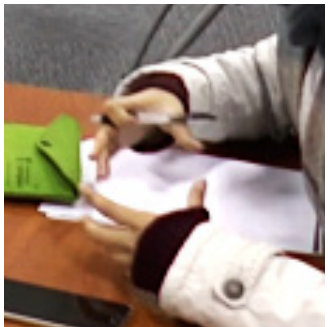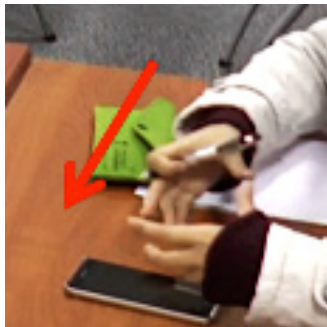
d. **to a certain** e. **area** f. and er **form**
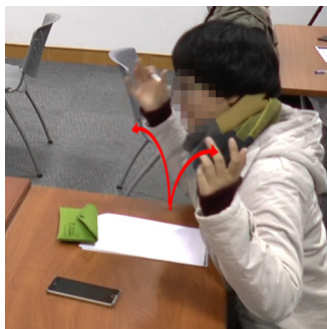
g. **a mountain** very big

Figure 5.39 Hua's redepiction of *the rock cycle*

Hua uses various three-dimensional gestures to invoke images associated with rock-formation: holding gestures motioned from one side to another; vertical movement to suggest *piling* of rocks; finalized by their culmination into a *mountain* gesture construing *largeness* through image and verbalization ('very big' at line 050, fig. 5.39g). Hua's paraphrase introduces several depictive construals which Amara appears to borrow in her subsequent trial: the use of three-dimensional space, and the *mountain* gesture form, reused in Amara's introduction of the stimulus diagram.

The example in Excerpt 5.14 illustrates the degree of *joint imagining* (Stukenbrock 2017)—the shared experience of a non-present entity—that speakers can activate between them. While all depictive practices can be said to invite joint imagining, the interaction between Amara and Hua shows that participation in this imagining can take place in different ways. As Amara and Hua do not appear to attend to each other's gestures directly (cf. Excerpt 5.5), they nonetheless enact competing depictions that each serve to complete the imagining of the other.

In her third trial, Amara optimizes her explanation for joint imagining by integrating the collaboratively afforded diagrams and categorizations into the depiction of the water cycle. Here she is able to manipulate viewing of the phenomenon through the use of the horizontal and vertical planes of perspective, and three-dimensional iconic gestures and techniques, thereby increasing the level of iconicity in the depiction (cf. Dingemanse, Perlman, & Perniss 2020).

Figure 5.40 shows Amara's trajectory in moving from her starting, natural home position to a new, iconic one. At the onset of her explanation she deploys her gestures more prominently, set against the background of her natural default home position with hands underneath the table (fig. 5.40a). Various depictions of processes in the diagram are projected by Amara's new home position, configured in a diagonal, flat

palms-lateral orientation, both hands touching and resting on the table. Amara first introduces her topic using the categorization given previously by Claire, *geography*, indexing it within the stimulus in preparation to reformulate it as 'a diagram' (figs. 5.40a–c), depicting *diagram* with her two hands in an outward, parallel circular motion (fig. 5.40d), borrowing Hua's mountain gesture. Amara thereby visualizes the diagram which forms the basis of her explanation. The gesture resolves into a two-handed home position, which Amara rests on the table (fig. 5.40e) as she specifies saying 'explaining how the water in the Earth', then quickly depicts a circle in vertical space as she says 'make a circle' (fig. 5.40f). She thus conventionalizes and projects the circularity which becomes a salient image in her explanation, while entering into a second home position. This second, two-handed home position affords deployment of transformed gesture forms, making the divisions between boundaries more clear, as seen in the multiple functions of the provisionally held form in pragmatic moves (fig. 5.40g), thinking displays (fig. 5.40h), and peripheral depictions (fig. 5.40i).

a. *home position 1*

b. **there is**

c. *preparation*

d. a **diagram** explaining

e. *home position 2*

f. how the water in the Earth **make a make a circle**

g. **in turn**

h. *thinking pause*

i. mountain
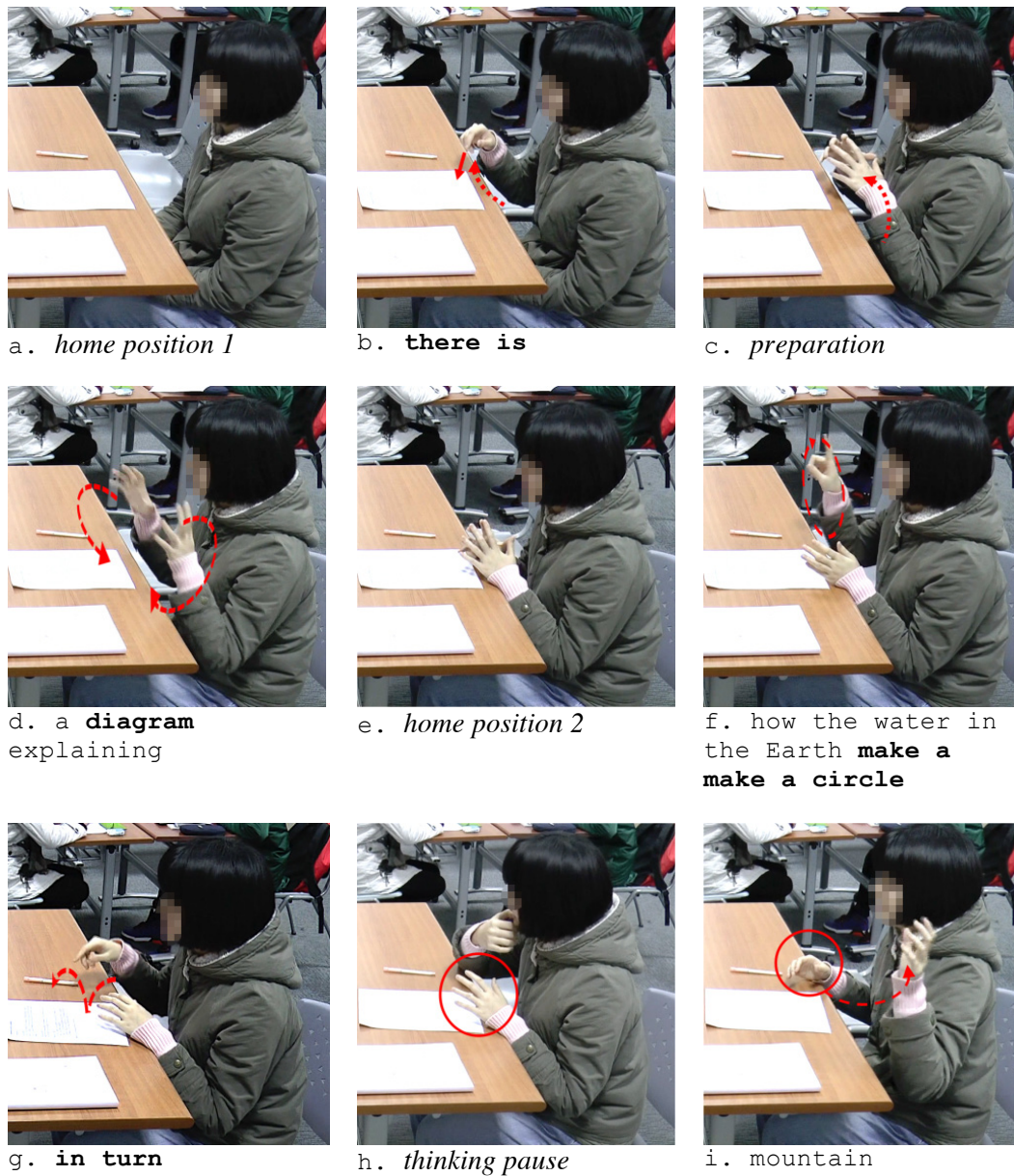
Figure 5.40 Amara's trajectory of home positions and intermediate forms

Further redepictions can be observed in the other-afforded gesture space from the previous trial, for example in Amara's prominent use of the vertical plane and in her use of three-dimensional space, as seen in Figure 5.41. Here the images illustrate Amara's transformation of the cloud gesture (fig. 5.41a), and the use of scaping gestures which carve out the streams and rivers (fig. 5.41b, c), used alternately instead of drawing lines. The variation of these forms are afforded by a change in hand configuration: from a pointing gesture (cf. fig. 5.38b) to a *power grip* hand form (cf.

Streeck 2009b: 45). Thus the change in articulator form affords a change in method, which in turn constrains the visualization of the target gestural object.

a. **clouds**

b. *silent scaping*

c. **it melt and become the running water**

d. **reform**
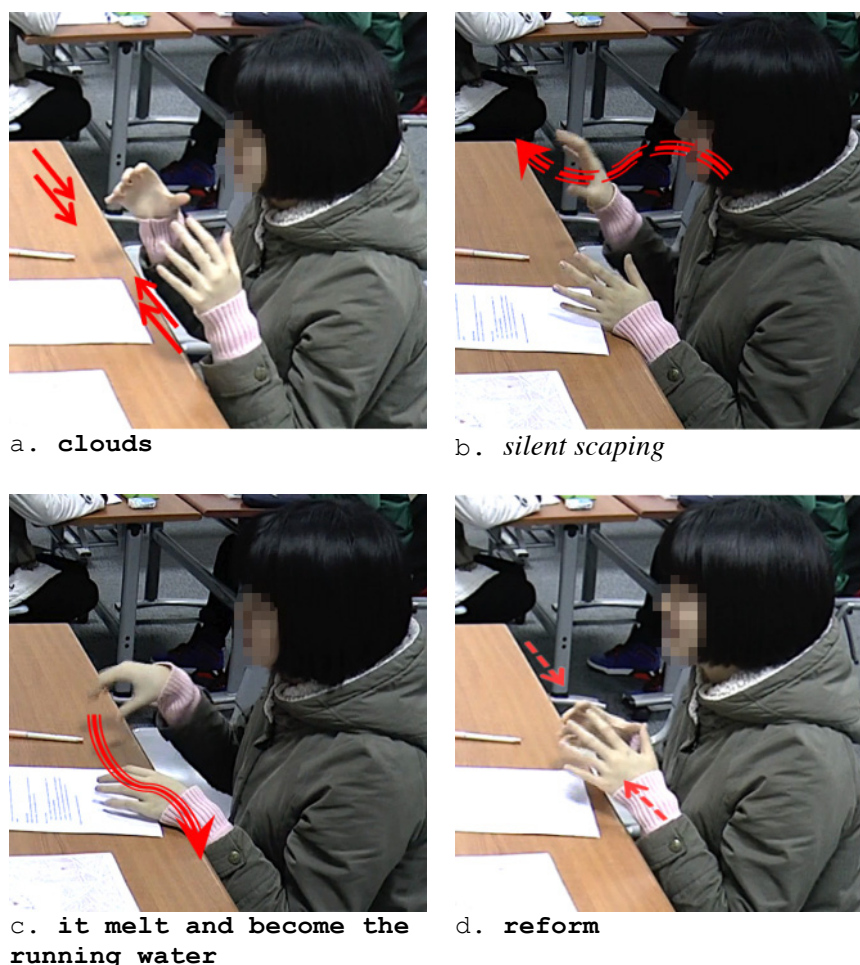
Figure 5.41 Some 3-dimensional gestures in *geograpy2.3*

For instance, to depict the entity *clouds*, Amara changes from a deixis based diagram (pointing at the *sky* then pointing to the *ground*, cf. fig. 5.39a) to an iconic depiction by modeling the roundness of the cloud and evoking its *puffiness* through repeated motions (fig. 5.41a). Other three-dimensional forms include depicting the transfer of water by evaporation out of the clouds using an SDC (fig. 5.41b), evoking the terrain that rivers carve by scaping (fig. 5.41c), and the formation of mountains (fig. 5.41d).

An interaction excerpted from *geography2.3* (Excerpt 5.15) further illustrates how Amara optimally uses transformed integrations in her explanation of the water

cycle, making relevant an anticipatory completion (Lerner 1996) by her recipient,

Emma.

Excerpt 5.15 geography2.3
mcht1617exp24ug2 [03:52.684 – 04:12.466] Participants from left to right:
Emma, Amara.


```
052 AMA:    and er in turn [the ocean]
    g:                     ^-------->>
    #:5.42                 a
053 EMM:                   [(nods)   ]
054 AMA:    the water [in the ocean]
    g:      --.---.----.---.---.---
055 EMM:              [   (nods)   ]
056         (1.5)
    g:       ^****
    #:       b
057 EMM:    ok i know [(laughs)      ]
058 AMA:              [become become] the air
    g:                ^******--.---------^**
    #:                (b)                 (b)
059 EMM:    ≈mhm≈
060 AMA:    water air=
    g:      ^******^**
    #:    (b)
061 EMM:            =≈mhm≈
062 AMA:    (0.9) 蒸发 {zh: evaporate}=
    g:       ~~~~~^*****************
    #:           c
063 EMM:                            =≈mhm≈
064 AMA:    [the water air to the (.) clouds]
    g:      ^****************************~|
065 EMM:    [             (nods)          ]
066 AMA:    and that's one=
    g:        |~~~~~~~^***-------------|
    #:              d
067 EMM: →           =water circle=
068 AMA:                       =≈water≈ circle=
    g:                         ---.~~~|
069 EMM:    =yeah
070 AMA:    one small (.) small circle
    g:        |^*********--.--~~~|
```

a.   AMA: **the ocean**

b.   AMA: the water in the ocean **(1.5)**

c.   AMA: zh: *{evaporate}*

d.   AMA: and that's **one**
EMM: water circle

Figure 5.42 Depiction and co-formulation of *water cycle*

The transcript annotates the depictive gestures that Amara uses. She models

ocean with a three-dimensional form (5.42a), similar to a gesture she introduced to

evoke puffy clouds (cf. fig. 5.42a), and scapes or excavates the water to depict its

evaporation, for which she uses language alternation into Mandarin to support the

depiction (line 059, fig. 5.42c). Emma continually provides tokens confirming understanding (lines 057, 059, 061, 063) until she anticipates the conclusion to Amara's explanation as Amara depicts the circularity of the system (lines 066, 067, fig. 5.42d). It is noteworthy that neither Amara nor her recipient gaze at Amara's gestures, yet when she pauses her speech, Emma demonstrates attendance to and understanding of the explanation when Amara gestures silently. The action of the silent word search adjacent to her utterance formulation makes relevant an intervention by her peer—but the depictive sequence leading up to it constrains the possibilities for filling in the slot of silence (cf. Goodwin & Goodwin 1986). In other words, Amara's summary reveals itself in and within the term *one* as having equivalence with *water cycle*. Amara's efficacy of her gesture is revealed in how it gives its placement within the sequence of its "local intelligibility" (Goodwin 2018: 52), situated in the imaginary diagram delimited in space. While it may be impossible to judge whether Amara's reformulations are directly borrowed from Hua, Amara's turn to three-dimensional space demonstrates an optimization towards more iconicity, which was made relevant in Hua's use of vertical space and of three-dimensional *handling* (Streeck 2008) of entities in the depicted cycles. It also demonstrates the relevance of these changes in the reformulations of a depiction, for instance in how the *puffy cloud* affords visualization of air rising to create rain, which facilitates the three-dimensional view of *ocean*, invoking its traceability to previous depictions and made projectable by the circular gesture (cf. Cantarutti 2020; Pfänder & Couper-Kuhlen 2019). Thus the elements that Amara borrows from her co-participants are not only reused, but also transformed and also transformational in her newly formulated explanation. In other words, they provide new structures from which Amara can realize her depictions in slightly different ways.

5.5   Chapter discussion and conclusion

The examples in this chapter serve to illustrate how explainers within asymmetric knowledge sharing events (Heritage 2012) draw on a repertoire of resources to conduct skillful analyses of their topics. Such analyses are conducted through the making of depictions, diagrams, and ad hoc categorizations, which are not accessed merely by virtue of individual cognitive skills, but through the participation space engendered by explanation in interaction. The fine-grained description of the explanations also serves to show that explanations are not the product of planned input-to-output processes, but rather contingent on the moment-by-moment trajectory of utterance formulation. In other words, expository formulations, as temporarily ratified local environments, bear the mark of hesitation, repair, restarts, and the goal- and recipient directed affordances of interaction. The illustrative examples also show how construal, rather than being an individual cognitive imposition of perspective, is publicly accountable in interaction. Parties in explanation reuse, upgrade, refashion and restructure each other's gestures.

In formulations of depictions, both recipient and goal-directed design work together in shaping specific features of hand configurations. For instance, when Claire depicts a *cup* for representation of the large beaker in the osmosis experiment, the techniques of depiction which make it possible as an imaginary object have relevance for subsequent actions that take place in and around it. The holding of the outer rim of the *big cup* makes relevant visualizations of the *small cup* inside it and the *paper,* or membrane, over its outer rim.

Local and collaborative contingencies of exposition are not only made visible in formulations of explanatory depictions, but are also prefigured in the anticipation of misunderstandings. As Schegloff (1992) points out, repair work for intersubjective

alignment lies in the interaction between interlocutors, and not solely on individual agency (1338), as observed in the anticipatory repair of the explainer's reformulated depictions. Explainers demonstrate careful attendance to specific features of their depictions in order to accommodate repair, also revealing the array of construal relations inherent in structuring talk and gesture. Ivy's careful attenuation of her version of the osmosis containers, and her alternate formulations between *tubes* and *bottles*, illustrates how experiential knowledge of the hands is available to explainers to idiosyncratically adjust their techniques of depiction.

Consequently, gesture, like spoken language, opens possibilities for misunderstanding if ignored or misread. For instance, lack of attendance to manually depicted items may have consequences for trouble ahead, as observed in Hua's initial depictive comment checking her understanding of Claire's display of *cups*. By retaining the same lateral palm configuration as Claire's, but reconfiguring other aspects, perhaps Claire missed the mismatch created by Hua. Hua's initial depiction of the cups retained the same palm-lateral configuration as Claire's, but varied in specific ways that when missed, led to misunderstanding (e.g. using a *big cup* configuration but verbalizing *small cup*). Thus it was through Hua's depictive paraphrase that her understanding was made accountable to Claire's initial formulation. At this stage, and without recourse to the interactant's thoughts, Claire's frame of mind in regards to Hua's depiction remains opaque. However, Claire does display orientation to Hua in treating her repetition of the nominal group *small cup* as confirming understanding. Moreover, Claire's continuation conditioned Hua's depiction as "interactionally irrelevant" (Firth 1996: 250), when in fact it was an essential part of Claire's goal-directed design. Trouble then arises when Hua's usage of her gesture is added to the original *small cup* depiction in the sequence of *three*

cups that she mistakenly depicts. Thus gestures demonstrate susceptibility to being misinterpreted due to variable configurations, but can also be taken up as repairs from previous interventions and reused.

In observation of the reuse of lexical and corporeal structures, Goodwin (2018) draws attention to what he calls accumulation, the "sedimentation of a specific, limited but useful set of resources" (38). However, explainers must attend to their reuse of collaboratively afforded items when confronted with new recipients and new opportunities to formulate their expositions. Given new opportunities to explain, speakers can anticipate and thus project with their corporeality the design of their depictions. For example, in how explainers orient their bodies towards depiction, not only in their postures, but also in their hand configurations, making them ready-for-depiction in the ensuing sequence.

Chapter 6   Intercorporeality in academic group discussions

6.1   Introduction

This chapter examines the Group Discussion (GD) task as an interactional ecology for intercorporeal and embodied construal, which follows from the claims in the previous chapter regarding the respecification of the immediacy of planning and analysis as circumscribed by Cognitive Grammar (CG). As the analysis illustrates, the gestures that emerge in this context follow distinct trajectories from the previous setting of the Complex-Systems (C-S) task. Furthering Streeck's (2009b) exploration of the typological impact on gesturing within distinct communicative ecologies, the gestures that emerge in the GD task relate to its specific goals. Moreover, given a slightly distinct ecology, the dynamics of the GD task's unfolding involve a distinct goal-oriented environment than the previous data-set, which was characterized by reiterated utterances of asymmetric knowledge in distinct episodes. In contrast to the C-S referential communication task, in the GD format discussants engage in long episodes of talk through a more interactive frame, while co-discussants assume equal knowledge for the analysis of the topic-at-hand. Therefore, given the institutional character of the GD format, multiple affordances and constraints are involved that shape the trajectories of talk and interbodily dynamics.

After describing in Section 6.2 the empirical material and specific methods used in this chapter, the analysis consists of three primary sections. In Section 6.3 I provide an organizational view of the GD task in how the participants construct it themselves through interactional organization. Section 6.4 provides analyses of various examples of syntagmatic and paradigmatic construals, focusing on collaborative formulations within the context of discussing specific entities in the topic-at-hand. Section 6.5 takes

a microgenetic approach to how individual discussants distribute construal by activating salient imagery throughout their discussion. The chapter ends in Section 6.6 with a conclusion and summary.

The analysis in these sections entails showing how the discussants themselves orient to and construct embodied reformulations of the topic-at-hand. My analysis illustrates two primary ways that construal is coordinated to intercorporeally within the discussions: 1) syntagmatic analysis of referents in sequential reformulations by way of specificity relations, other-afforded elaboration, and repair; 2) repetition and reuse of gestures that serve to distribute an analysis of the topic-at-hand.

6.2   Empirical material and methods for this chapter

6.2.1   The GD task and corpus

The empirical material for the GD corpus comes from video recordings of a skills module for post-graduate students conducted by an English for Academic Purposes (EAP) institute on campus. The skills program is colloquially known as the *pre-sessional*, in that it is a set of modules taken before graduate study begins. The pre-sessional consists of courses in reading, listening, writing, and speaking. The students who take the program do so either voluntarily or because they missed the required mark in the standardized English proficiency examination for entering post-graduate studies at the university. In particular, the speaking program consists in teaching students how to give oral presentations and how to conduct academic discussions in class.

The activity collected for the GD corpus is an oral discussion task used for assessment as part of graduation from the pre-sessional. Video recordings were made of rehearsal sessions that simulated the conditions of the assessment using topics from the textbook. Rehearsals were recorded in lieu of the actual assessments in order to

protect the intellectual property of the institute, which develops proprietary testing materials for its modules. Additionally, given that the test questions may be reused in subsequent assessments, recording only the rehearsals evades the possibility of accidental dissemination of test questions to future students. These rehearsal recordings were then collected under the subcorpus of peer interactive tasks and given the label *Group Discussions* in the CAWSE corpus. In total, the GD corpus used for the current study consists of eleven recordings selected from CAWSE, following the methodological and ethical procedures outlined in Chapter 4.

As an institutional examination, the GD resembles recent reorientations of assessment which align more closely to the natural activity of the interactive classroom (Philp, Adams, & Iwashita 2014: 174–175). While such an alignment may result in empirical data that is more "reciprocal" and "balanced", and thus more representative of natural language for a researcher, the potential variability of the participants complexifies the value of peer interaction as both a form of assessment and research object (*ibid*.: 178–179). Nonetheless, as a genre the GD takes the reorientation of assessment a step further in that the students are assessed based on how they interact with their peers, and, in the case of the GD task as developed at the EAP institute, the focus on content primarily serves as a vehicle through which interactional competence is assessed.

In the video recordings made for the GD corpus, the tasks simulated the format of the assessment, but were followed up by feedback sessions with the instructor and some peers. Timing was constrained depending on the number of discussants: 9-minute discussion for groups of three, and 12-minute discussions for groups of four. The time limit was employed to give each discussant ample time to participate, as participation is part of the assessment, which follows a rubric given to the students

during the module (cf. Table 6.1). Due to the sensitivity of internal copyright and the privacy of the institutional material, the table below represents a paraphrase of the rubric, keeping it as transparent and general as possible without repeating it verbatim.

Table 6.1 Group Discussion Rubric (paraphrased)

Language	Topic Knowledge	Interaction
1) Spoken fluency 2) Pronunciation 3) Use of relevant terminology and discussion-appropriate vocabulary (e.g. transitions and turn-allocation) 4) Spoken Grammar	1) Knowledge of content 2) Formulation of stance and navigation of opinion 3) Formulation of examples and related content	1) Knowledge of proper response and organization of speaking turns. 2) Development of discussion topic and sub-topics

The rehearsals mimicked the assessed format of the GD task exactly, which is segmented into two stages: a preparation stage and a discussion stage. The task begins when the instructor gives a stimulus question to the discussants, which in the rehearsals came from the course textbook (*Lecture Ready 3* by Frazier & Leeming 2013) and selected at random by the instructor. Examples 6.1 and 6.2 are samples of stimulus questions derived from the textbook:

(6.1) *Do you think ethics should be an important part of business decisions? Discuss using examples from class and from your notes*. (adapted from Frazier & Leeming 2013: 23)

(6.2) *Read, paraphrase and discuss the five quotes about art on pages 126 and 127. Do you agree or disagree with these perspectives on art and why? Express positions and paraphrase each other's opinions*. (adapted from Frazier & Leeming 2013: 126)

Example 6.1 involves discussion around a social concept and its importance, while Example 6.2 illustrates how various points of view can be interrogated for consensus. At the onset of the task, the topic question is projected onto a screen and the preparation stage begins, during which the discussants are given two minutes to write notes on the topic, and can talk amongst themselves in their L1 (i.e. Mandarin Chinese). In the recordings, participants could be observed choosing a moderator who controls the organization of the discussion, and building a consensus on subtopics and examples to discuss, However, not all participants conversed during the preparation stage, and in the discussion stage the moderator was not always active in allocating turns, where other discussants often self-selected turns and posed turns to their co-discussants.

The timed discussion begins after the preparation stage during which the discussants are required to use English. To enrich discussion content, the students are exposed to a variety of materials in the module, watching video lectures and movie clips, listening to radio programs, and reading library materials that support building a knowledge base to actively engage with and contribute to the topic. With one minute remaining in the discussion, the instructor provides a signal, through either a verbal message or another signal of some kind (in the corpus these were transcribed as actions such as *coughs, shows cue card,* or *clears throat*). A more detailed analysis of how the discussants oriented to organizational features of the task is given in Section 6.3 below.

Gleaned from both the rubric and the recordings is a degree of artifice in the unfolding talk of the task, related to the genre of spoken interaction. As an institutional speech-exchange system, it is the purpose of the GD to demonstrate competency in the self-organization of conversation that is appropriate to academic

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talk, and therefore the interactional order of the task is oriented to by the discussants to a high degree. Markee (2000) points out that these types of pre-organized tasks lend themselves to a rather rigid turn structure, where "speakers who have the right to speak will do so in a fixed order and for a fixed period of time, thus producing extended, multi-[turn construction unit] turns" (73). Such was observed in the GD corpus, where the discussants engaged in extended turns at monologic talk with occasional overlap, while at the same time displaying some urgency in their desire to interject and impart their knowledge in the discussion, especially evident in their corporeal behavior, such as through body shifts or prominent gestures during another speaker's turns (cf. Mondada 2007; Streeck 2009a).

Consequently, there is a normative reflexivity brought to bear onto the actual unfolding of the task (Seedhouse 2004), underpinned by the module's learning activities, the 2-minute preparation stage, and the instructor's time-keeping routines. Despite these normative constraints, analysis of the corpus revealed that there remains a degree of spontaneity in the discussions, as evidenced in the form of turn projection, interruption (cf. *turn relevant insertion*, Schegloff 2007), and indeed overlaps to a certain degree. Furthermore, in accord with the focus of this chapter, the task in practice evinces the intercorporeality of talk, in that the discussants are continually oriented to the discussion in an embodied way. This embodied semiotic can be observed in the ways that subtle movements of gaze and posture are mobilized to coordinate with the verbo-gestural contributions which appear to organize the discussion. Indeed, it is one of the purposes of this chapter to show how participation in academic discussion is a corporeal sense-making endeavor.

6.2.2 *Methodology for the chapter*

The initial methodological approach in this chapter follows that of the C-S corpus (see chapter 5.2): I first watched each of the videos in the corpus to observe for candidate phenomena related to gesture, along with the perusal of transcripts for turn-taking organization. I then selected a single case for a detailed analysis of the organizational ecology of the task as it was constructed by the discussants, followed by a prototypicality analysis comparing the structure of the single case to the rest of the corpus (cf. Markee 2000: 103). Given the interactional ecology of the GD task, the trajectory of discussion evolves in several distinct ways than the C-S task. For instance, microgenesis of learning objects involves trajectories that follow the various phases of the task, i.e. verbalization of the topic, illustration and analysis, and summary. While the participants contextualize the topic much like explainers did in the C-S task, given the assessment of interactional competence, intratextual reformulations (Linnell 1998) involved collaborative sense-making. The GD task therefore lends itself to an analysis of how discussants orient to intersubjective practices of elaboration, comment, and illustration in their mutual contributions.

Furthermore, the longer format of the GD task makes available a microlongitudinal analysis of paradigmatic construals in recurrent verbo-gestural couplings. The thrust of this type of reformulation is the reuse and repetition of imagery which are used throughout a discussion as salient forms for depicting, visualizing, or conceptualizing a referent. Syntagmatic, intratextual reformulations will be examined in Section 6.4, while distributed construals of activated imagery will be explored in Section 6.5.

A question that drives this chapter is:

- *How does the distinct format of the GD task change the construal environment of depictive or conceptual gestures?*

Furthermore, given the GD's distinct interactional ecology:

- *How do the discussants achieve bringing the topic-at-hand for collaborative analysis?*

Before moving into the analysis of specific cases, I first provide a cross-sectional view for a global understanding of the GD as an interactive activity.

6.3   Interactional organization in the GD corpus

The exposition in this section serves to identify and describe the various interactional phenomena that emerge from the GD task's ecology, i.e. the particular interactional constraints and affordances reflective of the structure of the task and constructed by the discussants themselves. This shaping leads to the task being observably divided into multiple phases within the discussion: contextualization, elaboration and discussion, and summary.

6.3.1   Overall move structure in the GD corpus

Perusal of the GD corpus reveals that the discussions follow a relatively stable trajectory of moves, bookended by the instructor's actions, whose role is to provide the topic stimulus and keep time. After the instructor provides the stimulus and the discussants prepare, they orient to verbalizing the topic and a definition is discussed at some length. This phase is followed by a substantially longer phase during which the discussants each offer further elaboration in the form of stance-taking and illustrative examples. In the final phase, the discussants move to summarize their positions and

points of consensus, often verbalized by one discussant selected by consensus[9]. This concluding phase often occurred immediately after the 1-minute signal, but some discussants oriented to it beforehand. Table 6.2 outlines the stages and phases of the GD task.

Table 6.2 Stages and phases in the GD task.

Stage	Actions taken
1. Preparation	speaker's decide on examples and discussion points and choose a moderator
2. Discussion	
2.1 Contextualization	verbalization and specification of topic, spoken definitions
2.2 Elaboration/Discussion	exemplification, scenario building, stance-taking, analogizing
2.3 Conclusion	summarizing of opinions, stances, and examples

Discussants sat in three possible arrangements, as seen in Figure 6.1, either in triads (a) or tetrads (b, c). In the triadic arrangement, the middle discussant acted as moderator, while in the quadratic set-up this position varied.

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[9] There is evidence in the corpus that in some cases summarizers and moderators were pre-selected in the preparation stage.

Figure 6.1 Seating arrangement for the GD task

In the triadic formation (a) discussants sit in a line. When in tetrads, discussants sit either in pairs across from each other as in (b) or in a semi-circle as in (c).

6.3.2 *Contextualization phase: defining the topic*

In all of the samples in the GD corpus, the discussants' initial series of moves consists in orienting to clarifying the stimulus question and defining its elements. As seen in examples (6.1) and (6.2) above, the stimuli involve a multi-part question, focused around a social concept and its importance or contribution to society[10]. The discussants weigh its advantages and disadvantages and to what extent they agree with each other on the perspectives put forth. In the corpus, verbalization of the topic was typically done with a definition of the key concept, followed by an elaboration or comment, either with an expansion of the definition or a narrowing of its scope.

Excerpt 6.1 is a prototypical example of the topic phase that initiates the GD task. Monica, Nancy, and Olivia (pseudonyms are used throughout) discuss the question of the impact of changes in the music industry. In particular, the discussants

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[10] All of the pre-sessional data was recorded from modules preparing post-graduates for majors in social science and humanities.

collaboratively contextualize the topic when Nancy requests the opinion of her co-discussant. (For transcription conventions and annotation of embodied actions see Tables 5.2 and 5.3).

Excerpt 6.1 Contextualizing the topic of discussion
GD05.Music.Industry [00:48.538 – 01:27.250]. Triad(a) from left to right: Monica, Nancy*, Olivia. (*) identifies the moderator for the task.

```
001 T01:    ok (.) so that's about two minutes (0.5)
002 NAN:    ok
      z:    ›board»
003         so today we gonna talk about (.) music industry
004         and how has it change recently
005         and we will discuss >whether it has< er
006         imposed a positive impact or negative impact hh
007         so at the very beginning i'd like to ask er (Nancy)
      z:                    ›down»
008     →   how do you think about it
      z:    ›board»
009         do you think about er
010     →   music industry has changed a lot recently↑
      z:                    ›OLI»
011 OLI:    ≈yes≈ i think er
      z:    »down          ›away
012         i think er music industry change a lot erm
      z:    ›down                              ›away
013     →   in China. (.) recently
      z:    ›MON          ›down»
```

Nancy, who is moderating, orients to the task by repeating the stimulus phrasing followed by a direct request to her co-discussant, Olivia, asking her in lines 008 to 010 whether she thinks the music industry has 'changed a lot recently'. By formulating the question in this way, Nancy problematizes the degree to which the music industry has changed. Olivia responds to Nancy's request by confirming with a *yes*, and expanding by further specifying 'in China' (line 013), projecting a possible further contextualization into a more specific domain. Thus, at the beginning of the task the discussants intersubjectively contextualize the topic by co-construing a general to particular relationship, narrowing the scope to an appropriate level with which to weigh the topic of discussion.

The next example, reproduced in Excerpt 6.2, illustrates through trouble how the interactional order of the topic phase is significant to turn-taking. Grace, Huiling, and Iris are given a stimulus on the topic of artificial intelligent robots, articulated as *intelligent machines*. The discussants engage in a collaborative process of defining the topic, beginning at line 012 with Huiling's clarification question on Iris's previous contextualization. Also, a disturbance in the interactional order can be observed, as Huiling, the moderator, shifts her gaze between her co-discussants who each treat Huiling's gaze shifts as a turn allocation. In consequence there is some overlap between Grace and Iris, and further visible display of trouble from Grace who shows frustration at having to abandon her turn due to Iris's overlaps.

Excerpt 6.2 Turn-taking trouble in contextualizing the topic
GD03.Intelligent.Machines [00:09.381–00:43.005].
Triad(a) from left to right: Grace, Huiling*, Iris.

```
003 HUI:    well today our topic is
     z:  »board              »
004     →  what are some of the challenges risks
005        and opportunities involved in
006        developing intelligent machines
007        so what is intelligent machines do you think (0.3)
     z: →  ›IRI      ›GRA                          »
008 GRA:    [tsk hh]
     z:  »dwn ›IRI»
009 IRI: →  [i think] er intelligent machine means that machine
     z:     ›board      ›notes                 ›HUI     »
010        can work like a man er like they react to what er
     z:          ›notes                        »
011        people's order or they can think like a man  (0.8)
     z:  »                              ›HUI            »
012 HUI: →  [you mean the machine can think or act like]
     z:     ›away        ›IRI                      »
013 GRA: →  [yes (laughs) hh (smiles)          ]
     z:     ›IRI           ›away                    »
014 HUI:    a man=
     z:  »IRI
015 IRI:      =yeah [they can interact ]
     z:       »dwn              ›HUI   »
016 HUI:            [like a human being]
017 IRI:    with human beings
     z:  »HUI        ›away  »
018 HUI:    er (Grace)
            ›GRA
019 GRA:    yeah i think er that is a good point point
     z:     ›dwn          ›IRI›away                »
```

In line 004 Huiling characterizes the topic in terms of a dichotomy between disadvantages (*challenges, risks*) and advantages or benefits (*opportunities*) of *intelligent machines*. However, before extending into an outline of this dichotomy, Huiling orients to a definition by requesting it at line 007. She gazes first at Iris, but then shifts gaze to Grace mid-turn. Both Grace and Iris appear to take up the request at turn, overlapping at lines 008 and 009. While Iris begins the turn verbalizing her response, Grace can be heard beginning to talk but abandons her turn, shifting gaze to Iris. Iris takes up the request at lines 008 to 010 by defining *intelligent machines* as 'machine that work like a man'. Huiling and Iris then engage in an exchange of the notion of what it means *to be like a man* (lines 014–016), appearing to ignore Grace as she sits gazing at Iris. At line 013, Grace displays visible frustration when she answers Huiling's question laughingly (directed at Iris) but is ignored, then looks away with a smile. Huiling then offers the next turn to Grace by shifting gaze to her and verbalizing her name. In continuation, Grace provides her contribution by acknowledging the point made by Iris. Thus the interactional ecology of the topic phase can be observed, as the discussants orient to contributing their turns-at-talk but where the urgency to contribute can result in confusion if moderators are not careful in the way that they allocate discussant turns. Furthermore, Huiling's verbalizing of Grace's name, as a repair move, is afforded by the interactional order of the task as moderator, whose job it is to observe the entitlement to speaking.

In another example, reproduced in Excerpt 6.3, the discussants orient to a specific component, the concept of *the placebo effect* in a discussion of *alternative medicine*. Here once again, a term is problematized as an epistemic asymmetry (cf. Heritage 1984b, 2012) that invites explanation.

Excerpt 6.3 Laughing at placebo in Alternative Medicine
GD11.Alt.Med [00:00.432 – 00:24.132].
Tetrad(b): Xiu and Yue* sit across from Zoe and Jasmine.

```
001 T02:    please begin your discussions=
002 XIU:                             =okay hh
003 YUE:    erm so the topic we are going to talk about
004         today is er alternative medicine (.) er so we er:
005         we could er consider the word plAcebo (1.3)
006    →    do you know what is placebo is (1.2)
007         [placebo   ]
008 ZOE: →  [no can you] explain it
009    →    (all laugh)
009 YUE:    yeah it is a kind of medicine to (.) maybe it
```

Yue, by directly asking for the meaning of *placebo* from a co-discussant (lines 006–008), invites discussion on the topic by opening the floor. The discussants orient to Yue's question, however, by laughing as the asymmetry is made explicit by Zoe (lines 008, 009). Thus, Zoe does not merely request the definition of *placebo*, but rather expresses lack of understanding and inviting construction by her co-discussants. However, as Zoe, and her co-discussants, had been preparing to discuss this possible topic throughout the module, her displayed epistemic asymmetry can be explained as being performed for the sake of the task—feigning lack of knowledge as impulse to the discussion.

As can be seen in the previous excerpts (6.1–6.3), discussants move towards clarification of the topic by narrowing the scope: either by narrowing the context (6.1, 6.2) or defining a term (6.3). From the perspective of construal, the move from verbalizing the topic to elaboration involves creating a specificity relation between topic and comment, which becomes further elaborated in the discussion phase. The contextualization itself is therefore sensitive to reformulation, as will be shown in the examples in Sections 6.4 and 6.5.

6.3.3 *Discussion phase: stance, comment, and illustration*

After the topic has been contextualized, the discussants take turns at giving contributions on the topic, typically formulated as examples or illustrations that argue for various stances on the issues involved. These exemplifications are characterized by more interactive involvement than in the rest of the discussion, by the participants engaging with each other's paraphrasings, opinions, and illustrations, resulting in longer stretches of interaction. The commitment to interactive engagement is also evident in the turn-design of their utterances, by overlaps that occur at transition places, and the marked use of transitional expressions employed as part of the interactional order.

For specification into the discussion, discussants could be observed formulating announcements as issuing from their personal point of view, or as learned in class, or both, as observed in the examples in Excerpt 6.4.

Excerpt 6.4 Transitioning to exemplification
(a) GD09.Multiple.Intelligence [02:14.263 – 02:44.126].
Wanda* and Viola sit across from Rebecca and Xinyu.

```
061 REB: →  er (Wanda) you said something about spor-
062          sports er i'd like to say something about multiple
063          thinking this maybe kind of kind of er
064 WAN:    best
065 REB: →  er yeah maybe i want to give an example when we are
066          in primary or senior we can find that boys have
067          high grade have high scores in the
068 WAN:    [(laughs)]
069 VIO:    [(nods)  ]
070 WAN:    [yes     ]
071 REB: →  in math or [science] than girls hh
072 WAN:               [(nods) ]
```

(b) GD04.Birth.Order [01:10.068 – 01:51.121]
Triad(a): Jie, Kexin, Lynn

```
029 JIE: →  er (.) from the er lecture i learned that er
030          birth order in children er would er
031          more clear and er more clever and er
032          success than the second and young children
```

```
033 KEX:     [mhm       ]
034 JIE: →   [and in my] opinion er there are en several erm
035          reasons to er comfirm this=
036 KEX:                            =uhuh
037 JIE: →   er the first is their er (0.7)
038          the first reason is that en (0.6)
039          once they born (0.5) they have (.) h:eavy weight (.)
```

(c) GD02.Marketing.Trends [06:47.185 – 07:13.086]
Triad(a): Diane, Eason*, Feng

```
079 EAS: →   so but from my /respective/ i want to add something
080          about the new trend from erm the internet erm
081          i read article from lib- from in the
082          library materials last week and er i got the new
083          definition about new trend is called the
084      →   big dirty [yes ]
085 DIA: →             [data]
086 EAS:     yeah
087 DIA:     data
088 EAS:     data yes right (1) this big data is
```

In 6.8(a), Rebecca formulates her turn as a paraphrase of Wanda's sports example but to transition to her own. In this case Rebecca reformulates Wanda's example as *multiple thinking*, thus construing a generality from the specific notion of athletics as one of the many types of multiple intelligence. In turn, Rebecca formulates her own contribution as a re-specification of *multiple intelligence* in terms of gender differences (lines 066, 067, 071). In (b) Jie invokes the lecture material, using a reformulation expression *in my opinion* to initiate an explanation, saying 'there are en several erm/reasons to er confirm this' (lines 034 and 035). In (c), Eason also invokes the class's resources, formulating a response based on the library materials, moving into the reformulation with the expression 'from my respective (sic)' and suggesting the notion of *big data*. The repair sequence beginning with Eason's utterance of 'big dirty' (line 084) initiates an other-repair by his co-discussant Diane into 'data' (line 085). Thus, in a general way the discussants can be observed orienting to their contributions as personalized reformulations of the topic. Intersubjectivity is evidenced in the manner in which the subtopics are feigned as problematic, how they

are oriented to as learned from the class, in how co-discussants anticipate responses, and in repair. Thus in instances of errors, the co-discussants can be seen displaying their own knowledge of the task order and themes as a whole (cf. Schegloff 1992).

The examples in Excerpt 6.5 illustrate the usage of transitional expressions formulated as agreement between co-discussants.

Excerpt 6.5 Transition through agreement
(a) GD04.Birth.Order [02:09.161 – 02:31.164]

```
049 JIE:     on their growth (.) education hh erm (1.6)
050          hm what about you (Lynn)
    z:       ›LYN
051 LYN: →   ok er i agree with you about the
052          more attention part
    z:  →    ›JIE                   ‹
053          because i think the first
054          the first children may get the
055          most care and expectation from er
056          his or her parents (0.4)
```

(b) GD01.Business.Ethics [00:52.560 – 01:00.963]

```
029 BRE: →   er: i kinda agree with that
030      →   do you mean that erm er:
031          a business ethics is like a principle
032          it's like a series of ru:les
```

(c) GD03.Intelligent.Machines [01:20.523 – 01:32.044]

```
040 IRI: →   er i agree with you but i think intelligent
041          machine maybe erm more er more er er related to
042          er cutting edge technology erm maybe more er
```

In these examples, the display of agreement is used as a way to enter into an elaboration or comment of a previous formulation. In (a), Jie gives the turn to Lynn after discussing the advantages of being a first child. Lynn takes up the turn through an overt agreement display (*i agree with you*) contiguous with a gaze shift towards Jie as she says *more attention part*, followed by her paraphrase which serves to analyze Jie's formulation of the notion of attention. (b) and (c) likewise demonstrate

agreement tokens in transition. In (b) Brenda elaborates on the previous formulation

by her co-discussant with a clarification check after the agreement display (line 030).

In (c) Iris's agreement is followed by an expanded analysis, oriented to by the

conjunction *but*.

However, this use of agreement for transition can be problematic, as illustrated

in Excerpt 6.5. Here the discussants have turned to whether they agree on the use of

placebo drugs for their purported beneficial psychological effects.

Excerpt 6.5 Problematizing agreement
GD11.Alt.Med [08:11.857 – 08:56.390]
Tetrad(b): Xiu, Yue*, Zoe, Jasmine

```
155 YUE:    yeah and i notice that you (Zoe) erm you er
156         analyze it the placebo from the perspect- er
157         perspective of the /ethnic/ {ethic} (.) you
158         think the doctors er (.) it's maybe not ethical for
159         the doctors to use it cheap things to replace
160         [er:  ]
161 ZOE:    [≈yes≈]
162 YUE:    expensive things (.)
163 ZOE:
164 YUE: →  [i    ] totally agree with you on that point
165 ZOE:    [(nods)]
166         ≈yes≈
167 YUE:    yeah
168         so what about you [(.) guys]
169 XIU:                      [(laughs)]
170 JAS:                      [(laughs)]
171 YUE:    [opinions]
172 JAS:    [(laughs)]
173 XIU:    erm i think general=
       z:                    ›JAS

174 JAS: →                   =why you agree with her
       z:                    ›YUE
175      →  make her (0.6) some examples
176 XIU:    [er ah ah mm (.) hh]
       g:     +raises right hand palm lateral
177 JAS:    [(laughs)         ]
```


At lines 155 to 160, Yue is paraphrasing Zoe's point about the expense of drugs. She

expresses agreement at line 164, then opens the floor to her co-discussants at lines

167 and 170. Xiu takes up the call to contribute at line 172 but is interrupted at line

173 by Jasmine, who directs her gaze at Yue to push for an example. However, Xiu dismisses Jasmine's push by continuing on with her contribution. This example shows how the discussants orient both to their transitions and to the requirement to provide more specified contributions beyond mere agreement.

If the discussion is stimulated by stance-taking on multiple issues, the discussants will take these up one by one, and their illustrations will function in service of formulating agreement or disagreement with a particular stance, and therefore agreement is oriented to in terms of the topic itself. For example, in Excerpt 6.6, Troy contradicts his co-discussant Ulrica, expressing agreement with a proposed position on *art* that she disagrees with, affording Troy's analogy with the tennis shoe brand *Nike*.

Excerpt 6.6 Agreement for initiating an example
GD07.Art-2. [03:11.039 – 03:46.686]
Tetrad(c) from left to right: Troy*, Ulrica, Violet, Wanda

```
054 WAN:     according to Marshall /Ma-clU-Han/ we all maybe
055          misunderstanding of the art
056          in his opinion art just
057          for commercial use and for advertisement
058          i disagree
059 TRO: →  mm er ok i kind of agree with him because i think
060          maybe the greatest art because
061          art tries to convey er meaning to the reader
062          i think the advertisement also can convey er
063      →  the meaning of the products like /like/ /likee/
064      →  nike so they present the image of sports
```

Again, in instances of trouble, the discussants can be observed orienting to the interactional order of the discussion, as in Excerpt 6.7.

Excerpt 6.7 Trouble repaired by orientation to exemplification
GD09.Multiple.Intelligence [00:43.866 – 01:04.443]

```
018 WAN:    (Qiao) (laughs)
019 QIA: →  er 怎么办，她说到哪了？是这里吗
                {zh= what should I do, where is she saying now?
```

```
                       is it here}
020 WAN:      是这里，举一个例子 {zh= kind of here, give an example}
    g:        +waves hand over notebook
021 VIO: →    give an example=
022 WAN: →                     =give a [example]
023 VIO:                              [i think]=
    g:                               +open hand palm up 2x
024 QIA:      =er just like er: (1.1)
025           maybe er some er children are er
026           good at er playing sports
```

Here Qiao uses language alternation (Gafaranga 2016) to seek assistance from her peers when she is selected by Wanda to take the turn to elaborate on the question of *multiple intelligence*. Qiao displays trouble by uttering in Mandarin, 'what should i do, where is he saying now? is it here?', simultaneously orienting to the location of the previous speaker's turn as she points to the notes written during the preparation stage. Wanda responds, in Mandarin, with 'kind of here', waving her hand towards the books and notebooks, but quickly advises to 'give an example', which Violet repeats in English. Wanda also repeats 'give an example' in English while Violet provides a candidate initiator *i think* coupled to a reduplicated palm-up gesture. Qiao takes up the suggestions at lines 023 to 026, formulating her response in terms of *playing sports* as one type of intelligence. The discussants thus display awareness of the purpose of the turn—to give an example within the domain of *multiple intelligence*—and also provide suggestions for how to formulate an exemplifying construction (e.g. *i think*).

Generally, then, the interactional order of the discussion affords various participation frameworks, particularly with the way stance-taking is mobilized in order to motivate elaboration. Specific embodied actions—gaze and gesture—that are involved in elaboration of these positions will be explored in Sections 6.4 and 6.5.

6.3.4   Conclusion phase

In a final phase, the discussants orient to summarizing and recapitulating points made in the discussion. A pre-chosen discussant, sometimes the moderator, reiterates the

main points of the discussion, the stances of each discussant, and any conclusions that
were reached in regards to the topic's importance or merit. The examples in Excerpt
6.8 illustrate how discussants orient to the summary after hearing the 1-minute signal
from the instructor.

Excerpts 6.8 Orienting to discussion conclusion
(a) GD02.Marketing.Trends [10:49.648 – 11:14.835]

```
170 FEN:     for example the news er er the erm:
171          for example news about nations [so      ]
172 T01: →                                 [(coughs)]
173 FEN: →   [(nods)    ]
     z:      >T02
174 EAS:     [the regions]
175 FEN:     yeah
176 EAS:     yeah
177 FEN:     regions so mm so maybe the good (.) good way
178 DIA:     mm ok
179 FEN:     erm
180 DIA: →   in conclusion in today's er discussion we've
181          mentioned about three new trends of
182          market research
```

(b) GD06.Art-1 [11:00.233 – 11:30.161]

```
183 REB:     but if w- he want to produce some artist
184          er productions
185          he have to [alone to: to to say              ]
186 T02: →              [one minute remaining ladies and gents]
187                                          one minute]
188 REB:     they his have to express their emotions (1)
189      →   ok (Qiao) you er: you
190          you can draw a conclusion about our discussion
191 QIA: →   er: (.) er artist er: u- (.) er:
192          artist usually created his er: (2.4)
```

In (a), the teacher coughs at line 172 to signal that one minute remains in the
discussion. Feng acknowledges the signal by gazing at the teacher and nodding (line
173). The discussants wrap up their stage of the discussion and Diane takes up the call
to provide the conclusion (line 180). In (b) the teacher verbally announces the time
(lines 186 and 187) after which Rebecca selects Qiao to provide the conclusion. In

each of these cases, the discussant formulates a move explicitly verbalizing the conclusion of the discussion, thus demonstrating orientation to a new phase in the task.

As can be observed, the GD task unfolds through a juxtaposition of interactional and institutional order, in the turns-at-talk and time keeping constraints which conspire in the structure of the task. The requirement to contribute lends impulse to each discussant to develop and implement formulations for discussing the topic, thus affording specific arenas for how the discussants formulate their construals. The next section examines more closely how discussants use the body in meaningful ways towards formulating and reformulating discussion on the topics-at-hand.

6.4   Embodied reformulations in discussion

In this section the interactional order of the GD task is used to illustrate the interplay of expositional phenomena as goal-directed and contextually motivating the interactivity of the discussion, thus illustrating the intercorporeality at the intersection of *task-as-workplan* and *task-as-process* (cf. Seedhouse 2004). That is, that in order to construct the GD as a learning activity, multiple collaborative and embodied actions are in play to shape the talk which contextualizes the topic of the task. In particular, construal is shaped through syntagmatic reformulations in relations of adjacency, as second-pair parts within an utterance-response relation (Sacks et al. 1974). As embodied constructions, utterances within interaction also display paradigmatic relations between gesture and speech. In the GD corpus, depictive gesture in syntagmatic reformulations can be observed functioning in several ways: i) in the definition stage where the topic is verbalized and collaboratively specified through embodied reformulations; ii) in verbo-gestural repair; and iii) within discussion and conclusion phases where further hierarchies of general to specific construal are enacted through reformulation.

As observed in Section 6.3.2, discussants orient to specifying the topic or a subtopic as read from the prompt. However, specifying the topic requires attendance to both interactional and conceptual organization. Excerpt 6.9 illustrates how the discussants begin the task through embodied coordination of their bodies and material resources, calibrating these resources for the construal of the topic-at-hand. The three participants, Alice, Brenda, and Cynthia, discuss the topic of *business ethics*, and define it from the perspective of the classroom materials while also orienting to the order of turn taking so that each discussant is able to contribute to the definition. Brenda moderates the discussion by first problematizing the topic by displaying a lack of understanding, seeking clarification from her co-discussants.

Excerpt 6.9 Collaborative definition of the topic-at-hand
GD01.Business.Ethics [00:00.400 – 00:54.191] Triad(a): Alice, Brenda*, Cynthia.

```
001 T01:    ok
002 BRE:    ok let's start
    z:      ›board
                ›ALI
003         start by talking about
    z:              ›board
004    →    what IS business ethics
    z:      ›CYN
005    →    i i don't (.) i quite (.) can't get it (0.3)
    z:      ›ALI              ›down ›CYN
006 ALI:    ok
    z:      ›BRE
007         business ethics is a rule or [principals]
    z:      ›down               ›BRE
008 BRE:                                 [mm mm     ]
    z:      ›ALI»
009 ALI:    that the business must er obey
    z:      ›CYN      ›BRE
010         erm' it's from the video
    z:      ›down
011         er we know that er business ethic
    z:              ›BRE›CYN
012         >told people< how to behave (.) [in a company]
    g:      |~~~~~~~~~~~~~^*********~~~------^*********~~~|
    #:6.2 (a)              b                c
013 BRE:                                    [mm mm      ]
014 ALI:    [so]
015 BRE:    [en]
```

a. *home position* b. **how to behave** c. **in com**pany
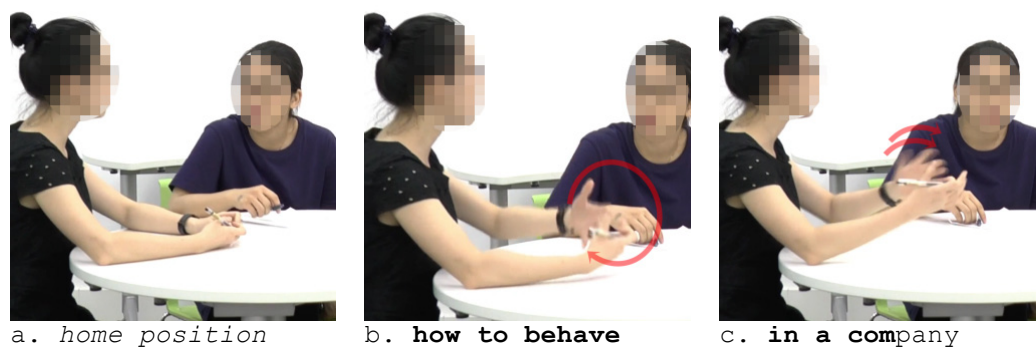
Figure 6.2 Alice's home position and sequence in *business ethics*

At lines 004 and 005 Brenda orients to the organizational structure of the task by first doing a pre-announcement (Schegloff 2007), saying 'what IS business ethics/i i don't i quite can't get it'. The pre-announcement formulates an epistemic asymmetry (Heritage 1984b) into the topic, emphasized by the intonation of *is*, thus inviting clarification and construing it as a repairable. As observed in Excerpt 6.3 above, Brenda's display of lack of knowledge appears feigned in order to motivate the discussion. Alice, in turn, treats Brenda's formulation as a clarification request by contributing a definition, reading from her notes several times (lines 007, 009–012). She first defines *business ethics* as 'a rule or principles / that the business must er obey' (lines 007, 009), further specifying it with 'business ethic / told people how to behave in a company' (lines 011, 012). Along with her characterizations, Alice gestures in a way that appears to give form to the content of her talk. As she utters 'behave', she uses her two hands, open palms facing her, and arcs outwardly into gesture space (fig. 6.2b). She repeats the gesture as she says 'in a company' (fig. 6.2c). In the video recording it can be observed how this repeated hand form is afforded by her home position: Alice's two hands are on the table, as shown in Figure 6.3a: palms inward and cupping the page in front of her. From this position she can produce her two hands while keeping a relatively stable hand shape, thus foregrounding the arcing motion as the salient, meaningful part of the gesture. By repeating the gesture, Alice

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crates an iconic tie between the utterances of 'behave' and 'in a company' with a cyclic motion, visualizing a process (cf. Ladewig 2014). Brenda provides continuation tokens at lines 013 ('mm mm') and 015 ('en'), affording continuation for Alice at line 016 towards transitioning into a subtopic, formulated as 'how important about the business ethic' (line 016). However, awareness of the interactional order of the task can be observed when Brenda treats Alice's topic shift as a jumping ahead in the discussion, given that Cynthia has yet to take her turn at defining the topic.

Excerpt 6.9 (cont.)
GD01.Business.Ethics [00:25.816 – 00:51.514]

```
016 ALI:    er how important about the [business ethic]=
017 CYN:                               [(.)
    g:                                 |~~~~~~~~~~^***-»
    #:6.3                                           a
018 BRE:    =mm:=
    g:       +touches ALI arm and purses lips
019 ALI:       =°oh°=
020 CYN:          =i think maybe i want to add some (.)
    g:            »---.----.-------.------~~~~~~~~~~»
    #:               (b)
    z:            »ALI     ›down
021         er more specIFIc business ethics like
    g:      »^---------.-.-.-|        |^*****-----»
            +PD        +PU              PU
022         i think it's erm
    g:      »----.---~~~~~.--»
    z:       ›ALI         ›down»
023         about the mo:rally in:form=like honest
    g:      »--.---------.-----~~~.---------~.-----»
024         [and also]
    g:      »----------»
025 ALI:    [mhm      ]
026 CYN:    you need to treat serious for [every case]
    g:      »------------^************-------.---|
                         PU
    z:      »down       ›ALI/BRE                   ›down
027 ALI:                                   [≈mm≈       ]
028 CYN:    and others maybe gi- be careful
    g:      |^**~~~~~~~|      |~~~~^*******~~~|
    #:       PU                 PU
    z:      »down              ›ALI         ›down
029         and to: (1)
    g:         |^**~~--»
030         to treat your partners and [how about else]
    g:      »---^*****^***--.----.-------^*********----»
    z:                      ›ALI                ›BRE
031 ALI:                                   [≈mm≈       ]
```

a. *home position* b. *palm-ups as used throughout*

Figure 6.3 Cynthia's default gesturing in *business ethics*

While Alice brings up the importance of business ethics as a sub-topic (line 016), Cynthia extends her arm in a palm-up forward gesture (Streeck 2009a), signaling that she is electing to respond to Brenda's inquiry (line 017, fig. 6.3a). Brenda touches Alice's arm and purses her lips as she gazes at her (line 018), appearing to indicate that the discussion should continue in its current trajectory within the definition phase. Alice responds with a silent *oh* and capitulation at line 019, receipting Brenda's move to repair the digression from the order of the task. Throughout her turn, Cynthia positions herself as can be seen in figures 6.3a and b: her right arm on the table at a 45-degree angle in front of her, holding a pen; left hand tucked in towards her body length-wise; head turned so that she can gaze at her participants. As she discusses, she syllabically beats along with several points in her extended sequence, and throughout her discussion in the task. Cynthia ends her turn (line 030) by first gazing at Alice, then at Brenda, opening the floor to 'add something', further displaying attention to the current order of the task where each discussant contributes to defining the topic.

Excerpt 6.9 continues with Brenda's contribution to the definition phase of *business ethics*. In taking up Alice's and Cynthia's elaborations, Brenda designs a

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gestural sequence which further specifies the notions of *behave* and *obey*, respectively

contributed by Alice and Cynthia.

Excerpt 6.9 (cont.)
GD01.Business.Ethics [00:51-514 – 01:10.365]

```
032 CYN:    [do you want to add something]
033 BRE:    [er: i kinda agree] with that
034         do you mean that erm er:
    g:      |^**************|~-----»
    #:6.4 a
035         a business ethics is like a principle
    g:    »----------------|~~~~~~~~~~^********
    #:                               b
036         it's like a series of ru:les
    g:      ~~~~~~~~~~^****************
    #:              c
037         that business should stick to hh
    g:      ^*************^****************~~~
    #:      d            (d)
038         when they like dealing with the business things
    g:      ^****************************^----.---.-----.---
    #:      e                            f
039         and [doing] their jobs
    g:      ^****************~~~~|
    #:      g
040 CYN:        [mhm   ]
041 BRE:    [is that]
042 CYN:    [mhm     ]
043 BRE:    what you mean? (.)
044 CYN:    erm yes er
```

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Figure 6.4 Brenda's gestural analysis in defining *business ethics*

Brenda formulates her taking of the turn as an agreement which transitions into a paraphrase at lines 034 and 035, uttering 'i kinda agree with that / do you mean that', bringing her hands down onto the table as she points to Cynthia with her right hand and forming a home position (fig. 6.4a). She then *brushes* with her left hand, palm lateral inwards towards Alice (fig. 6.4b) as she utters 'principle', perhaps as a reference to Alice as the originator of the term. She therefore orients to both of her co-discussants simultaneously with her body, and with the subsequent paraphrase Brenda designs her turn in several depictions that co-occur with a concretization of the notion *principle*, and into narrower specification of the question of *business ethics*.

At line 036 she follows with a paraphrase, saying 'is like a series of rules', using a depicting gesture which appears to mold the shape of a flat surface, profiled by open palms oriented downward and moving outward as she utters 'series of rules' (fig. 6.4c). At line 037 an interplay of palm-up cyclic and reduplicated gestures begins. After completing the *series of rules* gesture, Brenda immediately performs two successive palm-up gestures as she says 'that business' and 'should stick to', while holding her left hand in a palm-lateral orientation (fig. 6.4d); the palm-up orientation of the right hand appears to be presenting the topic as relational between *business* and the notion of *sticking to* (cf. Müller 2004). As Brenda utters 'when they like dealing with' at line 039, she performs an analogical gesture (Cooperrider & Goldin-Meadow 2016), where contrary motion is used as the speaker expresses concepts that have interplay or have opposing ideas. In these analogical gestures, the back-and-forth alternation at the wrists is profiled, thus construing relations around utterances of *dealing with* and *doing their*, the idea of people or actors is coerced out of the vague term *they* by both the verbal (line 037: 'business should stick to' personifies business; 'dealing with' and 'doing their jobs' implies agency), as well as in the analogical gestures that construe activity.

An interplay of motifs is thus visualized by Brenda's sequences of abstract gestures, first in the *series of rules* gesture which profiles a gestural space in front of her and for her co-discussants to see. The series of palm-up and back-and-forth gestures operate within this space as functioning to construe the activity involved in carrying out business ethics. When linked to the multimodal comment provided by Alice in her cyclic gesture, and Cynthia's emphasis on the notion of *obey*, the three discussants collaboratively enrich the concept of *business ethics*. Furthermore, adherence and orientation to the interactional order of the task can be observed, the

discussant knowledge of which is displayed in the turn structure as the discussion unfolds.

Excerpt 6.10 illustrates intercorporeality in how discussants can elaborate on each other's definitions more directly through mutual, embodied reformulations. The excerpt is taken from the discussion on *intelligent machines*.

Excerpt 6.10 Collaborative multimodal construal in *intelligent machines*
GD03.Intelligent.Machines [00:23.044 – 00:35.681] Triad(a): Grace, Huiling*, Iris

```
009 IRI:    [i think] er intelligent machine means that machine
     g:    |H»
     #:6.5  a
010        can work like a man er like they can react to er
     g:          |^**********~~~~^****~~~~~^***^****~~~~~~|
     #:           b
011        wh- what er people's order
     g:    |H2        |-----.-------.---»
     #:                     c
012        or they can think like a man (0.8)
     g:    »------------^****-.------.-~~~~~|
     #:                 d
```

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a. *home position*

b. can work **like a man**

c. **people's order**

d. they can **think like a man**

Figure 6.5 Iris's gesturing in her definition phase.

Iris's home position (a) shows participation in the discussion as she actively listens to her co-discussants, but also affords the two-handed pragmatic gestures in her turn at talk: (b) palm-up presentations for 'like a man', cohesively tied to a function by repeated palms-up and beats in (c) and (d).

Iris initially frames the topic in terms of *being like a man,* uttering 'i think er intelligent machine means that machine can work like a man' (line 009) while holding her hands together at her chest in a home position (fig. 6.5a). At line 010, while saying 'like a man', she presents her two hands in open palm-up orientation and spreads them apart, thus beginning her sequence with a schematic gesture underscoring the phrase 'like a man'. She pulses her hands in this configuration along with the syllables in 'they can react to' (line 010, fig. 6.5b), placing her two hands, palm-up and spread apart, beating along the syllables of 'people's order' (line 011, fig.

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6.5c). At the end of the utterance she maintains her hands in the terminal position with left hand in a loose hold, right hand beating along with the syllables in the utterance 'or they can think like a man' (line 012, fig. 6.5d). However, as she says 'think', she makes her beat more prominent, raising it higher than the other beats and slowing it down to synchronize with the utterance of *think*. The sequence then functions to underscore the domain of *man* as possessing the attributes of *reacting to orders* and *thinking*.

Huiling responds by elaborating on Iris's definition through an embodied paraphrase—using gesture and speech to specify Iris's point about machines *being like a man*.

Excerpt 6.10 (cont.)
GD03.Intelligent.Machines [00:35.681 – 00:42.442]

```
013 GRA:    [yes (laughs) hh                              ]
014 HUI:    [you mean the er machine can think or act like]
    g:      |~~~~~~~~~~~~~~---^***************************
    #:6.6                      a
015         a man=
    g:      **^--»
    #:        b
016 IRI:         =yeah they [can interact       ]
    g:                      |^*******
    #:                          c1
017 HUI:                    [like a human being]
    g:          »-----------------^********--»
    #:                              c2
018 IRI:    with human beings
    g:      -.----.-----.----
```

a. HUI: **machine can think or act like a**

b.HUI: **man**

c2. HUI: [like a **human being**]   c1. IRI: yeah they [can **interact]**

Figure 6.6 Synchronous gesturing in narrowing a definition

Huiling summarizes Iris at line 014, saying 'you mean the machine can think or act like a man', during which she performs a series of reduplicating, alternating cyclic gestures with both hands (fig. 6.6a). Using her open palms-up, she rotates in contrary motion towards and away from her body. As in the previous example (Excerpt 6.9 above), I interpret this form-motion pairing as an analogical gesture in that it analogizes or suggests the notion of iterativity, thus construing dynamic process

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in the acts of thinking and acting *like a man*, and effectively bringing those notions into one visualization. Huiling continues her reduplication at line 015, until stopping to hold a palm up as she says 'man', holding during Iris's insertion at lines 016 and 018 (fig. 6.6b). Here Iris treats Huiling's multimodal paraphrase as an affordance for elaboration, saying 'they can interact with human beings', relexicalizing the term *man* and producing an iterative gesture of her own where she beats her two hands, palms down, in straight pulses away from her body along with the term *interact* (fig. 6.6c1). At nearly the same time (line 017), Huiling repeats the outward swing motion of the previously held palm-up as she overlaps with Iris's utterance of 'human being' also uttering the relexicalization of *man* into 'human being' (fig. 6.6c2).

A collaborative construal of the topic-at-hand is observed in Huiling and Iris's mutual reformulations, where the notion *like a man* becomes a focal point which becomes paradigmatically analyzed through intratextual reformulation. Iris establishes the embodied notion of a machine being *like a man* in terms of iterative action, possibly to access *intelligence* through similarity with *man*. Thus a conceptualization *intelligent machines* is achieved through the notion of iterativity, first performed in Iris's two-handed palm up gesture, followed by Huiling's two-handed cyclic analogical gesture, and finally Iris's two-handed palm down pulsing. Thus the forms of two-handedness coupled to iterative motion combine in the construal of what may be called *human-like action* that functions to establish the definition of the topic-at-hand: *intelligent machines*.

The examples reproduced in excerpts 6.9 and 6.10 demonstrate how multimodal sequences of topic definition can become arenas for reuse and transformation, even though discussants maintain their own specific style of gesturing. Furthermore, interactive and collaborative analysis can be observed emerging from individual

gesturing. Excerpt 6.9 showed how the discussants take turns in defining their topic, and how multimodal constructions function to display different construals of the topic which enrich the domain of the discussion. In Excerpt 6.10, the mutual reformulation between co-discussants illustrates the fine-tuned, collaborative work that discussants engage in to specify the concepts in use for the discussion. Moreover, body movement and gestural visualizations demonstrate the collaboration between interactive and semantic construal. The next section illustrates how discussants make use of illustrations and scenarios to visualize their stance on the topic.

6.4.2   *Verbo-gestural reformulations in illustrations of stance*

Embodied reformulations are also observed in the ways that the discussants seek to elaborate on their own and each other's examples, much like in the example in Excerpt 6.10 above. Returning to the discussion on *intelligent machines,* Excerpt 6.11 demonstrates how a discussant can use depictive gesturing as a paraphrase to a peer's illustration. Here Grace has been discussing some of the disadvantages of intelligent machines, framing it in terms of the high cost of building artificially intelligent robots. Huiling takes up Grace's illustration as needing further elaboration by creating a series of depictive gestures that visualize a specific example.

Excerpt 6.11 Multimodal paraphrasing re-construes specificity
GD03.Intelligent.Machines [03:07.840 – 03:26.310]

```
083 GRA:    expensive and it also need many labors
084 HUI:    labors=
085 GRA:        =and er labors↑=
086 HUI:                =la- labor force
087 GRA:    yeah er [with a with a high]
088 HUI:         [labor force        ]
089 GRA:    high brain high intelligent like genius
090 HUI: →  ≈like genius↑≈ [er you mean]
091 GRA:                 [≈yeah≈      ]
092 HUI: →  we need talented people to [(0.6)]
    g:        |~~~~~^*******************~~^***
    #:6.7            a                    b
093 GRA:                               [yeah ]
```

```
094 HUI: →  er (.) create those machine right
     g:     ~~~----^***********~~~~~~~~~~~~~|
     #:            c
095 GRA:    yes and er s- er and er also will will li-
096         will need many er high tech er materials
```


a. we need **talented people to** b. *0.6 seconds of silence* c. **create those** machine right
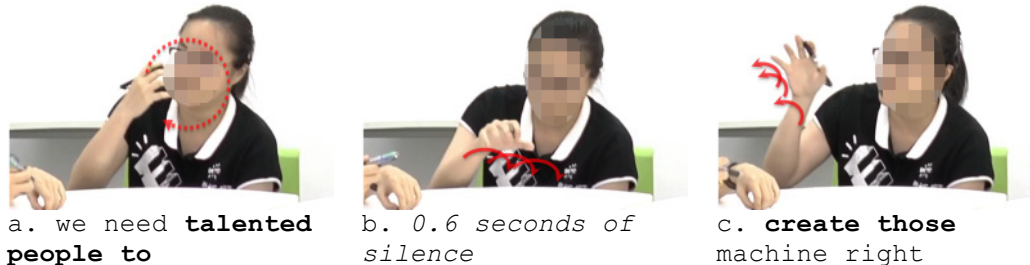
Figure 6.7 Verbo-gestural paraphrase

Here Grace is formulating her stance on *intelligent machines* in terms of the work involved in making them, saying 'expensive and it also need many labors' (line 083). Huiling reacts to the term *labors*, treating it as unclear by repeating the term with a rising tone, and prompting Grace to relexicalize it from *labor force* to *high brain* to *high intelligent* to *like genius* (lines 084–089). At line 90 Huiling takes up the term *genius* for an enactive paraphrase, introduced by the reformulation marker *you mean*. She formulates the paraphrase saying 'we need talented people' followed by a pause, then 'to create those machines' (lines 092, 094). As she says 'talented people', she brushes a circle around her face with her open hand in a palm-inward orientation (fig. 6.7a), indexing her face as an imaginary actor in the scenario *talented people*. In the interim pause, she brings her hand down over the table, keeping the palm-down configuration, iterating an up-and-down movement (fig. 6.7b), which is quickly followed by the same configuration moved to open space on her right side, and the same iterative motion (fig. 6.7c), as if inputting something into a keypad. She terminates her depictive paraphrase uttering the confirmation-request token 'right'

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(line 094), soliciting comment from Grace on her formulation and allowing Grace continuation in the formulation of her stance.

Huiling's reformulation appears to serve a dual purpose: to assist Grace's trouble in uttering her comment, and to provide a visualization of it by paraphrasing and offering a depictive construal. As shown in previous examples (cf. Excerpt 5.6, Chapter 5), Huiling formulates her paraphrase as a concept-checking depiction, providing a verbo-gestural visualization that specifies and enriches the category invoked by Grace—*many labors* as *genius*. Huiling's depiction serves as an analysis of *genius* through an enactment of *create,* by typing on an imagined keyboard and then onto a robot in gesture space (figs. 6.7b, c). Huiling's embodied reformulation demonstrates several aspects of how visualizations are manipulated for analysis of a referent. Absence of speech at the onset of the *create* gesture profiles the hand as the primary evoker of meaning, which also projects imagery into the subsequent verbalization. Repetition and reuse of a hand form create cohesion and serve the embodied enactment of a specific feature of intelligent programmers. Thus Huiling displays her analysis of Grace's formulation as vague, while also giving charity to it as an authentic contribution to the discussion, worthy of enrichment.

Intersubjectively, the trajectory of *many labors* to *genius,* and into the multimodal scenario, illustrates collaborative concept analysis. While Huiling's depiction paradigmatically enriches *create* by narrowing and augmenting its visualization (construing it as *inputting into a computer and into a machine*), by embedding the gesture within the collaborative trajectory invoked by the frame *many labors*, a co-conceptualization of *intelligent machines* is achieved. Thus the exchange between Huiling and Grace, much like the one between Huiling and Iris in Excerpt 6.10, illustrates how concept analysis in discussion can be an intersubjective endeavor.

The next example in Excerpt 6.12 illustrates how a discussant can self-specify their stance from an immediately prior multimodal illustration. Here Xiu is in a discussion with Jasmine, Yue, and Zoe about *alternative medicine*, having specified an analysis of the ethics of administering *placebo drugs* to patients in order to benefit from their positive psychological effects. Jasmine has been arguing the case against it by suggesting that giving patients placebo drugs unbeknownst to them is unethical, especially when patients pay high prices for the real drugs. Xiu then formulates her turn as a disagreement in terms of how patients may experience beneficial effects of placebos by mistake, constructing a multimodal scenario where medical reports are swapped, thus giving misinformation to their recipients. Xiu elaborates by recruiting her and her co-discussant Yue's bodies for indexical enrichment, treating her own scenario as vaguely constructed.

Excerpt 6.12 Schematicity and disambiguation in scenario building
GD11.Alt.Med [08:56.390 – 09:20.734] Xiu and Yue* sit across from Zoe and Jasmine.

```
177 XIU:    no i think maybe in general it it is a good way to
    g:                   |~~~^---~~~|   |syllabic and
    #:                       p→notes     pointing to notes»
178         maybe help the patients
    g:      ~~~~~~~~~~~~~~~~~~~~~~~»
179         i have i have heard a story in my young age that
    g:   »~~~.--|~~~~~~~~~~~~~~~~~~~.---.---.----.------
180         er a doctor er give two peoples er: give
    g:      ~~~~~.-----------.----.--^*******------.--»
181         two peoples er of their body examination reports
    g:   »----^***********----------.-----.-----.----.----|
182         but they don't have (.) the right (.) right
    g:   |~~~~~~~~~~~~~~~~~~~~---^********-----^****
    #:6.8                     a            (a)
183         reports of themselves
    g:      ^******------.--.----
    #:      p→notes
184    →    it mean maybe i took your: reports but
    g:      ~~~~~~~~~~~~~~~^~^~~~~^*****^-----~~~~
    #:                    b1,2   3     4
                          p→(1:self/2:YUE/3:self~YUE/4:self)
185         you took my reports and er maybe the report said
    g:      ^***~~~~~^--------------~~~~~~~~~~~^----.------.--
    #:      p→YUE     p→self                  p→notes
```

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```
186        i got cancer but you think you got cancer (.)
     g:    ^**.---.-----~~~^***------.----.--^********|
     #:    p→self           p→YUE              p→self
187        [so it is kind of so i think] it
     g:    |~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~--»
     #:               PN@body PL@table
188 ZOE:  [(laughs) £who got cancer£]
189 XIU:  the placebo maybe i will be happy and er may- and
     g:    --------~~~~^------------------------~~~~~~~^-------»
     #:              c                           PL
190        the doc- story says three months later (.)
     g:    ----.--.-----.--------^-------------------
                          PN@table
191        i overcome this cancer (.) but you (.)
     g:    ^-----------~~~~~^--.---~~~^*******---
     #:    (c)              (c)        d
192        but you (.) really [got the cancer (.)]
     g:    ^******----^*********************~~~~~|
     #:    (d)         PL over notes
193 JAS:                [£so bad£ (laughs) ]
194 XIU:             [(laughs) so i]
195 JAS:             [(laughs) (x) ]
196 XIU:   yeah it's a very good example for to: prove that
     g:    |syllabic pen over notebook»
197        placebo is (0.8) makes sense
     g:    »                         |
```

a. but they don't have **the right** / **right** reports of themselves
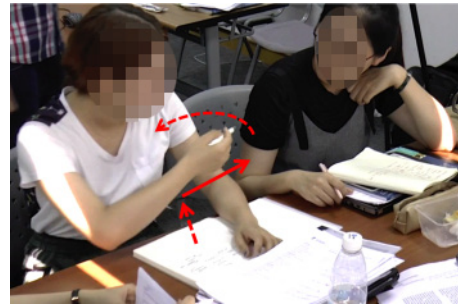
b. **i** / **took** / **your** / **reports** but
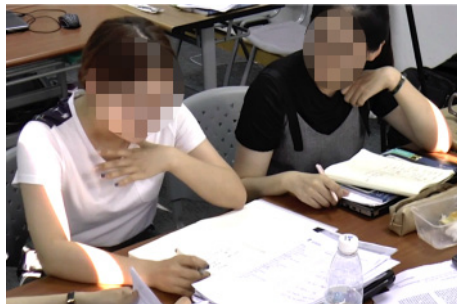
c. **maybe i will be happy**
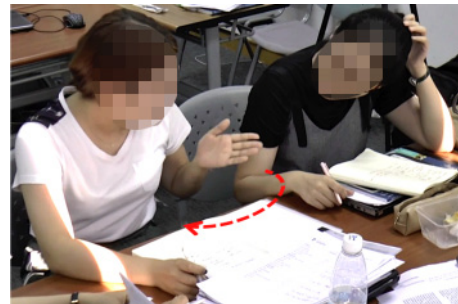
d. **but you** / **really got cancer**

Figure 6.8 Creating a scenario through indexical reference

Xiu reformulates the scenario of swapped reports as expressed in (a) by recruiting hers and her co-discussant's bodies in a more specific scenario (b – d).

Xiu prefaces her comment by saying 'i have heard a story', motioning with her right hand over her notes while holding her pen (line 179). The story is given as a doctor who mistakenly swaps the reports of two people. At line 182 Xiu says 'but they don't have the right', performing a negation gesture, both hands palm down crossing over each other, as she says 'the right' (fig. 6.8a), and repeating the verbal and gestural construction until she says 'reports', where she points at her notes with her pen.

At line 184 Xiu begins a reformulation that specifies the scenario, indicated by the reformulation marker *it mean*. An elaborate display of deictic gestures ensues into line 185, alternating pointing with her pen as she says 'i took your reports but you took my reports' (fig. 6.8b). By alternately pointing to herself and to Yue, Xiu indexes

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their bodies as imaginary entities in the scenario and profiles the dynamicity in the swapping, foregrounded by pointing back and forth as she says 'your'. This specifies through elaboration on the swapping of the report. Xiu resumes to describe the consequences of the swap: that one person believes that they have cancer while the other believes they do not. This second elaboration is indicated by an embodied marker, where Xiu switches from pen-pointing with her right hand to open-hand deixis with her left hand (e.g. fig. 6.8c). With her open hand, she alternates between indexing herself by placing her open hand at chest level (fig. 6.8c), to motioning towards Yue (e.g. fig. 6.8d). Additionally, as she says 'but you really got cancer', Xiu motions in an arc trajectory over the notes, which have been indexed as the swapped report.

The excerpt illustrates how planning and reformulation work within self-elaboration. Xiu's gestural reformulations provide a step-wise enrichment marked by the salient use of back-and-forth motion, first as construed by the reduplicated palms-down across gesture, second by the motioning of the pen-point between her and Yue, and third in the motioning of her left-handed open palm. Furthermore, the contrasting between the pen-point and the open palm further displays the distinction between reality and the false beliefs of the people in the scenario. The change from the pen-point to the open palm mapping construes trouble in the swap: open palms display the falsity of the scenario of the participants' beliefs, and again with reduplication to convey the swapping action. The open palm that Xiu brings to herself at neck/chest level (fig. 6.8c) appears to be an experiential projection of the happiness felt at having a negative test for cancer. The open palms towards the *you* of the scenario (fig. 6.8d) continues the theme of the false belief of the other person. In the discussion Xiu

seems to want to turn this into an advantage of *placebos*, based on the psychological effects, even if temporary, that they can bring to an ill patient.

Thus reformulations can become embodied for the purpose of fulfilling specificity relations between the topic-at-hand, a scenario, and the elaboration of that scenario, contextually indexed and conditioned by the sequential establishment of a domain. Overt trouble can also give access to inferences about what counts as a construal in the discussions, as observed in the examples in Section 6.4.3 below.

6.4.3   Gestural reformulation in repair

The following excerpts are examples of reformulation occasioned by trouble in the discussion phase. In the GD corpus, the most ubiquitous use of individual gestures involved in repair followed verbal repair by way of syllabic beats. That is, as a discussant is involved in the utterance of their turn, and syllabically beating with a hand, verbal stops and starts and elongated enunciations were followed by synchronous hand movements. Also, during word searches, the hands are often used to display a thinking process to interlocutors (Goodwin & Goodwin 1986; Ladewig 2014), and thus demonstrate that a pause remains to be filled. Third position reformulations of repair (i.e. repair conducted after the completion of a trouble displaying turn, cf. Schegloff 1992) in the GD corpus were more rare than in the C-S corpus, possibly given that the C-S task was a referential task designed to elicit reformulation, and as section 6.3.3 explores, in the GD task the discussants focus on formulating moves for their own contributions. Nonetheless, multimodal reformulations of repair were observed in the GD corpus as self-initiated self-repair, and occasionally involved other-initiated repair.

Excerpt 6.13 exemplifies a basic repair in third position resulting from multiple discussants. Here Jie, Kexin, and Lynn are discussing the topic of birth order. In the

excerpt, Jie begins giving an example, formulating it from personal experience (*in my life*). Ambiguity in her example is treated as a repairable by Lynn, who seeks to repair the ambiguity through a gesture, but mismatches it with her speech. Thus a chain of repair troubles leads to more trouble, where other-initiated, other-repair that becomes self-initiated, self-repair creates trouble and other-initiated, self-repair for another discussant.

Excerpt 6.13 Repairs in gesture-speech construction
GD04.Birth.Order [06:58.785 – 07:26.168]

```
158 JIE:    yeah in my life er i i found that er because my
159         erm classmates most of my classmates have er
160         sisters [hh  ]
161 KEX:            [yeah]
162 JIE:    or brothers er: i found that their sisters er are
163     →   erm more successful than them=
    g:          |^****^***^**----~~~~~^***|
164 KEX:                             =(laughs)
165         [$really$↑]
166 LYN:    [you mean]
    g:      |~~~~~~~~~»
167 JIE:    [[$yeah$        ]]
168 LYN: →  [[you mean little]] little sister
    g:     »~~~~~~~~~~~^-----~~~^*****~^*****
    #:6.9             a         b     (b)
169     →  or: young- [er (.) elder sister]
    g:     ~~~~^****~~~~~~^---~~~~~~~~~~~~~|
    #:       (c1)          c1
170 JIE: →              [younger sister (.) ]
    g:                  |^*************~~~~~~|
    #                    c2
171 KEX:                [er er            ]
172         [younger↑               ]
173 JIE: →  [er er er elder sister]
    g:             |^****~~~~~~~~~|
    #:             (c2)
174         [elder sister yeah   ]
    g:      |^****|
    #:      (c2, slight raise)
175 KEX:    [≈uhuh≈]
176 LYN:    [ok    ]
```

a. you mean **little**

b. **little sister**

c1. LYN: or: **young**- er

c2. JIE: **younger sister**

Figure 6.9 Realignment of mismatched repair gestures

At line 166 Lynn signals trouble in Jie's claim, detecting ambiguity in the word
sister. She seeks to remedy the ambiguity through a verbo-gestural construction, but
as she begins to verbalize, saying 'you mean little', she raises her hand high (fig.
6.9a). She treats the construction as a mismatch, demonstrated in how she redresses it
by quickly lowering her hand as she repeats 'little sister', motioning forward along
the utterance of each word (fig. 6.9b). Lynn performs another mismatch as she raises
her hand high again while beginning to say 'younger', which she quickly repairs into

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'elder' (fig. 6.9c1) However, the dichotomy of little and younger has already been presented, taken for granted by Jie as she responds selecting *younger* with her hand raised (fig. 6.9c2). In the meantime, Kexin responds using various discourse markers, effectively nudging the discussion at crucial points in the repair episode: smile-voicing as she says 'really' with rising intonation at line 165, and display of lack of understanding through hesitation markers and rising intonation at lines 171 and 172 ('er er younger'). At line 173 Lynn overlaps with Jie, repeating the gesture and verbalizing 'elder sister' in repair of the mismatch (which was repeated by Jie). Jie is motivated to repair her repetition, repeating Lynn's gestural repair at line 174, thus successfully receipting the repair as indicating the original dichotomy between *little sister* and *elder sister*.

Excerpt 6.14 reproduces an example of multimodal reformulation of repair as occasioned by an interlocutor's misunderstanding during *business ethics*. Here Brenda's repair functions as a move into a more specific illustration of a scenario, and her gestures appear to follow in pursuit of depicting the scenario in different ways. As observed in Chapter 5, a perceived trouble spot requires an entire redepiction in order to accommodate the repair. The excerpt begins with Brenda in the midst of providing an example to illustrate how social media companies might exploit ambiguity in order to gain more popularity, verbally characterized by Brenda as *clicks*. However, the term and the notion of *clicks* itself creates a perceived trouble, displayed by her co-discussant Alice in her repetition formulated as a question with rising intonation (line 217). Brenda couples this part of the illustration with gestures that enact the actions of the social media audience who might *click* on their phones to *like* the posts (figs. 6.10–6.12).

Excerpt 6.14 Concept illustration occasions repair
GD01.Bus.Ethics [06:18.012 – 07:09.131]

```
192 BRE:     =some er: some examples we maybe just the
193          corporation just like er in order to make
194          more prof[its]
195 CYN:             [(nods)]
196 BRE:     and they like take some or get into some grey
197          [grey area]
198 CYN:     [(nods)   ]
199 BRE:     hh i'd like to illustrate by er: i- do you know
200          the media [it's just] (.)
201 ALI:               [≈mhm≈    ]
202 BRE:     the media the media corporation like in
203      →   order to cater the consumer's need just for
    g:       »~~~~~~~~~~^*****
    #:                   +crossing boundary
                          gesture form
205 ALI:     [≈mhm≈          ]
206 CYN:          [(nods)  ]
207 BRE:     report some some news partially (.)
    g:       ^****************------^~~~~~~~~~~~»
             +analogical            PU
208 CYN:     [≈mhm≈   ]
209 BRE:     [without] presenting the whole things
    g:       »~~~~~~~~~~^**********~~~~~^***********
    #:6.10            a                b
210          [to the public]
    g:        ^***********
    #:        (a)
211 ALI:     [≈mhm≈          ]
212 BRE:     like hide hide the mm hide the good
    g:       ~~~~~^***~^***~~~~~~~~^~~~~~~~~^***
    #:           c  (c)          (c)       (c)
213          good half of it
    g:       -.---.----~~~~~
214          for like some rumors of the stars=
    g:       ^**-------------------------.---»
    #:       d
215 ALI:                                    =≈mhm≈=
```
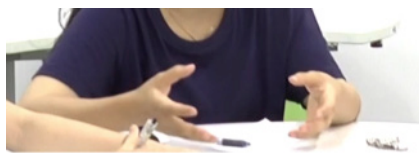

a. **presenting** the / **to the public**
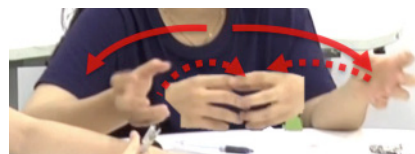
b. **whole things**

c. **hide**
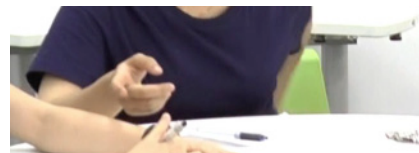
d. **for like some rumors of the stars**

Figure 6.10 *presenting news* gestures in *business ethics*

In this example Brenda frames her illustration with the notion of a business seeking profits through a 'grey area' (lines 192 and 194). She resumes formulating a multimodal sequence that sets up the example: media companies *cater* to their audience by reporting news *partially*. As she says 'cater' at line 203, Brenda uses an SDC that she has introduced earlier in a *boundary* metaphor—left hand in a palm inward configuration, while the right hand motions from a palm in to a palm up, thus visualizing crossing the boundary (the dynamic construal of this metaphor will be analyzed in section 6.7 below). She then couples her utterance of 'report the news partially' (line 207) with an analogical gesture—both hands moving back and forth in contrary motion in palm inward configurations—followed by an abstract depiction in four gestures: she couples 'presenting' with two hands in a palm lateral configuration, held apart in front of her, as if holding the object of presentation (fig 6.10a). She then brings her fingers together when she says 'whole thing' to depict the unity of this whole, but subsequently couples 'public' with the open gesturing used for presenting (fig. 6.10b). Finally, she brings her hands together again, hoping them on the table as she says 'hide hide the mm hide the good / good half of it' (fig. 6.10c), concretizing the depiction with a pointing gesture towards Alice as she says 'for like some rumors of the stars' (line 214, fig. 6.10d). A three-step depiction is thus construed using space: holding the news which would be whole becomes partial when given to the public, leaving the image of partiality linked to the notion of *rumors of stars*. Thus her framing of *businesses seeking profit through grey areas* is given a multimodal specification in the way that social media reports partial news, where her gestures function to paradigmatically construe both the *catering* and the *reporting* as conspiring in the exploitation of public ambiguity. The construal of this ambiguity becomes achieved through the succeeding multimodal sequence depicting and

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conceiving alternation of *partial* and *whole* news for the subsequent depiction—the

clicking motion to represent the public giving likes to the partial news.

Trouble ensues with Brenda's depiction of *clicks*, as Alice displays through a

clarification request accomplished in her repeating the term *clicks* with rising

intonation.

Excerpt 6.14 (cont.)

```
216 BRE: →  =like to get the clicks £to get more money£ (.)
    g:     »~~~~~~~~^**************----------------------
    #:              6.11
```


like to **get the clicks**

Figure 6.11 Brenda's reduplication of *get the clicks*

```
217 BRE:    [just for ah just er]
    g:       ^*******-----------
    #:        6.12
218 ALI: →  [er clicks for the↑]
    g:                      |^******|
    #:                         b
```


a. BRE: **just for** ah just er
b. ALI: er clicks for **the?**

Figure 6.12 Brenda and Alice's gestures for *clicks*

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Brenda treats the trouble as a misunderstanding of her framing of the term *clicks*, as demonstrated in her ensuing re-depiction and reformulation of the *grey area* construal. She reformulates the illustration by providing a more specific example in the form of a hypothetical scenario synchronized to a newly crafted gestural diagram. Brenda treats the trouble source as her depiction of the notion of *partial news* by formulating the example of celebrities photographed together from the backside. By doing so, an ambiguity about their relationship can be exploited by the unethical social media company, depicted in the barrier and crossing barrier gestures.

Brenda begins the repair by tracing a circle in the air with her index finger, confirmed as a projected depiction of a computer screen by subsequent verbo-gestural constructions.

Excerpt 6.14 (cont.)
GD01.Bus.Ethics [07:09.131 – 07:52.900]

```
218 BRE:    er: for example if i- er (.)
     g:     ^****************~~~~~|
            +draws circle
219         the star a [is dating with] star [b ]
     g:    |^************~~~^***********----.---.-
     #:6.13a              b
220 ALI:            [oh oh         ]       [oh]
222 BRE:    actually the things just just doesn't happen
     g:     ^*******************************************
     #:    c
222         [at all]
     g:    »*******
223 ALI:    [≈mhm≈ ]
```


a. **the star a**   b. **is dating with star b**   c. **actually the things just just doesn't happen at all**
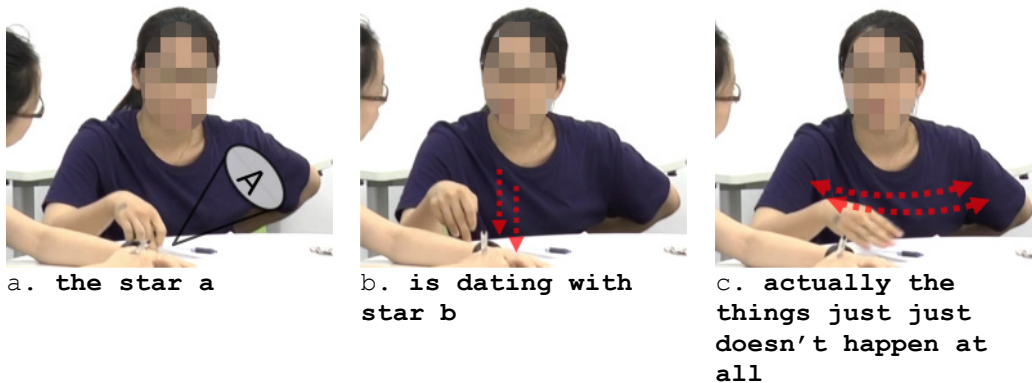
Figure 6.13 Diagramming location of *stars*

```
224 BRE:    they just like report it like just pi- put
    g:     ~~~~~~~~~~^****^**********~~~~~^**********
    #:6.14           a   (a)              b
225        some picture [some ]
    g:     »^-------------~~~~~
    #:     (b)
226 ALI:                 [≈mhm≈]
```


a. **they just like report it**   b. **just pi- put some picture**

Figure 6.14 Depiction of *pictures*

```
227 BRE:    like er back of someone (.) just the £back of£
    g:     ^****~~~^*******~^*******-----^*****************
           +points to backside        +waves hand on backside
228        someone maybe they can even
    g:     *******~~~~~~~~~~~~~~~~~~~~
229        can't tell who is this one er who is this
    g:     ~~~~~~~~~~^****************~~~^**********
    #:               +series of rules g-form
230        person it just put [er a]
    g:     »*******~~~~~~~~~~~~~~~~^****
    #:6.15                      a
231 ALI:                       [mm  ]

232 BRE:    a and b are dating they fall in love with
    g:     ^******^*^-----------^*******************
    #:     (a)       b(b)        c
```


a. **a and**   b. **b are dating**   c. **they fall in love with each other**
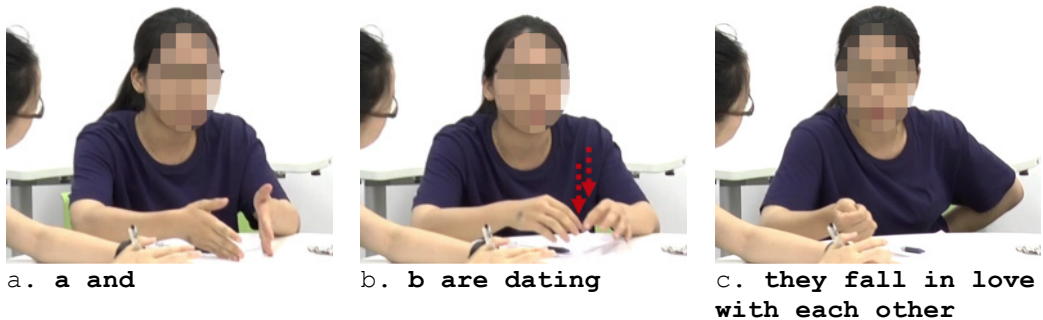
Figure 6.15 Resequence of *stars* for construal of relation

```
233 BRE:    each other like this it's just rumor because
    g:     ***********~~~~~~~~~~^****************~~~~~~~
    #:                         (6.11a)
```

```
234         they want to make [profit like]
    g:      ~~~~~~~~~^*****************~~~~~
    #:6.16             a
235 ALI:                      [≈mhm≈        ]
236 BRE:    make money like gains the clicks
    g:      ^*****************************
    #:      b
238 BRE:    like [get the] er likes [(0.5)]
    g:      ^*********************
    #:      c
239 ALI:         [mm      ]              [mhm]
240 BRE:    [º咂嘴º {zh=make clicks of admiration} (.)
    g:       ^**********************************
    #:       d
242 CYN:    [so]
243 ALI:    [oh]
```


a. they want **to make profit** like

b. like **make money like gains the clicks**

c. **like get the er likes**

d. 咂嘴 (**make clicks**)
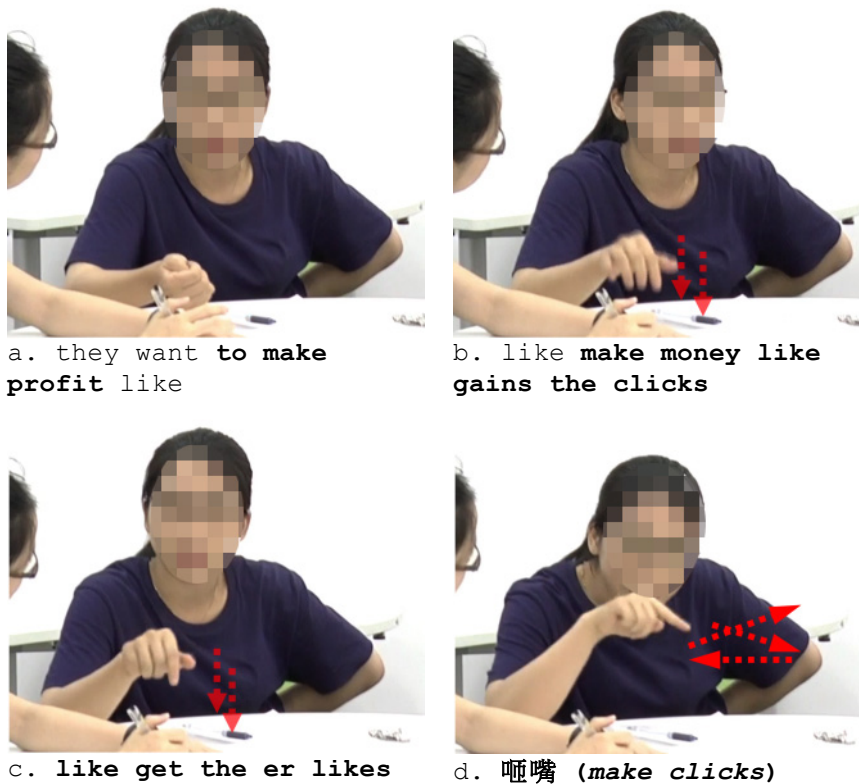
Figure 6.16 Reformulation of *clicks*

In her reformulation, Brenda resorts to a combination of enactments, body indexing, and diagramming techniques to disambiguate her previous construal. She draws a circle in the air which projects a computer screen or picture (line 218, projection confirmed in lines 224, 225). Then diagrams stars 'a' and 'b' by locative gestures: draws 'a' on the table then moves slightly to the right and points and taps as she says

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'b'. She negates by saying 'actually doesn't happen', coupled with a palms-down across gesture back and forth, wiping away as if to convey that the previous utterance (and diagram) do not occur but are in fact partial news. Thus she depicts a scenario visualizing two celebrities occurring together and the public being told they are dating but in fact they are not. She then depicts 'picture' using both hands in a palm lateral orientation starting from head position and moving downward in a straight line, ending with a 'container' visualization—both hands palm lateral facing each other in ball grip configurations. This gesture appears to convey the back of a person by pointing to her back, twice. She couples a palms down expansion gesture (cf. 6.4c) with 'can't tell who this one or who is this person', setting up the ensuing re-diagramming of the stars: both hands flat-palm-lateral placing or marking space on the table for each star, negated with the verbal expression 'it's just rumor'.

Brenda is then able to redepict the click gesture in the newly afforded gesture space filled with the two *stars* erroneously represented by the social media company as *being in love*. As she says 'because they want to make profits' she reuses the click gesture as before (lines 233, 234, fig. 6.16a), then reformulates with a new gesture and relexicalization as she says 'like get the er likes', using her index finger in iterative movements up and down on the table (line 238, fig. 6.16c) The iterativity of the gesture-speech coupling construes gaining clicks plus gaining profits as enactment of finger clicking on a flat surface (such as on a mobile phone). Brenda ends the sequence with a final strategy, using language alternation. She appears to say the term 咂嘴 (za1zui3), which in Mandarin Chinese can mean the making of clicks in order to gain admiration, coupled to a zigzag motion with her index finger (line 240, fig. 6.16d.) The excerpt shows the development of alternative strategies to accommodate the reuse and transformation of the verbo-gestural construction to depict *clicking likes*

for profit, which further develops Brenda's stance that social media companies make money from user interaction with content.

What these two examples show is that how speakers interpret errors impacts their multimodal repair constructions in ways they deem salient for an original concept. Moreover, in both cases, depiction was the primary strategy involved in repair. In the birth order example, the participants sought to remedy a situational ambiguity through multimodal constructions, which were also susceptible to trouble. The business ethics examples illustrates how lack of clarity in a gesture occasions a new depictive scenario which reuses the gesture but also exploits newly afforded gesture spaces to accommodate variation in depicting a referent.

6.4.4   *Diagramming: giving meaning to space for reference*

As space and time afford placement of virtual entities into the imagined field of view (i.e. the visualization), the use of space in the GD corpus was observed in the construal of contrast by gesturally placing items onto different points in space. Physical space for semiotic distribution can be a useful resource for integrating oppositions and other relations involving multiple entities. However, as can be seen in Except 6.14 above, where Brenda used space in two depictions to differentiate between *whole news* and *partial news* in one sequence, and two *stars* in another, spatial relations can be used in rather complex ways in building illustrations and scenarios (Excerpt 6.12 can also be analyzed from this perspective, if consideration is made that the participants indexing their bodies mark reference points that allow access to the *swapped* patient knowledge of their illnesses).

Excerpts 6.15 and 6.16 illustrate how dynamic construal is achieved through diagrammatic relations to access various entities in the discussion. The examples are taken from the discussion on *marketing research*. In Excerpt 6.15, Feng has

contributed the notion of *neuro-marketing* as a new trend in marketing research. She gives the example of the taste test survey participants are given to detect differences between *Pepsi* and *Coca-Cola*. To set up these two entities, Feng uses reduplicating deictic gestures which invest meaning onto points in space, diagramming a reference point relation between them.

Excerpt 6.15 Pepsi and Coca-Cola transcript
GD02.Market.Trends [03:42.669 – 05:01.918]. Triad(a) Diane, Eason*, Feng

```
027 FEN:    mm i want to add something here er
028         a new trend calls neuromarketing erm
029         i in the lecture we learned er before erm
030         er the professor said er er research that
031         mm pepsi and er coca cola erm they er er call er
     g:     |~~~^****~~~~~~~^*****.*~~|
     #:6.17    a           b
032         call some volunteers and do blind test erm
     g:     |^.----.----.----.-----.---.-^****-.~~|
     #:     RPU                         (b)
033         in the research they found when they are
034         don't know the brand er er and er
     g:     |~~.----.----.----.~~|     |.---.-
     #:      (a)  (a)  (a)  (a)
035         taste the drink together they found er
     g:     -.--------^****--.-.--.-------^****---
     #:              RPU                 RPU
036         halfed and half (0.5) yes er
     g:     ^******~~~~^***~^**^**~~~~~~|
     #:     c         d
037         the final res- re- research but
     g:     |~~~~~~~~~^****^***^********~~~~|
                      (wr: underlining)
038         when they know the brand er
     g:     |~~~~~~~~~^****-----.------
     #:              e
```

a. **pepsi**

b. **coca cola**

c. **halfed**

d. and **half (0.5)**

e. when they **know** the brand

Figure 6.17 Diagramming a reference point relation for a scenario

```
039 FEN:    which is coca-cola and er which is
     g:     ^********.----.---~^******-.----.-
     #:6.17(a)                (b)
040         pepsi-cola erm and er final research
     g:     -.-----.---.-----------.-----.--.---
041         changed mm seventy seventy percent people
     g:     ^******|   |-.----.---.---.---.------.----
     #:     (e)
040         choose pepsi er choose coca-cola and twenty (.)
     g:     --.-----.--------.------.----.---------.--.---

041         twenty er thirty percent people choose pepsi
     g:     --.---.-----.------.--------------------.---
042         so this means mm neuromarketing maybe can
     g:     ----------------^****-------------------
                            PU
043         improve companies know how er co-
     g:     ----.---^********------^**~~~~~~
     #:          (e)             (e)
044         con- consumers really want (.) buy
     g:     ^****^**********--.--.--.----------
     #:     (e)  (e)
045         and what they are thinking about
     g:     -.----.------------.-------.-->»H3
```

At line 031 Feng uses different points in space while uttering the two terms in a scenario formulated in the blind scenario of the taste-test, using a point towards her notebook as she says 'pepsi', and a point away from it as she says 'coca-cola' (line

031, figs. 6.17a, b). By holding her pen, Feng makes these reference points more prominent (cf. Mondada 2007). As seen in the remainder of the excerpt, the spatial endpoints are referenced gesturally by Feng in distinct ways. One way is to invest the space between the two points with actions and processes involving the survey participants in the scenario. For instance, when Feng says 'call some volunteers and do blind test' (line 032), she produces palm-up beats durative with the syllables of each word, until she says 'blind test', which is temporally synchronized with a more elongated arc gesture stretching across the fractional space between the spatial endpoints marking *Pepsi* and *Coca-Cola*. A similar gesture occurs with Feng's utterance of 'don't know the brand' (line 034), which has temporal overlap with a set of beats that also cross the path referenced by the endpoint for *Coca-Cola*. The arc gesture occurs again when Feng says 'halfed (sic) and half' at line 036, marking the two endpoints by temporal overlap of each utterance of 'half', with each respective endpoints in the gesture space (i.e. between figs. 6.17a and b). To represent the action of conducting research, Feng acts an underline action in her notebook as she says 'research' (line 037), which is followed by a verbal distinction into a new aspect of the scenario.

From lines 038 to 041, Feng describes the scenario if the participants of the taste test were to know the contents of the colas. At line 038 she uses an elongated arc durative with the utterance of 'know' as she says 'when they know the brand'. Feng reaffirms the space distinction when she utters 'which is coca-cola and which is pepsi-cola' (line 039), and overlapping an elongated arc gesture with the utterance of 'changed' (line 041), which again begins at the first endpoint and ends at the final endpoint referencing the respective cola brands.

A similar practice is observed later in the *marketing research* discussion, reproduced in Excerpt 6.16. Here the discussant, Diane, brings up the difficulty of using big data as a resource for market research. After Eason, the moderator, requests Diane to talk about disadvantages of using big data for market research, she uses a depictive gesture coupled to the notion of *big data* which is then divided in gesture space into *useful data* and *not useful*.

Excerpt 6.16 Gesture space for semiotic distribution
GD02.Marketing.Trends [09:52.218 – 10:13.083]

```
150 DIA:    i think the way they analyze big data might be:
151         difficult [because  ]
152 EAS:              [yeah yeah]
153 DIA:    th- there are er too many datas and some some data
     g:               |~~~^********.~~~~|^*********.***----
    #:6.18                 a                b
154         is useful [and er]
     g:      .--.-------------
155 EAS:              [yeah  ]
156 DIA:    where somes are not so you should recognize the
     g:      ~~~~~~^*****^***^**~~~~~~~~~~-------^**********~~~~
     #:          c    (c) (c)                PU
157         useful one
     g:      ^**.***.**|
     #:      d
158 EAS:    [mhm]
159 DIA:    [er ] through these SO many datas
     g:      |~~~~~^*******.*****^*********~~~~~|
     #:          (e)             e
160 FEN:    yes i think [so  ]
161 EAS:                [yeah] that's a good point
```

a. there are er **too many** datas

b. **and some some data is useful**

c. where **somes are not**

d. **useful one**

e. through these **SO many datas**

Figure 6.18 'data' spatialized by gestures

In this excerpt, Diane provides comment on the disadvantages of *big data* by first introducing it as *difficult to analyze* (lines 150, 151). She uses a series of gestures to construe relationships between various concepts that illustrate this difficulty. She first uses a gesture synchronized to her utterance of 'too many datas (sic)' at line 153, using her two hands in a palm-up configuration, fingers slightly bent, and motioning from down to up, as if digging or scavenging with her hands (fig. 6.18a). She immediately follows it with her hands configured, one on top of the other, right palm down and left palm up, appearing to grip something in-between, synchronized to and beating with her utterance of 'and some some data is useful' (lines, 153, 154, fig. 6.18b). At line 156, Diane beats with palm-lateral gesture as she says 'where somes (sic) are not', hopping from left to right on the table (fig. 6.18c), in effect placing various increments of *data* into viewable spaces for visualization. She then prepares for the next gesture by placing both hands slightly more apart on the table, right hand

configuring into a palm-up as she says 'recognize' (line 156), then into a beating palm-down as she says 'the useful one' (line 157), using a portion of space viewable as the *useful* portion of data previously visualized by the gripping gesture (fig. 6.18d). She ends her comment by repeating the dusting-up gesture in variation as she says 'through these SO many data'—first *gathering* the *data* using palm-laterals molding a spherical entity, then dusting up as she had done previously (fig. 6.18e), thus visualizing the entity of *big data* that requires *recognition through*.

The thrust of Diane's comment lies in the distinction between *useful* data and *not useful*, as the primary difficulty in analyzing the concept *big data*. Three sets of entities have thus been afforded by space to establish reference points: the scavenging gesture visualizes a *dusting up* of many things, i.e. a large amount of data, whereas the two-handed holding gesture visualizes a *gathering* of a small portion of the larger whole. Beating along the horizontal plane of gesture space affords the distinction of a set of entities, the array of useful and not useful data. Diane is thus able to reference conceptions of *data* through a visual diagram, where the sequence of hopping gestures also allow for a conceptualization of data into countable chunks that can be selected and classified. Finally, her concluding remark effectively bookends the notion of difficulty in discerning the *useful* data from *not useful*.

6.5   Gestural sense making and the distribution of visualization

The following section follows the trajectory of gestures by individual discussants as they coordinate their analyses of the topic-at-hand with the interplay of verbo-gestural planes of construal. The first analysis in section 6.5.1 follows Brenda in her metaphorical and conceptual analysis of *business ethics*, followed in section 6.5.2 with an analysis of Rebecca as she discusses various quotations by famous artists on the question of *what is art*. The analysis of each case entails a closer examination of

what may be called *manual thinking* (Streeck 2006; Lapaire 2016), which involves the hands giving form to abstract content. The seeming unwittingness or spontaneity of gestures for manual thinking has given speculation as to the communicative intent vs. contribution of gesture to the thinking process (Bavelas, Chovil, Lawrie, & Wade 1992; Casasanto 2008; Gallagher 2005; Goldin-Meadow 2005; Streeck 2009b). The examination of these gestures by the discussants involves asking, following Streeck (2017), how the "hands [themselves] make sense when they gesture" (204).

6.5.1   *Enacting metaphoricity in* business ethics

The analysis in this section follows the trajectory and distribution of gestures by Brenda as she engages with her peers Alice and Cynthia on the topic of *business ethics*. As described in Section 6.3.2, the normative ecology of the *business ethics* discussion follows that of the rest of the samples in the corpus. The discussants initially move to define the topic (asking: *what is business ethics*), which involves a preliminary definition proposed by Alice as *a rule or principle that businesses must obey*. Cynthia and Brenda then elaborate on this definition in respective turns. After the definition phase, the participants move on to the question of *why business ethics is important*. This is taken up by Cynthia and then interactively discussed by all three participants (cf. Excerpt 6.9). Various arguments are put forward to take a position on the notion of *importance*. Brenda requests clarification on Cynthia's contribution, which prompts Cynthia to provide some examples. The discussion continues in the interrogation of various controversies in business ethics (e.g. Excerpt 6.14), then moves into the conclusion phase after the teacher gets the attention of Cynthia to end the discussion, giving the floor to Brenda. Brenda concludes reiterating some of the points of consensus between the discussants, recapitulating some of the main ideas involved in the question *what is business ethics,* but also reusing and transforming her

verbo-gestural constructions that were used in the definition phase. The teacher ends the discussion at the 9-minute mark to give feedback.

As described and analyzed in Excerpt 6.9, the definition phase involves multimodal constructions and embodied orientations contributed by each of the discussants who specify the domain of *business ethics*. Returning to Brenda's contribution, now here as Excerpt 6.17, Brenda's reuse and repetitions of particular gestures are reexamined. Here the focus is on recurrent forms which through the course of the discussion become dynamically activated as salient metaphoric imagery in the analysis of the topic-at-hand (cf. Müller & Tag 2010).

Excerpt 6.17 Brenda's design of *business ethics*
GD01.Business.Ethics [00:48.925 – 01:10.365]

```
030 CYN:    to treat your partners and [how about else]
031 ALI:                              [≈mm≈           ]
032 CYN:    [do you want to add something]
033 BRE:    [er: i kinda agree] with that
034         do you mean that erm er:
       g:  |^***************|~-----»
       #:6.19a              (a)
035         a business ethics is like a principle
       g:   »---------------|~~~~~~~~~^********
       #:                             b
036         it's like a series of rules:↑
       g:   ~~~~~~~~~^****************
       #:           c
037         that business should stick to hh
       g:   ^***********^***************~~~
       #:   d          (d)
038         when they like dealing with the business things
       g:   ^***************************^----.---.-----.---
       #:   e                            f
039         and [doing] their jobs
       g:   ^***************~~~~|
       #:   g
040 CYN:       [mhm  ]
041 BRE:    [is that]
042 CYN:    [mhm     ]
043 BRE:    what you mean? (.)
044 CYN:    erm yes er
045 CYN:    i mean it's about it
046         i think it's en a rule that need to be obey
047 BRE:    mm mm (1)
```

a. **do you mean that** erm er:	b. is like a **principle**	c. it's like a **series of rules:**
d. **that business / should stick to**	e. **when they like** dealing with	f. **the business** things
	g. **and doing their** jobs	

Figure 6.19 Conceptual gestures for *series of rules*

In Excerpt 6.17, Brenda develops a thread of elaboration that is visualized by her gestures and framed by a new home position that projects ensuing verbo-gestural conceptual and metaphoric sequences. Paradigmatically, in the first sequence, as observed in lines 034 to 039, and Figure 6.19, Brenda designs a gestural motif around the verbo-gestural construction *series of rules*, in which she uses her two hands, palms-down, to spread out in parallel motion to the sides and then downward, shaping the space in front of her into a three-dimensional surface. The salient image, which appears to recur in the rest of Brenda's discussion, is the abstract motion of moving forward on that surface (fig. 6.19c), using the evocation of this space to construe *series* in terms of linear continuity, i.e. as a whole (cf. Núñez 2008). In effect an area

is visualized in which gestures that occur within it are actions that occur within a metaphorically imagined world, in this case an *ethical arena* of space. This is evidenced in the way Brenda displays actions which can occur in that space, held salient by her left hand in a palm-lateral orientation (e.g. figs. 6.19d, f). Likewise in the use of analogical gestures to construe activity (figs. 6.19e, g). Thus Brenda is able to use a paradigmatic construal, the *series of rules* pairing of metaphor and gesture, to elaborate a syntagmatic relation, that business activity must be underpinned by ethical constraints.

Brenda ends this first sequence with a confirmation check, requesting elaboration from Cynthia (line 043 above). Cynthia confirms receipt of the request by following through on the elaboration, adding the term *obey* at line 046. Brenda responds by expanding on Cynthia's notion of *obey* through a metaphorical sequence, which acts as a transformation of the *series of rules* structural motif—the two handed palm-down form. That is, Brenda treats Cynthia's repetition of the construction *a rule that need to be obey* as a point of agreement to continue elaborating on the definition by construing the generality of the definition through the metaphor of a *boundary*, which in turn is treated with a reformulating sequence that conventionalizes the metaphor in the discourse (cf. Jensen 2017; Müller & Tag 2010).

Excerpt 6.17 (cont.) Verbo-gestural *boundary* metaphor

GD01.Business.Ethics [01:10.384 – 01:54.017]

```
048 BRE:    yeah i al- i think so and everything needs a [ru:le]
049 ALI:                                                 [mhm  ]
050 BRE:    like (0.6) a boundary should really be set up
    g:    |~~~~~~~~~~^********--------------------~~~~~~~^*»
    #:6.20              a                          b
051        for [people] like er confron- confronted with (.)
    g:    »****-----------------^*******-------------~~~~~~~»
    #:                              brush
    z:                             ›ALI
052 ALI:        [≈mhm≈]
053 BRE:    the things hh [mm:   ]
    g:    »~~~~^**.***---------»
    #:        (b)(b)
054 ALI:                  [(nods)]
055 BRE:    which er we can cro:ss↑
    g:    »------~~~~~~~~~~^*****
                           c
056        [er  ] cause erm (1.5)
    g:     ~~~~~~|H3------------|
057 CYN:    [≈mhm≈]
058 BRE:    er: (0.6)
    g:    |~~~~~~~~»
059        cause if we: like don't:=er
    g:    »~~~~~~~~~~~~~~-----^*****~~~
    #:                    (b)
060        follow er a series [of rule↑]
    g:    ^*********^*********---------
    #:    d          e
061 ALI:                       [≈mhm≈    ]
062 BRE:    it's kinda er: easy for us like break laws↑
    g:    ~~~~~^****~~~~~^*************^*.****.***----
    #:         PU          f              g
063        like make [crimes↑]
    g:    ~~~~~^***---------
    #:         (g)
064 CYN:            [(nods)]
065 BRE:    like make mista:ke
    g:    ~~~~~~~|
066 ALI:    mhm (0.9)
067 ALI:    so business ethics is a rule that
068        we should obey (0.3)
069 BRE:    mhm (.)
```

Figure 6.20 Verbo-gestural metaphorical sequence of *boundary*

In lines 30 to 34 Brenda's sequence is used to metaphorize *obey*, verbalizing 'a boundary' (line 045) and depicting it through gesture by modeling with her palms flat, oriented inward towards her (fig. 6.20a), thereby visualizing the physicality of the notion *boundary* as a wall or barrier. The depiction is held salient by her left hand upon which the ensuing discussion acts both verbally and in gesture through SDCs: with her right hand enacting *activity* (6.20b) and *crossing of the boundary* (6.20c, g). Therefore the *boundary* gesture does not depict *business ethics*, but rather it depicts the barrier which functions as a metaphor for the abstract concept. The depiction of the barrier further functions as a home position from which more gesturing can

transpire, by keeping the form static in the left hand while the right hand performs abstract motion. Thus, the image of the barrier is held salient throughout this sequence as Brenda elaborates on both her definition of *business ethics* and on her own gesturing. At line 060, Brenda repeats the *series of rules* gesture, preceding it with a gesture co-occurring with the word *follow,* her flat hand moving from her cheek (fig. 6.20d), down into the *series of rules* gesture (fig. 6.20e). The vagueness of the utterance at line 061, 'confronted with the things which er we can cross' is resolved by the imagery of the boundary and the ensuing forward motion that crosses it. As she utters the phrases 'break laws' and 'make crimes' (lines 062, 063, fig. 6.20g), Brenda appears to reuse the *crossing* gesture from the earlier definition (fig. 6.20b), which has now been given a metaphoric function.

In the excerpt, two contrasting forms can be observed that function in the conceptualization of the same idea: *forward expansion* and *boundary,* each offering particular visualizations of the concept *business ethics*. Focusing on the surface-shaping gesture raises the question: what is the relation between this gesture and the notion of *business ethics* as *a series of rules*? Interpreting the gesture as an instance of thinking-by-hand, or *ception*, the gesture enacts an experiential representation of a concept (Streeck 2009b: 163). The gesture does not depict or illustrate *a series of rules*; it is a cognitive activity in display of thinking through the concept within the domain of business ethics. The verbal utterance coupled with the gesture form (an expanding flat surface), conceptualizes *business ethics* in a way that is visible and analyzable. Likewise with the metaphorical that is performed, a double imagery is displayed (cf. Jensen & Cuffari 2014), *boundary* in the verbal and *barrier* in the gestural. Brenda uses these gestures throughout her discussion, giving saliency and pattern to their use, while also recontextualizing them through transformation. This

can be observed in the way they are employed in the *fake news* scenario, analyzed in Excerpt 6.14 above. For instance, the *barrier* gesture as an image frames her discussion of social media use of ambiguity in paparazzi photos to make profit, thus transgressing the barrier visualized by the gesture.

The interplay and juxtaposition of Brenda's various salient forms can be observed in her conclusion at the end of the discussion, reproduced here in Excerpt 6.18.

Excerpt 6.18 Brenda summarizes the position on *business ethics*
GD01.Business.Ethics [08:16.059 – 08:31.693]

```
260 BRE:    so er so today we talk about the business
261         ethics and we all agrees that a business
    g:           |^*******~~~~~~|       |^*******
    #:6.21              a                   b
262         must to follow must follow a series of er
    g:      ^*************~~~~~~^*****~~~^*****^****
    #:   c                     (c)      (a)    (a)
263         the principles er rules
    g:      ^*************~~~~^****»
         (c)
```


a. **we all** agrees / a **series** / **of**   b. that a **business**   c. **must to follow** must **follow** / **the principles** er **rules**
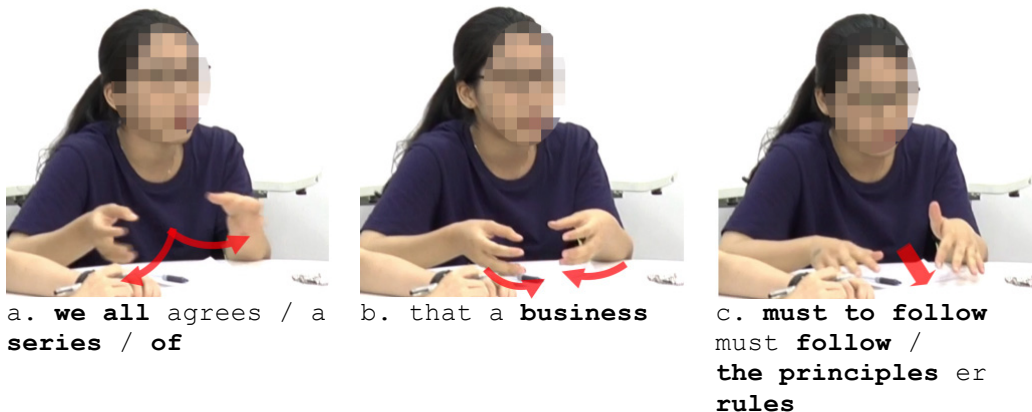
Figure 6.21 Recurrence of *series of rules* sequence

To conclude the discussion, Brenda begins her summary synchronized to a depictive sequence. As in her sequence from Excerpt 6.17, she maintains a home

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position, her two hands oriented palms-inward and touching (fig. 6.21a). From this position she is able to integrate her recurrent forms: a bounded entity held by both hands as she says 'business' at line 261 (fig. 6.21c); an open palm-lateral motioning outward as she says 'series' at line 262 (fig. 6.21b; also coupled to 'agrees'); and a forward, abstract expansion as she repeats 'follow' and 'series of rules' (lines 262, 263, fig. 6.21c). These salient forms and home position also afford Brenda's reiteration of her metaphorical sequence of the *boundary*.

Excerpt 6.18 (cont.)
GD01.Business.Ethics [08:31.693 – 09:01.157]

```
264 BRE: →  er like er keep themselves in a £boundary£=
    g:    »------------~~~~~~~~~~~~~~~^*************
    #:6.22                            a
265 CYN:                              =≈mhm≈
266 BRE: →  just er er also they want to make profit bu-
    g:    ~~~~~~~|       |~~~~~^*****************~~
    #:                      b
267       but this must be based on following a series of
    g:    ^**~.---~~~~~~^*********~^********************
    #:    (6.25d)         c           d
268       business ethic business ethics
    g:    ~~~~~~~|      |^********~~~|
    #:                      e
269       [right]
270 ALI:  [≈mhm≈]
271 CYN:  so and if they break such a business ethic
272       ethic they will erm face mu- much more
273       problem and dru- for er individuals also for
274       [company]
275 BRE:  [mm mm  ]
276 CYN:  and for er society=
```
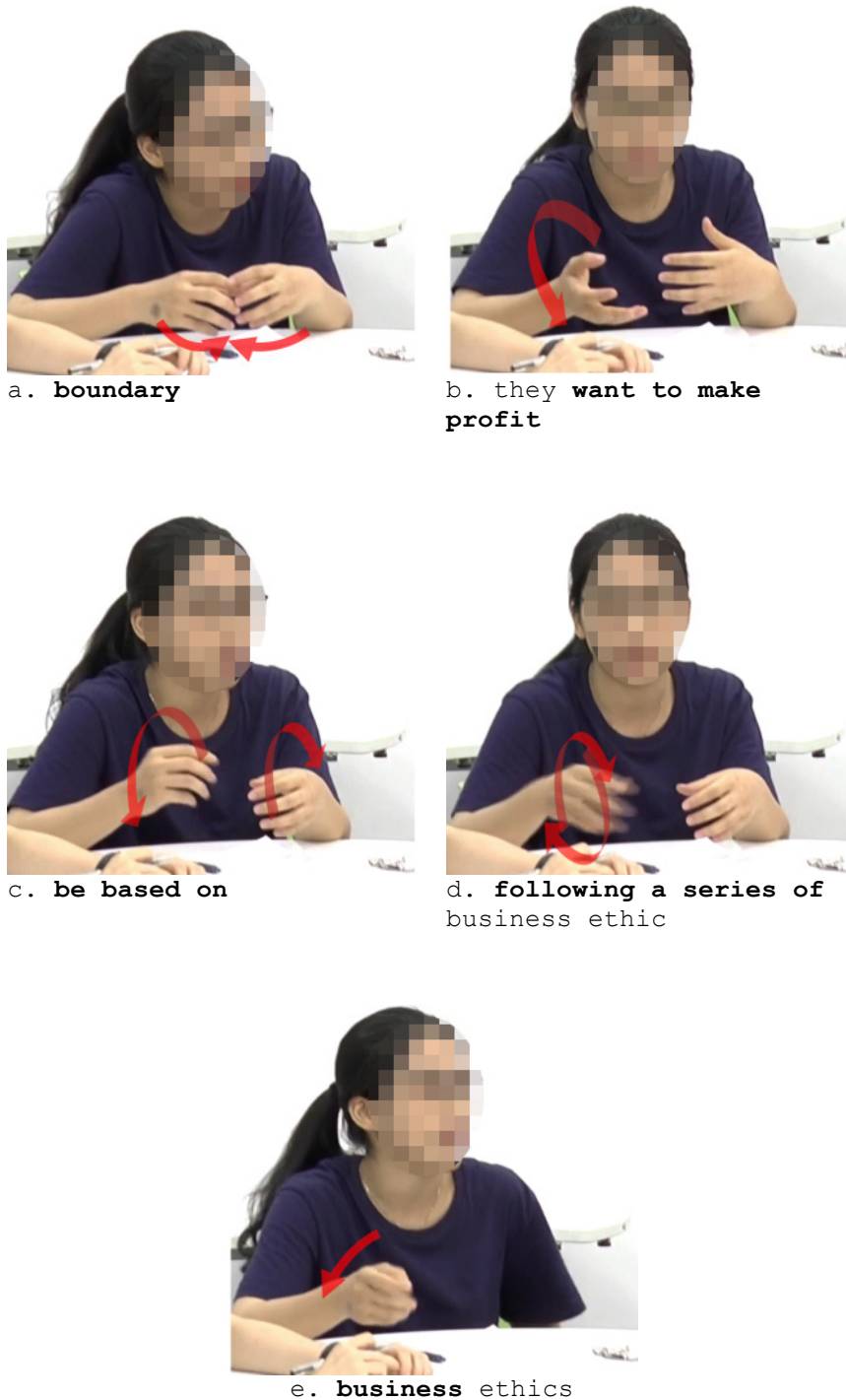
a. **boundary**

b. they **want to make profit**

c. **be based on**

d. **following a series of** business ethic

e. **business** ethics

Figure 6.22 Brenda wraps-up her summary

Brenda continues saying that the aforementioned *principles*, at line 265, 'keep themselves in a boundary', reusing the verbo-gestural construction presented earlier (fig. 6.21a). When put together, her utterances integrate the metaphor into the notion

of principles as before, optimizing her verbal definition into *business ethics is a series of rules or principles that keep businesses in a boundary of behavior*. In her concluding summary, starting at line 266, Brenda reverses the order of events, from specific to general, adding the scenario 'they want to make profit' and regeneralizing saying 'but this must be based on following a series of / business ethic business ethics'. By adding the scenario 'want to make profit', coupled to the *crossing* gestures (fig. 6.21b), Brenda reuses the construction that was used for visualizing transgression of ethical principles. As she says 'based on' (line 267), she uses a two-handed alternating cyclic gesture (fig. 6.21c), visualizing dynamic iterativity into *based on*, i.e. motion construed in a static notion. This becomes further enriched with the single-handed cycling a she says 'follow a series of' (fig. 6.21d), and reuse of the *crossing* gesture with 'business ethics' (line 268, fig. 6.21e). Thus, both the meaning of *profit* and the *crossing* gesture become transformed in their proximity to the utterance of 'based on following a series of business ethics'. Likewise, *series of rules* becomes integrated as *series of business ethics*. Once again, the experiential gesturing in the multimodal definition visualizes and arena of space, an ethical world, onto which ensuing gestures are to be seen as actions within that world. However, in this summary these serve to congeal the main point of the discussion.

Tables 6.3, 6.4, and 6.5 follow Brenda's reuse of specific recurrent forms in her discussion: *series of rules*, *boundary,* and the *crossing* gesture, following McNeill's (2000) method of recurrent feature analysis. McNeill (2000) calls recurrent gesture features *catchments*, to suggest that the imagery of recurrent forms feed into discourse. Taking this distributional analysis to a metaphoricity analysis (following Müller 2008; also see Jensen & Cuffari 2014), in Table 6.3 the recurrence of the *series of rules* gesture can be observed as activating and distributing a construal of abstract motion in

the domain of *business ethics,* in gestural derivations as a flat, outward expansion. In terms of frequency, eleven occurrences of the gesture can be observed during the 9-minute discussion, where the form also recurs in two sequences in the discussion, during two different scenarios presented as examples of unethical acts.

The *boundary* form, which serves as a home position and metaphorical image for saliency, functions to construe a background/foreground relation between itself, visualizing *ethics* as the *boundary,* and actions which serve as transgressions against it, most saliently visualized as a *crossing* gesture, the right-hand cycling over the left-hand from a palm-inward to palm-up. The occurrences of *boundary* as depictions in metaphorical mappings and concretizations are outlined in Table 6.4, with eleven occurrences throughout the discussion in relatively stable couplings. The acts of deploying the *crossing* gesture are outlined in Table 6.5 below.

Table 6.3 Distribution of the *series of rules* gesture

Adapted from McNeill (2000: 314). Single horizontal lines separate gesture unit sequences.

Recurrence	Line in transcript	Verbal Utterance	Recurrent gesture feature	Discussion phase
1	18	a series of rules	2-hand opposing-lateral motion	Definition
2	32	follow er a series of rules	2-hand flat forward-outward motion	Definition
3	49	like be integrated	"	Illustration
4	49	being honest	"	
5	49	to the public	"	
6	84	er basic rules	2-hand inward vertical forward motion	Illustration
7	86	like moral rules	"	
8	150	a business must to follow	2-hand flat forward-outward motion	Summary
9	150	must follow	"	
	150	a series of er	2-hand opposing-later motion	Summary
10	150	the principles	2-hand flat forward-outward motion	Summary
11	150	er rules	"	

Table 6.4 Distribution of *boundary* gesture and variations

Adapted from McNeill (2000: 314). Single horizontal lines separate gesture unit sequences.

Recurrence	Line in transcript	Verbal Utterance	Recurrent gesture feature	Discussion phase
1	45	boundary should really be	Both hands palm-in touching at finger tips	Definition
2	45	set up	Both hands palm-in opening and closing	Definition
3	46	(for) people like er	"	Definition
4	46	confronted	Both hands palm-in touching at finger tips	Definition
5	48	with the things	Both hands palm-in opening and closing	Definition
6	54	don't er	"	Definition
7	81	behavior themselves well	Both hands palm-in touching at finger tips then fingers crossed	Illustration
8	137	(pay more) attention to the profit making	Both hands palm-in touching at finger tips	Illustration
9	158, 160	their er the market	Both hands palm-in opening	Illustration
10	262	business	"	Summary
11	265	in a boundary	Both hands palm-in closing	Summary

Table 6.5 Distribution of *crossing* gesture and variations

Adapted from McNeill (2000: 314). Single horizontal lines separate gesture unit sequences.

Recurrence	Line in transcript	Verbal Utterance	Recurrent gesture feature	Discussion phase
1	033	the business	Left hand palm-in, right hand cyclic from palm-in to palm-up	Definition
2	033	should stick to	"	Definition
3	034	the business things	Left hand palm-in, right hand palm-up beat	Definition
4	050	can cross	Left hand palm-in, right hand palm-up straight motion	Definition
5	058	kinda er	"	Definition
6	058	like break laws	"	Definition
7	059	make crimes	"	Definition
8	137 (139)	pay more (attention to profit making)	"	Illustration
9	267	want to make profit	Left hand palm-in, right hand palm-up arc	Summary
10	268	based on	Left hand palm-in, right hand alternates in and up	Summary
11	268	following a series of	Left hand palm-in, right hand cyclic	Summary

In the analysis of these gestural sequences, an image begins to emerge of the way Brenda has come to demonstrate her understanding of the topic-at-hand. There is not only a repetition of forms and depictive strategies throughout the discussion, but also a variety of forms for different conceptualizations. The prolific and patterned use of gesturing demonstrates how experiential schemata come to give structure to thematic content in a way that the repetition of the verbal cannot do, or does so in a distinct way. Not only does the repetition of a form show that a sensory experience is being conventionalized, but also that these conventionalizations remain subject to

transformations and recontextualizations, thus demonstrating Brenda's dynamic learning process through change.

Dimensions of construal are enacted in Brenda's talk and gesture, constituting them as cognitive practices, observed in the repetition of terms and reuse of particular gestures. Yet, the reuse and repetition of these entities are not exactly synonymous, at least if understood from a dynamic construal perspective. This is due to the fact that usage events of language constitute a recontextualizations of linguistic entities, and thus activation of potentially renewed networks of meaning associated with these entities (Langacker 2008; Rosch 1978; Tomasello 2003; cf. Cruse 2008). This is observed in both the reuse of the terms, as well as their accompanying gestures. The repetition of the *barrier* form serves to create a syntagmatic prominence relationship in which repeated terms are foregrounded and recontextualized against a new background. For instance, the idea of *cross* is elaborated in the terms *break laws* and *make crimes*, analogically and iconically linked from the initial enactment of crossing in the gesture. When the same gesture is used within the sequence of *series of business ethics*, it not only recontextualizes the notion of *business ethics*, but juxtaposes it with the possibility of its transgression. Thus, they become reimagined when foregrounded over the barrier background, which has previously linked up to the two-handed tracing movement coupled with *rule*. Likewise, links are made salient by both structure and gesture reuse. Returning to the collaborative contextualization shown above (cf. Excerpt 6.9), when Alice reuses the cyclic gesture, she not only construes cyclicality in the sequence, but recontextualizes the first instantiation as sharing iconic relation with the second. The next section examines the ways schematic depictive and conceptual gesturing affords reuse and transformation in the analysis of another abstract concept, the notion of *the artist* in the domain *what is art?*

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6.5.2   Analyzing the concept of the artist *through gestural linkages*

This final analysis examines patterns of abstract gestures (i.e. schematic and conceptual) from a discussion on art. The four discussants—Pam, Qiao, Rebecca, and Sabrina—are engaged in a 12-minute discussion to comment on five quotes from the textbook, with Pam as moderator. The stimulus specifically requests that the discussants paraphrase and explore these five quotations, each attributed to a famous artist, designer, or theorist, and discuss whether and why they agree or disagree with these statements (cf. fig. 6.23 for quotations from the textbook). The general topic becomes contextualized through talk, and serves to reference a general domain of *art*, from which each different artist quotation provides analysis for the domain. Each quotation also serves as a preliminary conceptual base that sits at the background of the discussion.

"Advertising is the greatest art form of the 20th Century."   —Marshall McLuhan
"All art is autobiographical."   —Federico Fellini
"An artist is someone who produces things that people don't need to have."   —Andy Warhol
"Art produces ugly things which frequently become more beautiful with time. Fashion, on the other hand, produces beautiful things which always become ugly with time."   —Jean Cocteau
"An artist is always alone—if he is an artist…What the artist needs is loneliness."   —Henry Miller

Figure 6.23 Questions for *art* discussion

Adapted from Frazier and Leeming (2013: 126–127).

The analysis focuses on Rebecca's recurrent forms distributed in her contributions throughout the discussion, first around the discussion of what the participants characterize as 'the second question', followed by analysis of Rebecca's gestures in discussion of the topic of 'the loneliness of the artist'. The distribution of schematic forms illustrates their analytical facility along multiple planes of construal, i.e.:

- projection in home and pre-stroke forms

- salient imagery for paradigmatic-sequential analysis

- syntagmatic analytical mappings

- distributed forms through catchments, repetitions, and reuse

Excerpt 6.19 reproduces how the discussants enter into their talk.

Excerpt 6.19 Contextualizing art as the topic
GD06.Art1 [00:00.846 – 00:27.255] Tetrad(b) Pam, Qiao, Rebecca, Sabrina *

```
001 T02:    you now have twelve minutes to complete
002         your discussions (.) please begin (3.3)
003 SAB:    ok (0.8) er today we're going to talk about er
    z:      ›book»
004         (0.5) some: (1.6)
005 QIA:    some some [art]
    z:            ›PAM
006 SAB:              [old↑] thing↑↓ (laughs)
007 QIA:    art works (0.9) so
008 SAB:    about arts (.)
009         first advertising is the greatest art form
```

The discussion begins through a collaborative contextualization of the general topic. Sabrina begins to introduce the topic at line 003, but displays trouble (line 004), which is taken up by Qiao for repair, saying 'some some art' (line 005). Sabrina overlaps with Qiao's utterance of 'art' with 'old thing', which is immediately repaired by Qiao into 'art works' at line 007. Sabrina in turn (line 008) reformulates Qiao's term into 'arts' before continuing into particularizing the discussion into one of

the subtopics at line 009, in this case Marshall McLuhan's quote that "advertisement is the greatest art form of the 20th century" (cited in Frazier & Leeming 2013: 126). Sabrina and Pam exchange a short discussion on this first topic before Pam ends her turn followed by a 3.5 second pause (omitted). Rebecca uses the interim pause to self-select for discussion of the second quote from the stimulus, pertaining to the notion that art is autobiographical, attributed to Federico Fellini in the textbook.

In Rebecca's elaboration on the topic, reproduced in Excerpt 6.20 below, several dynamic aspects of her contribution illustrate the distribution of embodied construals through conceptual gesturing, i.e. gestures coupled to abstract content in the talk. Her contribution is framed by a particular home position from which she mobilizes first into the discussion on *the autobiographicality of art*. She explores this topic by employing several schematic forms from which she elaborates on the notion that the artist uses art to express their feelings. The following excerpts analyze how Rebecca connects these schematic forms throughout her discussion, much in the way that Brenda does in her metaphorical construal of *business ethics*. For Rebecca's part, she characterizes the artist as *putting into* their artwork feelings and emotions and thus expressing these through art. This notion is characterized as the artist's *product* and *production*. Although they are less imagistic than Brenda's metaphoric gestures, Rebecca's gestures appear designed both to support her stance on this notion and to provide imagery for the content of her talk. She presents a two handed home position that alternates between two variations, initially supported by resting her elbows on the table (cf. fig. 6.24). In the first variation, her right hand continually moves from palm-out to palm-down with her fingers in a relaxed posture, her left hand raised with palm-down orientation moving incidentally with her gestures. Rebecca uses this incidental movement for a type of analogical gesture in which she alternately rotates her hands

as she talks about the artist's emotions (fig. 6.24a). Rebecca's second position respecifies the form by configuring her hands into precision or pinching grips (cf. Streeck 2009b: 47–51), and subsequently orienting her left hand into a palm up position, into which she beats, or more specifically, pecks with her right hand. The pecking variation is used concurrently during her elaboration of the notions of *drawing* and *producing* the artwork, and through her discussion for pragmatic and enunciative gesturing in support of her speech handling.

Rebecca's turn at talk begins at line 025, and at line 026 she reads the quote verbatim, then provides a stance of agreement (line 027). She then builds her embodied formulations in her analysis of the notion that *all art is autobiographical* through spoken definitions of *what is art* and the *production* of it by the artist (lines 028–042).

Excerpt 6.20 Conceptual/schematic gesturing in analyzing *art*
GD06.Art1 [01:43.745 – 02:50.092]

```
025 REB:    mm ok let's talk about the second question
      z:     ›book»
026         all art is: (.) auto-bio-graphical (laughs)
027         er i agree with this condition
      g:        |^~~~~|
                 p→book
028         i think er er: art ju- art can express someone's mm
      g:                                       |^**********~~
      #:6.24                                    a
      z:                          ›away      ›SAB ›QIA
029         emotion and er and his feelings (.)
      g:     ^******~~~~~~~~^*******~~~~~~~~~|
             (a)            (a)
      z:    »        ›book»
030         er if the artist draw the draw a picture or or the
      g:    |~~~~~~~~~^******^--------.----.------------.----»
                      (a)        b
      z:        ›PAM         ›book     ›PAM           ›away»

031         musician produce er: sounds
      g:    ».-.------.------~~~~~~----»
      z:    »         ›QIA        ›down
```

```
032        they put their feelings
     g:    »~~~~~.--~~~~~~~^------»
     #:        (b)          c
     z:    ›away            ›PAM
033        in thei- i- in the productions
     g:    »-----------^.~~~~~.*********»
     #:                  (c)      d
     z:    ›PAM                ›PAM
```
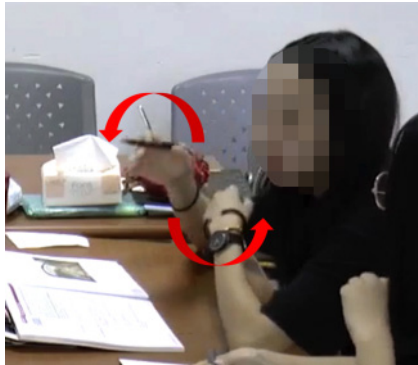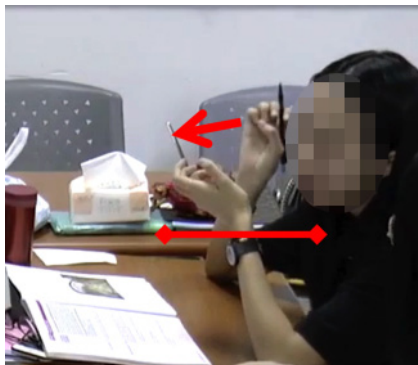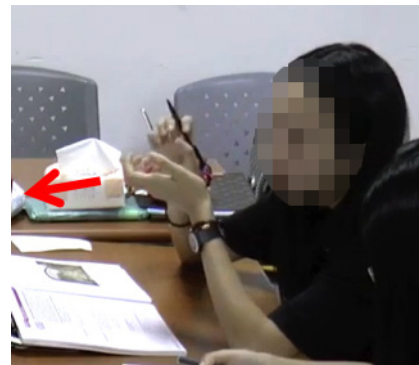

a. **someone's** mm / **emotion**
and er **and his** feelings

b. **draw** the **draw a picture**
or **or** the **musician produce**
er **sounds**

c. they put their **feelings**

d. in the **productions**

Figure 6.24 Analyzing the *feelings* of the artist

(a) *emotions:* syllabic rotations in contrary motion; (b) *draw:* right hand shifts into precision grip and beats syllabically. (c) *feelings:* right hand precision grip beats syllabically while left hand holds palm up; (d) *productions:* both hands beat forward.

Rebecca reads the question within her turn, laughs, and points to the open page of the book as she says 'er i agree'. In her contribution she moves towards elaboration of the quote, more specifically an elaboration of her agreement, projected by the specifying move *I think* followed by utterance of the discourse markers 'er er:' as a display of her formulation process (Fung & Carter 2007). In effect these moves function as colons in
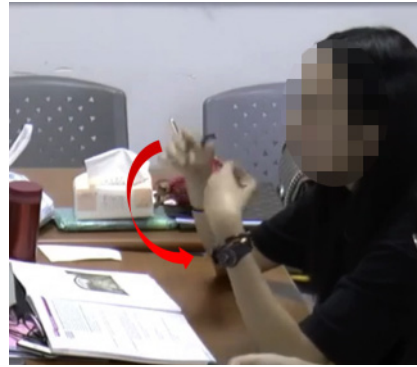
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separating the conceptual base, *the autobiographicality of art*, and the subsequent reformulation beginning at lines 028 and 029, uttering 'art can express someone's mm emotion and er and er his feelings'. Again, discourse markers are used for projecting a space for the terms *emotions* and *feelings* as distinct entities in the semantic scope of *the autobiographicality of art*. Through gesture she also co-construes the move into a specifying reformulation. When she utters 'someone' at line 029, Rebecca brings out her left hand from underneath the table, thus moving into a new home position (cf. fig. 6.24). In this position she keeps her elbows on the table, hands raised at face level, in palm-down orientation. She couples the utterances of 'someone', 'emotions', and 'and his' with the rotating gesture in contrary motion (fig. 6.24a).

At line 030 Rebecca makes an instantiation move by uttering 'er if', a hypothetical marker projecting an adjacent example. As she utters 'draw the draw a picture' she reconfigures her previous gesture position: left hand in palm-up orientation, fingers curled inward, with the right hand above it in a precision grip (middle finger and thumb connected, fig. 6.24b). With each utterance of *draw* she beats or pecks into the cupped hand. While it is difficult to interpret this gesture as a depiction of drawing, it might be possible to infer a connection to some kind of artistic action. This inference is strengthened by the reuse and repetition of the form throughout lines 030 to 034, and variations up to line 038. These variations involve holding her left hand flat palm-up with utterances of 'feelings' (line 032, fig. 6.24c), and 'productions' (line 033, fig. 6.24d), with this final gesture involving a motioning forward with both hands. As Rebecca continues her discussion, she couples her variety of conceptual gestures to various terms related to the artist's work, as can be seen in its continuation (Excerpt 6.20 continued below).

Rebecca ends her current contribution with a concluding statement on *the autobiographicality of art* by attempting to link the artist's work to their experience. She hypothesizes, formulated with the marker *maybe*, about how the artist's *productions*, 'tell his er experience or his stories' (line 035). As she develops this sequence, she couples it to a variety of gestures that she has been using.

Excerpt 6.20 (cont.)

```
034 REB:    >maybe ≈it's productions≈< er er he (.) he tell
    g:    »-------.------------~~~~|    |~~~~~~~^*********
    #:         (6.29d)                     LPU
    z:    ›down                 ›away       ›down
035         he tell his er experience or his stories er:
    g:    ~~~~~~~~~~~~~~~^*********~~~~~~~~.-------~~~~
    #:6.25                 a                 (6.24b)
    z:                  ›PAM/QIA                    ›away
036         via the: sounds or pictures
    g:      .-----~~~^*******~~~^*******
          (a)        (a)          (a)
    z:    ›PAM›away›QIA        ›down
037         >maybe< it er it's harder to understand
    g:       ^********~~~~^***************----------
           b             (b)
    z:      ›away          ›PAM»
038         the whole meaning they want to express
    g:    »^******************^****************^******
          (6.25a)            (6.24a)        (6.25b)
    z:    »                         ›book»
039         but (.) but it really er (.) aut- auto-
    g:      .-------.--~~~~~~~~~~~~~~~.---------»
    #:                               c
040         /auto-bi-origicraphy/ (.) -origical er::
    g:      ».----.--.--.-------------.----.--~~~~~|
     #:     (c)
041         for the: artists so i agree with this
    g:    |~~~~~~~~~^**.****.------------------
                    p→book
    z:    »down      ›PAM     ›book
042         what's your opinion (Qiao)
    g:      ~~~~~~~~~~~~^******~~~~~~~|
                    p(pen)→QIA
    z:    ›QIA
```

a. he tell his er
experience

b. **maybe it** er **it's harder
to understand**

c. **auto-bi-origicraphy (.) -origical**

Figure 6.25 *experience*, *understand*, and *autobiographical* gestures

(a) Both hands motion forward in a cast or arc movement; (b) both hands
rotate in tandem; (c) both hands enter into precision grip while trying to
enunciate *autobiographical*, syllabically beating and holding throughout the
final utterances of her elaboration.

Within this final sequence Rebecca continues to transform the alternating cyclic
gesture, beating forward with her two hands as she utters 'experience' (line 035, fig.
6.25a), and re-coupled with the utterances of 'via', 'sounds', and 'pictures' (line 036).
These couplings appear as specifications of *expression* by emphasis on the methods of
expression. She returns to the cyclic gesture as she utters 'maybe it er it's harder to
understand', again coupling the rotating motion with a thought process, which then
motions into the precision grip configuration as she says 'the whole meaning they
want to express'. Once again she creates a contrasting segment in both verbal and
gestural: the alternating rotational gesture, coupled to a general process, juxtaposed

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with the precision grip configuration for specification of that process. The precision grip configuration is then held available as she announces the tying conclusion, emphatically beating her right hand as she says 'but', then beating along saying 'but er it er really'. While trying to enunciate *autobiographical*, she syllabically beats and holds throughout the final utterances of her elaboration, thus demonstrating the utility of the form for speech handling functions (cf. McCafferty 2006; Streeck 2009b: Ch. 8). She ends the sequence with a pointing gesture to the book as she says 'for the artists' at line 041, thus linking her previously stated stance of agreement to the autobiographicality of art. In this manner of gesturing, Rebecca's argument and its development through the sequence is effectively circumscribed by her conceptual gestures, linked by the common imagery of the alternating cyclic motion construing experiential processes. Throughout the discussion Rebecca uses several variations of the precision grip configuration as well, mostly for pragmatic use in emphasizing discourse markers and points on a list. The precision grip gesture therefore appears to be an idiosyncratic form of speech assistance, as gleaned throughout her discussion (cf. Duncan 2008).

Towards the end of the discussion the participants turn to the question of the artist's loneliness, stimulated by the Henry Miller quote, "An artist is always alone—if he is an artist….What the artist needs is loneliness" (cited in Frazier & Leeming 2013: 127). Excerpt 6.26 reproduces Rebecca's embodied analysis on this last point, which immediately precedes the summary phase of this discussion. Here she begins in the original home position as before, with hands at the edge of the table. She further extends her use of the alternating cyclic gesture as not only a cohesive device in her overall participant as a discussant, but also in the ways she uses it in the analysis of the emotional life of the artist.

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Excerpt 6.21 Rebecca elaborates on the loneliness of the artist
GD06.Art-1 [10:07.545 – 11:18.959]

```
168 REB:    er in my opinion i think alone er
     g:                        |~~~~~~~~~
169         the /lonliest/ is different expression
     g:      ^****************^******.*****^**~~~~~~~»
     #:6.26a               b             (b)
170         en er cause alone is just show
     g:    »~~~~~~~~~~~~^**********----.--
     #:               c
171         and he is the er single one
     g:      ^******^******.--.--~~~~~|
     #:      d       (d)
172         but the /lonliest/ is a feeling
     g:              |~~~~~~~~~~~~~^********
     #:                           e
173         is that he built in his heart
     g:      ~~~~~~~~.-----------^*******~|
     #:                          p→chest
```


a. alone er **the
lonliest**

b. **is different
/expression**

c. er cause **alone is
just show**

d. **and he is the er
sin**gle one

e. but the lonliest
is **a feeling**

Figure 6.26 Gestures in the analysis of *loneliness*

At line 169, Rebecca's, couples the alternating gesture with the notion *loneliness*,

enunciated as 'lonliest'. Her full utterance encompasses a specifying move for the

notion, saying 'the lonliest is different expression', the rotating gesture at 'lonliest'

fluidly shaping into an emphatic form with the utterances of 'is different' and

'expression'. With her left hand held in a precision grip, her right, open hand motions forward, reiterating a similar form and motion as when she earlier uttered 'production'. She explains the utterance at line 170 ('er cause') bringing her hands to the table, fingers curled, first oriented inward towards her chest and brought down into a palm-up orientation (fig. 6.26c) as she says 'alone is just'. While uttering 'and he is the er', she raises her left hand, index finger pointed straight, holding the form and beating as she says 'er single one'. The complete elaboration up to this point appears to give an embodied conceptualization of loneliness as enmeshed with the solitary work of artistic expression. That is, the specific examples of productions settle into the singular nature of art, visualized by the index-finger point which is an outward display of the artist's inner feelings, and further visualized by Rebecca indexing her chest with both hands.

Rebecca extends into a further elaboration on the artist's *mind*, omitted here, but which follows through into the concluding remarks of her turn. In these final remarks, reproduced in the continuation of Excerpt 6.21 below, Rebecca reiterates the alternating cyclic gesture originally coupled to *feelings* and *emotions*, and the *production* gesture, juxtaposing them in her conclusion that although the artist is alone, 'he isn't lonely' (line 184), but needs loneliness for the full expression of ideas.

Excerpt 6.21 (cont.)

```
((lines 174 to 182 omitted))

183 REB:    and i think (1)
184         he: want he he wan- he isn't:=er: lonely
     g:          |~~~~~.-------------~~--.-------------»
     #:              RPLbeat
185         but if w- he want to produce some artist
     g:     »-.--~~~~~~~~~~~~~~~~~^*******^**********
     #:6.27                      a        b
186         er productions he have to
     g:     ~~~^************^**-------
     #:       (b-variation)
```

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```
187          [be alone to to:]
     g:      ~~~^*****---^**
     #:         (b)      (a)
188 T01:   [one minute remaining ladies and gents one minute]
189 REB:   to to state his i- to express their emotion (1)
     g:    ^************^*****^***********^**********~~~|
     #:   (a)          (a)                 (a)
190        ok (Qiao) you er: you
191        you can draw a conclusion about our discussion
```


a. **produce / to state his / to express / their emotion**

b. **some artist / productions / he have to / be alone**

Figure 6.27 Juxtaposing *expression* and *production*

As can be seen, the repetition, reuse, and transformation of salient forms in Rebecca's concluding remarks (lines 183–189) illustrate an embodied analysis of her verbalization: the rotation gesture which visualizes experiential, emotional, and psychological dimensions of the artist, coupled here to the notion of producing art (lines 185, fig. 6.27a), becomes visualized in the forward motion as she says 'artist productions' and 'be alone' (lines 185–187, fig. 6.27b). The reuse of the rotation at line 189 is transformative in its adjacency, intermingling the artist's psychological state of *aloneness* with their productions.

Table 6.6 lists the distribution of the rotation gesture used throughout Rebecca's discussion, and Table 6.7 lists the distribution of her precision-grip with its variants used in the forward motion gesture. These two gestures are included together because they coincided frequently in Rebecca's sequences (but twice counted in the finishing

touch to the rotation gesture, cf. recurrences 23 and 24 in Table 6.7. Such is the difficulty in parsing out gestures for analysis in this way, also attesting to how gestural collocations might be operationalized for further study.)

Table 6.6 Distribution of *rotating* gesture and variations

Adapted from McNeill (2000: 314). Single horizontal lines separate gesture unit sequences.

Recurrence	Line in transcript	Verbal Utterance	Recurrent gesture feature	Discussion phase
1	028	(express) someone's	[A]	*All art is autobiographical*
2	029	emotion	[A]	
3	029	and his (feelings)	[A]	
4	030	artist	[A]	
5	038	the whole meaning	[A]	
6	103	modern society	[A]	*Art vs. fashion*
7	113	to understand	[A]	
8	152	like maybe (architecture)	[A]	*The artist must be alone*
9	168	the /lonelist/	[A]	
10	177	er to be something different	[B]	
11	180	(mind) is er: (.) maybe (active)	[C]	
12	182	of er: (ideas)	[D]	
13	185	produce	[E]	
14	187, 189	to: to stay his i- to express their emotions	[D]	

Variations with rotation: [A] Both hands palm-down; [B] Right hand palm-down, left hand palm-up; [C] Both hands palm-up; [D] Both hands palm-lateral [E] Right hand palm-lateral, left hand palm-up

Table 6.7 Distribution of *precision grip* and *forward motion* gestures

Adapted from McNeill (2000: 314). Single horizontal lines separate gesture unit sequences.

Recurrence	Line in transcript	Verbal Utterance	Recurrent gesture feature	Discussion phase
1	030 - 031	draw the draw a picture or or the musician produce	[A]	*All art is autobiographical*
2	032, 033	they put (their) feelings (in their) in	[A]	
3	033	productions	[B]	
4	034	it's productions	[B]	
5	035	experience	[A]	
6	035	(his) stories	[B]	
7	036	via the sounds pictures	[A]	
8	038	the whole meaning they want to express	[A]	
9	039	but	[A]	
10	039, 040	/auto-bio-graphy-origical/	[A]	
11	99	different	[A]	*Art vs. fashion*
12	99	to definition	[A]	
13	100	in different arts	[C]	
14	102	think er	[C]	
15	102	this one is fashion	[B]	
16	104	so	[C]	
17	104	it's hard to say	[B]	
18	105	it's definitely the fashion	[B]	
18	106	time can change what the fashion is	[C]	
20	107	produces art art may	[A]	
21	107	seems	[B]	
22	108	LONG	[C]	
23	186	productions	[B]	*The artist must be alone*
24	186, 187	he have to alone	[B]	

Variations: [A] Right hand palm-up, straight forwarding motion / Left hand palm-up, precision grip hold; [B] Both hands palm-lateral, straight forwarding motion; [C] Both hands palm lateral, precision grip, beat

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Examining the recurrence of Rebecca's gestures in her discussion, a general patterning emerges in their form-meaning pairings, weaving a cohesive thread of conceptual content distributed in her elaborations. Conceptual linkages are tied imagistically by the rotating motion construing processes, and the precision-grip form that circumscribes her linguistic and conceptual formulations. These linkages further afford deployment of the forward motion, at times construing both the notion of *production* and organization of discourse.

6.6   Chapter discussion and conclusion

This chapter explored the GD as a distinct ecology for explanation and concept analysis by first examining the overall organizational structure of the task, followed by a focus on gesture in distinct cases. As a genre of EAP communicative tasks, the GD is designed to assess interactional competence, yet in the actual unfolding of the *task-as-process* (Seedhouse 2005), the GD becomes a vehicle for bringing the talked-about-world into view for collaborative analysis.

The preceding ways of examining depictive gesturing in discussion illustrates several ways that intentionality, intersubjectivity, and intercorporeality manifest in construal. Within immediate reformulations, discussants seek out the meaning of referents and of each other's contributions through formulation of the referent as analyzable. For instance, in the ways that discussants not only contribute to defining the topic individually, but in how they navigate through the interactional order, shifting to their turns and formulating utterances that create the conditions for their reformulations.

Intentionality, for instance, is observed as both a subjective and intersubjective alignment simultaneously following the goal-directedness of the task rubric, as well as the immediate goals of achieving the progressivity of the discussion through mutual

understanding. As Peräkylä (2008) notes about collaborative descriptions, intersubjectivity involves the "communion and divergence of minds" (118), reflecting how intersubjectivity is fluid and sensitive to the linguistic environment of joint discussion. Primary intersubjectivity, or intercorporeality, is observed in the ways that discussants, as bodied, linguistic beings, treat the discussion as multimodal communicative events. Specifically, they coordinate their hands, gaze, and body posture as they progressively contextualize the conditions for their analysis of concepts in talk. In turn, a careful analysis of their depictive gestures, for instance in the ways that hand forms were changed in response to co-discussant formulations (e.g. *intelligent machines* in Excerpt 6.11), as well as in how scenarios were layered in various level of specificity (e.g. *alternative medicine* in Excerpt 6.12).

Furthermore, the ecology of the GD task provided an emergent context for a variety of gestures which sought to bring the topic into view. Depictive gestures, of primary interest in this thesis, were observed being used to provide specifications of discussant verbalizations of the topic. In keeping with the CG notion of construal as the interactive enunciation of instructions to visualize a scene, gestural sequences in discussion can be understood as not only materially facilitating these visualizations, but also creating the reference points from which to access other aspects of the topic-at-hand. Gestures thus afford dynamic, joint conceptualizations that juxtapose the topic referent and specification through example, scenario, or imagery coupled by the speaker. As visualizations are not static events, but evolve and unfold through time, some discussants integrated their materially facilitated visualizations into the grammar of the discussions. Also, despite the discussants' consistent and idiosyncratic gesture configurations (Duncan 2008), discussant formulations, reuse, and

transformations in gesture can be accounted for as publicly analytical contributions towards the topic-at-hand.

In the next chapter I discuss possible insights into depictive gesturing in the classroom, particularly accounting for gesture as a communication strategy for language and concept learning. This is done in view of the eco-enactive approach to communication in seeking to respecify the meaningfulness of human action towards learning.

Chapter 7 Discussion and conclusion

7.1 Introduction

This study examined and aimed to demonstrate how speakers in goal-oriented, expository tasks endeavor to use depictive gesturing as a means of fulfilling those tasks. It uses a microethnographic framework as a way to bring together various theoretical perspectives in cognitive linguistics, conversation analysis, and an eco-enactive view on cognition. Specifically, it explores the intercorporeality, intersubjectivity, and intentionality of construal in gesture and speech, using tools from cognitive grammar and conversation analysis.

This chapter synthesizes the analysis of the two task settings from Chapters 5 and 6 in order to recognize the broader implications of my findings. Direct implications pertain to the functions of depictive gesturing as a communication strategy and analytical resource in L2 exposition. Working towards my research goals involved fine-grained analysis of the interactive ecology of manual depictions, which brought about an exploration of interactive affordances for reformulations in these depictions. The analysis of reformulations, in turn, leads to more general implications for an enactive perspective on learning. The chapter ends with a discussion on limitations and directions for future research.

7.2 Summary of the analysis

A general finding that becomes apparent from the analysis of the tasks is that participants follow and shape interactional order in both goal-oriented and interactively contingent ways. More specifically, the analysis illustrates the careful attenuation by participants of several dimensions of explanation, discussion, and depictive gesturing in L2 academic English tasks. The interactivity of these contexts

appears to motivate the calibration of construal towards the accommodation of a particular visualization.

Addressing the question of how speakers create the conditions for depiction as a communication strategy involves both an empirical investigation and a theoretical one. I first address the empirical question by giving an overview of the findings on how the participants themselves organized and structured the tasks. I then examine these findings in view of an investigation of strategy, analysis, and the construal of content in depictive gesture, which demand bearing out in terms of an interface between cognitive and praxeological perspectives on the motivation of gesture in second language contexts.

7.2.1   *The emergence of depiction and construal in interactive tasks*

To discover how the participants engaged with the task-at-hand, through a case and prototypicality analysis I examined the interactional order of each of the two tasks and how they were constructed by the participants themselves. Based on these preliminary analyses, I found that participants used contextualization strategies to mobilize into their depictions in various ways. In Chapter 5, participants were tasked with explaining complex phenomena in the Complex-Systems (C-S) corpus. The participants, divided into explainers and listeners, demonstrated that people in such tasks exploit epistemic asymmetry (Heritage 1984b, 2012) in the task design in order to mobilize responses according to specificity relations. Explainers in this case were observed verbalizing a topic name, which then moved into a more specifying elaboration. In this manner explainers enacted specificity relations between a general domain and selected constituents of that domain through practices of reformulation (Gülich 2003). However, contextualizations were found to be contingent upon co-participant interaction, as observed in the detailed analysis of sequences where

participants i) pursue contextualization of the topic, ii) initiate repair, and iii) adopt candidate topics and terminology as given by listeners. To mobilize into depiction then, explainers mark their discursive moves through body movement, hand gesture, gaze, and verbal markers, thus treating their contextualization as an about-move in which to set the background for a sequentially relevant elaboration (Goodwin & Duranti 1992). Explainers subsequently integrated interactively afforded transformations into reformulations of their depictions.

In Chapter 6, the interactive ecology that is particular to the academic group discussion (GD) evinced a more collaborative contextualization of the topic, in which participants planned for equal contribution in contextualizing the topic. Analysis of the trajectory of the GD task demonstrated that the contingency of contextualization persisted across task types, i.e. in the C-S and GD corpora. In the GD task, discussants used shared knowledge to contribute their discussions of the topic-at-hand, and thus display equal rights to knowledge claims. Discussants therefore contextualized their topics according to a predetermined claim to contribution, interactively creating the order of their contributions through verbalized turn selection, coordination of gaze, and body movement and gesture. Participants who used depictive gesturing as part of their discussion were observed orienting to their turns through embodied displays of forward gesturing (Streeck 2009a), sometimes projecting semantic features of future gestures. In both tasks, when depictive gestures were used, explainers/discussants could be observed coordinating their bodies and their hands during contextualization to coincide with elaboration of the topic. Depictions were thus used as part of the enactment of specificity relations between topic and the expansion of the topic.

In answering the questions on the functions of gestural depiction, I address questions of gesture as a communication strategy to suggest that depictive gesture

functions primarily as a type of manual analysis of visualized content, explained in the next subsection.

7.2.2   *Gesture as strategy and as a method of analysis*

To address the notion of strategy in gesture, I conducted fine-grained analyses of depiction in topic formulations, elaborations, and subsequent reformulations. I thus interrogate the functional notions of planning and compensation by attending to utterance design and reformulations in depictions. The depictive explanations in Chapter 5 illustrate how depictions are created through carefully tailored hand configurations and body movements, articulated in ways that have bearing on the sequential deployment of further gestures. This strategic articulation of forms could be observed in the sequences in which multiple entities and actions were placed into view for manipulation. For instance, in the depictive sequences in *osmosis1* and *osmosis2*, explainers initiated depictions of containers in a virtual laboratory experiment (i.e. a large beaker and a thistle tube) in ways salient to how they envisioned the forthcoming depiction. In *osmosis1*, Ivy configured her two hands to depict the containers as long tubes, using her index fingers to model the tubes. Ivy's extended index fingers, however, also afforded the use of her fingers as drawing tools for representing the containment relation between the containers (i.e. inside/outside), and for drawing numbers into the air to represent the percentage of solute in the experiment. Similarly, in *osmosis2*, Claire configured her hands into a shape molding the outer rim of a large beaker, which afforded depictions of actions as well as the placement of the thistle tube inside of it. In Chapter 6, depictive elaborations in the contextualization and discussion of a conceptual topic generated affordance-laden preparatory and depictive strategies. Discussants built depictive responses to one another in ways conditional to their stances, elaborations, and analyses (e.g.

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diagrammatic examples, analogies, and metaphors) in sequences of carefully articulated gestures. Their gestures not only followed their verbalizations, but bore marks of anaphoric and projective design. Thus, a degree of planning could be observed in how hand shapes become articulated for sequences of depictive explanation.

In addressing the compensatory nature of gestures, the findings in this study point to the implications for how an enactive view of embodied communication can respecify gesture's facilitative function. The notion of compensation in gesture remains problematic for various reasons, especially given that any assumption of what speakers and gesturers are compensating for remains opaque to an emic analysis (Burch 2014). Gullberg (2013) contends that for gestures to ascend to compensation they should possess three essential properties: (1) have expressive power and rich semiotic affordances, (2) be tightly linked to language, and (3) be relevant to addressees (40). Decades of gesture research substantiates all three of these aspects for gestures as communicative resources. Likewise in this study, depictive practices by the participants appeared to correspond to all three of Gullberg's compensatory properties in that they (1) provide rich visualizations of complex and abstract concepts, (2) are mobilized within discourse moves from topic to elaboration, and (3) promote participatory frameworks for co-analysis and gestural repair. However, as Gullberg (2013) further notes, the aforementioned evidence is sufficient only to demonstrate that gestures are used *for* compensation, but the question remains if they do in fact compensate by enhancing communication (40–41). Her answers to this question thus far (Gullberg 1998, 2006, 2011, 2013) have been that while gestures do emerge as packaged in the communicative intent of speakers, evidence remains lacking for any substantial enhancement to communication, with gestures primarily displaying

semantic or pragmatic redundancy with speech (Gullberg 2013: 46). Consequently, a more nuanced view of compensation, and more generally of communication strategies, needs to be developed in order to understand the complexity of L2 speakers' sense-making resources (*ibid.*).

7.2.3   *Gesture as manual analysis towards enactive construal*

While a more complete discussion on the points of contention for gesture as a communication strategy is beyond the scope of this chapter, the findings from a microethnographic perspective can shed some light on the questions of compensation and learning, at least for depictive gesturing. I argue that from a perspective of *enactive* construal, depictive gestures can be understood as transformative of both the meaning of utterances and of the communicative system between gesturers, addressees, and the visualized world created by depiction. One problem in previous questions about the compensation of gestures is in asking whether they convey more or different information than that of speech. Unfortunately, in taking an information-exchange model of language, some of the semantic contribution of gestures can be missed, but when viewed as enactive sense-making, particularly in the phenomenological senses of intercorporeality and intentionality, the function of gestures as part of the natural sense-making impulse can be re-assessed.

Firstly, gestures provide visualization in a new modality. For depiction in a general sense, any visualization can be understood to be an achievement of the aesthetic practices that enable its creation—depictions are *seeable* as the entities and actions they depict *because of* the methods of depiction (Goodman 1968; Podro 1998). Secondly, manual depictions not only provide imagery for related talk, but also interpret talk in at least two ways: (i) in providing a particular, intercorporeally motivated construal, and (ii) in the re-orientation from a pre-reflective but adaptive

attitude to an analytical one imbued with *concernful* and *dispositional action* (Yanchar 2011: 280–282), i.e. towards treating objects in talk as objects of depiction, thus mattering corporeally to the interactants of talk (cf. Heidegger 1927/2010; Merleau-Ponty 1945/2012). As visual forms of the body in thought (Arnheim 1969; Streeck 2009b), depictive gestures function in an interactive space to confront thinking problems as tactile ones. Any depiction performs an interpretive analysis, because selections are made by the depicter in how to visually grasp and conceptualize the content of the depiction (Müller 2014; cf. Cilliers 1998).

Furthermore, specific to gestural depictions, the visual modality becomes juxtaposed with the manual, and thus any visualization becomes enmeshed within the activity of a gesturing body, one which is always already meaningful to another person as a meaning-making entity. This is the phenomenological nature of gesture, that gestures embody in a direct way intercorporeal meaning. In taking a participatory and enactive view as advocated in this study, the corollary notions that constitute planning and compensation become redefined in terms of the immediacy and contingency of interaction. Thus intentionality and intercorporeality can explain how gestures can be both pre-reflectively charged with meaning, and reflectively engaged in analysis.

I further contend that depictive gesturing blurs the notions of planning and compensation, at least in the subject/competency related tasks viewed in this study. Rather than attempting to account for gesture as a type of strategy, gesture is best understood as within the same act as speaking. While it is true that not all people gesture in the same way and at the same rate (cf. Laurent, Smithson, & Nicoladis 2020; Nicoladis, Rose, & Foursha-Stevenson 2010), speakers mobilize their bodies as expressive forms of life for the purposes of conducting social action. What I have

sought to show in this study is that speakers who deploy depictive gesturing as part of their explanation and analysis of a topic-at-hand, do so in ways that are non-arbitrary, impactful, regulatory, and relevant to their talk. Depictive gestures are goal-oriented in ways beyond showing a picture of what is being said, but orient paradigmatic and syntagmatic construal relations in space and time.

Examining the two tasks for student interaction illustrates how construal is deeply embedded in the normative ecologies of distinct interactional trajectories. Likewise, as formulations evoke conceptual domains, the tailoring of construal as it unfolds shapes the terrain of possible concepts and conceptualizations, and their emergent analysis as objects of understanding (cf. Givry & Roth 2006). In Chapter 5, repair and reformulation afforded the enactment of focal adjustments onto depictions in anticipation of trouble and for renewed understanding. Therefore, the analysis as conducted by explainers themselves not only entailed looking at their referents from different angles of view, but also in providing new pathways to access visualizations of actions and processes relevant to the explanations. The GD tasks examined in Chapter 6 demonstrated similar findings, where discussants repaired and reformulated each other's talk in different ways. They also demonstrated embodied meaning practices in the patterning of their talk, by distributing salient imagery in different aspects of the discussions.

7.3   Implications for (enactive) learning

To conclude my discussion, I want to briefly touch upon how depictive gesturing can elucidate a conception of *enactive* learning. First, by considering the use of conversation analysis (CA) as the primary apparatus for understanding formulations and reformulations in depictions, I examine CA's emic perspective on situated and participatory learning. I then explore how the notion of change in the acquisition of

skills can be approached by foregrounding the transformative aspects within the theories of ecological psychology and enactive cognition.

As described in Chapters 2 and 4, using a primarily CA methodology entails approaching participant interactions as displayable and accountable to the immediate relevancies of their talk. Given its strictly inductive method, it is often argued that CA lacks a robust conception of both learning processes and their content (Kasper 2006: 86; Pekarek Doehler 2010: 121). This lack emerges because of the view in CA that objects of understanding, i.e. *learnables*, should be demonstrated in how they "are brought into being by the participants through their joint action, at particular moments in the ongoing activity" (Kasper & Wagner 2018: 83). Nonetheless, CA's emic perspective appears amenable to other participant-centered approaches, such as enactive cognition in mathematics education (Coles 2015; Reid & Mgombelo 2015), Vygotskian socio-cultural theory in L2 development (Mondada & Pekarek Doehler 2004), and situated learning (Melander 2009; Melander & Sahlström 2009; Sahlström 2011). The pursuit of gesture in the acquisition of knowledge fosters an embodied conception of learning entailing meaningful engagement with the world—variously alluded to as *participation* (De Jaegher & Di Paolo 2007; Goodwin & Goodwin 2004; Lave & Wagner 1991; Yanchar 2013).

It is also dubious to show that gestures evince agency by *explaining* the objects and processes we claim they do. As Osberg, Biesta, and Cilliers (2008) point out, the representation of the world through visual artifacts and theories alike remains susceptible to realist epistemologies rooted in a correspondence between knowledge and a world waiting in abeyance of acquisition. They suggest, rather, that learning practices be understood not merely as participatory and representational, but transformatively achieving learning in terms of fashioning the worlds of knowledge

that are investigated. If we are to take the view that human action is a way of approaching a meaning-laden world as if meaning were to unfold, and not entirely as pre-given, then it follows that an enactive educational approach would accept the "unfinished universe" that acts of knowledge seek to create (Osberg et al. 2008: 215). To this end, de Bruin & de Haan (2009) remind us that "The proper unit of analysis is not the individual (let alone the individual brain) but rather the coupled system as a whole, including the participants, their dynamic interactions, and the context in which these interactions take place" (229). Therefore, instead of focusing on change as the acquisition of skills in an individual body, we should understand learning as the adapting of conditions for enabling and constraining particular outcomes between agents, e.g. learners and the material objects of their learning (cf. Baggs, Raja, & Anderson 2020). I further add that gestural depictions provide a unique instance for learning conditions, in that they bring forth a world in a way that is unique to depiction. Under an eco-enactive consideration, learning emerges as a matrix of actions that become meaningful in the interactive environments from which they were brought into being, echoing the situated perspective offered by CA:

> When a resource or a method of interaction becomes a learning object, the entire activity configuration changes—asymmetrical epistemic relations are made relevant, material objects are put in the service of learning, social actions operate on the object in ways that make it into a learning object, and the activity shifts focus from achieving intersubjectivity to doing learning. (Kasper & Wagner 2018: 83)

As cooperatively attenuated acts of learning, intercorporeal sequences of embodied conceptual analysis and depictive formulations achieve open-ended explanations which remain extendable and regulatable by the participants themselves.

Learning is therefore reflected in the trajectory of depictions in the classroom. Depicters not only acquire new forms of gesturing, i.e. it is not simply a matter of

installing a new gesture within a sequence or coupling a gesture to a word (although this might happen too). Transformations, as observed in reformulated depictions, engage new ways of interacting with concepts—through manual, visual analysis of otherwise abstract ideas. Through an eco-enactive position on learning, we might contend that concepts, traditionally the province of disembodied theories of mind, are also embodied. Concepts, like memories and thoughts, are derived from our embodied experience, our individual and shared "corporeal memory" (Belting 2001/2011: 15). This view further suggests that the emergence of concepts can be observed through space and time (cf. Givry & Roth 2006; Irwin 2017), and instead of static ideas in the head waiting to be accessed, are brought into being in the relation between bodies, language, and imagination.

7.4 Limitations and future directions

In light of the synthesis of findings towards our understanding of gesture as an enactive strategy in learning, I conclude with a discussion of some of the limitations and future directions of this study.

Several aspects of the study stand out for refinement and improvement, related specifically to corpus design and construction, the semi-experimental explanation task, and the point of comparison between linguistic settings. Given the opportunistic approach to the corpus design for CAWSE (cf. Stevens et al. 2020), a data-driven methodology was taken to precipitate a discovery method of phenomena in the initial inquiry of data. Specifically this relates to the lack of uniformity in the data towards a more transparent corpus for multimodal corpus analysis (Adolphs & Carter 2013). To this end, further data collection might be guided towards a more precise sampling of group discussions from a uniform group of participants (e.g. gender, age group, language proficiency, and/or regional homogeneity). Uniformity in the data sampling

would enhance the reliability of not only the corpus, but also for the generalizability of qualitative findings along the lines of conversation analysis (Mondada 2013; Peräkylä 2016).

With regards the C-S task, the semi-natural design of the tasks foregrounds some disadvantages for both qualitative and quantitatively oriented research. Given the lack of uniformity of task stimuli and organization, multiple uncontrolled variables proliferate that hinder the generalizability and uniformity of the corpus. The C-S corpus also poses some problems for qualitative, interaction-oriented studies. For instance, Wagner and Gardner (2004) contend that experimental classroom tasks bear the mark of the researcher's agenda and have "no consequences for the participants' lives" (1). However, I would disagree, as they further claim, that these types of tasks lack the "range and subtlety" of interaction (*ibid*.). Given that the C-S task was designed as part of an academic English conversation group, one can take the participants as interacting in 'good faith' with the task, as demonstrated in their decisions to carry out and fulfill the task on their own terms. Furthermore, the lack of uniformity in the task design belies a potential feature for qualitative research, in that it demonstrates how participants choose to engage with pre-designed material in creative ways. Also, as tasks for generating communication in the classroom, games, debates, peer explanations, and other creative activities should be designed with the interest of the learner in mind (Willis & Willis 2007). These reservations notwithstanding, the results of the study illustrate the potential for observation of embodied sense-making in the natural setting of the modern, dynamic classroom.

Areas for potential research might involve establishing points of comparison between different languages and task ecologies. For example, comparison with other languages, such as other L1s or other L2s, and/or in other EMI communities (i.e.

across different campuses in different countries). The potential for cross-linguistic analyses of multimodal conceptualization and construal also merits evaluation (cf. Jarvis 2011), as well as further studies using the methods developed here for enactive, embodied cognitive practices. For instance, given the ways that construal formulations were calibrated for depictive sequences, a question that arises is, *How are more abstract sequences calibrated for, if the gestures rely less on affordances or techniques of depiction?*

In view of the nature of English for Academic Purposes (EAP), another possible direction might be the relationship between gesture, academic language, and assessment. Research questions within the scope of EAP might be, *What are the correlations between embodied actions and assessor perception of either fluency or conceptual understanding,* and/or *What account can be made for the use of gesture in academic settings, towards a notion of Gesture for Academic Purposes?*

These questions have further implications for the interface between gesture and pedagogy. However, invoking the suggestion of teaching gestures poses some challenges. As Dörnyei (1995) surveys in his analysis of the teachability of communication strategies, distinct interpretations emerge regarding their usefulness and value to either children or adult learners. This is a question that is often posed, in lay settings, about gesture, specifically regarding the facilitative role of gestures in education. However, in regards to these pedagogical implications, I agree with Di Paolo et al. (2018: 312) in invoking an ethics of ambiguity (de Beauvoir 1947) when interrogating the notion of the body as a communicative resource. As human beings, we encounter and enact worlds through our bodies, and thus leave ourselves vulnerable to acts of interpretation. Second language users, too, exist within a precarious ambiguity that leaves them vulnerable to conceptualizations of *native-*

speaker comparisons and standardization practices. Therefore, the temptation to systematize their sense-making is fraught with latent biases and potential objectification. Likewise, the interpretation of gesture within settings of linguistic vulnerability requires that we tread lightly in looking for a utilitarian dimension that informs prescriptive norms in our assessment of gestures for academic purposes.

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Appendix A
Complex-Systems task instructions

Explanation Activity (40 minutes)

Instructions

Dear student,

You will be given a diagram and an explanation of different concepts in a packet. Study for 10 minutes. You may use your phone to look-up any words you don't know. Your job is to learn the concept as best as you can so that you can explain it to your partner.

This is not a test.

Explain as best you can focusing on the diagram(s). No one will grade you on how well you explain, just try and explain it and have fun!

There are 2 rounds.

- Round 1: Explain to your partner for 10 minutes using the diagrams. Then listen to your partner's explanation.
- Round 2: Find a new partner and explain to them WITHOUT the diagram for 10 minutes. You can use your hands and face to try and explain the concepts in the diagram. Let your partner explain their concept to you too.

Thanks for your participation and enjoy the activity!

Appendix B
Data tables

B-1 Complex-Systems corpus Session 1

(All preliminary year students)

Session.Round. Table	Duration mm:ss	#Participants (Gender: F/M)	Topics
1.1.1	05:12	3 (3F)	Osmosis 1-1
			Human heart 1-1
1.1.2	04:09	2 (2F)	Evolutionary complexity 1-1
			Idealism 1-1
1.1.3	04:49	2 (1F/1M)	Modern art 1-1
			Tectonic plate system 1-1
1.1.4	04:31	2 (1F/1M)	Flowering plant cycle 1-1
			Geology cycles 1-1
1.2.1	05:39	3 (3F)	Wittgenstein 1-1
			Osmosis 1-2
1.2.2	04:50	2 (F)	Modern art 1-2
			Idealism 1-2
1.2.3	04:50	2 (1F/1M)	Evolutionary complexity 1-2
			Tectonic plate system 1-2
1.2.4	05:43	2 (1F/1M)	Flowering plant cycle 1-2
			Geology cycles 1-2
1.3.1	05:41	3 (2F/1M)	Geology cycles 1-3
			Idealism 1-3
1.3.2	06:01	2 (F)	Osmosis 1-2
			Tectonic plate system 1-3
1.3.3	05:03	2 (F)	Human heart 1-3
			Evolutionary complexity 1-3
1.3.4	05:45	2 (F)	Flowering plant cycle 1-4
			Wittgenstein 1-2
1.4.1	05:20	3 (2F/1M)	Osmosis 1-4
			Evolutionary complexity 1-4
1.4.2	05:34	2 (F)	Flowering plant cycle 1-4
			Idealism 1-4
1.4.3	05:41	2 (F)	Human heart 1-4
			Modern art 1-4
1.4.4	05:29	2 (1F/1M)	Wittgenstein 1-4
n = 16	m = 05:13	n = 9(7F/2M)	

B-2 Complex-Systems corpus Session 2

(All preliminary year students)

Session.Round. Table	Duration mm:ss	#Participants (Gender: F/M)	Topics
2.1.1	07:26	3 (2F/1M)	Idealism 2-1
			Geology cycles 2-1
			Modern art 2-1
2.1.2	~10:00	2 (F)	Evolutionary complexity 2-1
			Osmosis 2-1
2.1.3	08:27	3 (F)	Human heart 2-1
			Flowering plant cycle 2-1
2.2.1	07:39	2 (1F/1M)	Idealism 2-2
			Human heart 2-2
2.2.2	09:48	2 (F)	Evolutionary complexity 2-2
			Modern art 2-2
2.2.3	08:17	2 (F)	Geology cycles 2-2
			Flowering plant cycle 2-2
			Osmosis 2-2
2.3.1	07:10	2 (F)	Osmosis 2-3
			Human heart 2-3
			Modern art 2-3
2.3.2	09:34	3 (F)	Evolutionary complexity 2-3
			Geology cycles 2-3
2.3.3	07:50	2 (1F/1M)	Idealism 2-3
			Flowering plant cycle 2-3
n = 9	m = 8:16	n = 8(7F/1M)	

B-3 Group Discussion corpus

PS = Pre-Sessional students; PY = Preliminary Year students.

Number and Topic	Participants	Duration
1. Business Ethics	PS 3F	9 minutes
2. Trends in Marketing	PS 2F/1M	9 minutes
3. Artificial Intelligence	PS 3F	9 minutes
4. Effects of birth order	PS 3F	9 minutes
5. Music industry challenges	PS 3F	9 minutes
6. The value of art in society	PS 4F	12 minutes
7. The value of art in society	PS 3F/1M	12 minutes
8. The value of art in society	PS 4F	12 minutes
9. Multiple Intelligence	PS 4F	12 minutes
10. Multiple Intelligence	PS 3F/1M	12 minutes
11. Alternative Medicine	PS 4F	12 minutes
12. Web 2.0	PY 3M	9 minutes
13. Web 2.0	PY 3M	9 minutes
14. Web 2.0	PY 4M	9 minutes
15. Augmented reality	PY 2F/1M	9 minutes
16. Augmented reality	PY 1F/2M	9 minutes
17. Drone technology	PY 1F/3M	12 minutes
	n = 58 (39F/19M)	

Appendix C
CAWSE information form, consent forms and ethics approval checklist

Participant Information Sheet

Research project: The University of Nottingham Ningbo China Corpus of Chinese Academic Written and Spoken English (UNNC-CAWSE)

Project leader: Dr Yu-Hua Chen (School of English, UNNC)

Dear Participant,

We wish to use data from teaching and learning activities that you take part in for a research project within the University of Nottingham Ningbo China (UNNC). The project aims to build a large collection, a corpus, of English language samples from the campus of UNNC. For this study, we will record written and spoken samples of your language use, using both audio/video-recording equipment. We will also collect information about your sociolinguistic/demographic background (such as gender, language experience, student ID number, staff e-mail address).

The audio and video data we collect will be made available in an open-access, online corpus to be used by researchers. However, your personal information will be stored confidentially and securely on computers in locked rooms within the School of English and/or in password-protected cloud space at UNNC. Your personal information will also remain hidden and anonymised. Your identity will not be disclosed in any use of the information you have supplied during the research; however you may be recognizable by voice or image in the audio and video recordings. Other qualified researchers and research students will also be working on the project and will also have access to the data after signing a non-disclosure agreement. Copies of some recordings may be made to facilitate work between the different members of the research group. Once all the data has been collected, the final anonymised recordings will be prepared and uploaded to the online corpus available for all researchers and practitioners who are interested in a wide range of topics. These recordings, along with still photographs from video, may be shown publicly for teaching and research purposes, including seminars and/or conferences, as well as the project website(s).

Your participation in the research is entirely voluntary. You will be given a consent form to sign. You are able to withdraw from the research at any time and to request that the information you have provided is not used in the project. Withdraw from participation in the research will not affect your academic standing in any way. Once the project has finished, all personal information will be kept by the lead researcher (Dr. Yu-Hua Chen) and access will be granted only to those professional researchers who collaborated on the project.

The research project has been reviewed according to the ethical review processes in place in the University of Nottingham Ningbo. These processes are governed by the University's Code of Research Conduct and Research Ethics. Should you have any questions now or in the future, please contact the principal researcher, Dr. Yu-Hua Chen. Should you have concerns related to the conduct of the project or research ethics, please contact the University's Ethics Committee.

Yours sincerely,

Yu-Hua Chen

Contact details:

Project Leader: Dr Yu-Hua Chen (yu-hua.chen@nottingham.edu.cn)

Co-investigators: Dr Simon Harrison (simon.harrison@nottingham.edu.cn)
Dr David Oakey (david.oakey@nottingham.edu.cn)
Dr Shanru Yang (shanru.yang@nottingham.edu.cn)

University Research Ethics Committee Coordinator, Ms. Joanna Huang
(joanna.huang@nottingham.edu.cn)

参与者声明

研究项目: 宁波诺丁汉大学中国书面及口头学术英语语料库

首席研究员: Yu-Hua Chen 博士 (宁波诺丁汉大学英语系)

尊敬的参与者,

我们的调研项目希望使用您参与的学生测评/教与学活动的数据,此次调研项目将在中国宁波诺丁汉大学校内进行。本次研究项目旨在创建一个由宁诺校区学生英语使用样本组成的大型语料库。在研究过程中,我们将会使用音频/视频设备记录您书面及口头语言使用。此外,我们也将需要采集您的社会语言学/人口统计学相关信息 (如性别,语言学习经历,学生证号或教师邮箱等)。

我们收集的音频和视频数据,将被上传至本次调研项目建立的线上语料库中,以便于世界各地的研究人员查阅使用。但是,您提供的个人信息将被保密且安全地储存在英语系办公室的电脑上或由密码保护的宁诺云空间中。您的个人信息会做匿名处理,我们在使用您所提供的信息过程中决不会涉及您的身份,但您的声音和外貌有经由音频或视频被辨认出的可能性。参加本项研究的其他合格研究员及做研究的学生在签订保密协定后也将有权查看该数据。此外,为了协助研究组内各研究员之间的工作交流,有些资料也将会有副本存在。所有数据信息采集完毕后将被进行匿名处理,并整理上传至线上语料库,以便于所有研究人员及感兴趣的相关工作者查阅。这些音频视频,包括视频中截取的照片, 将会在教学及学术研究场景中公开(其中包括讨论课和研讨会),以及本项目的网站。

您此次的参与是完全遵循自愿原则的。您将会签署一份调研同意书。您可以随时无条件退出本次调研,并要求撤回您所提供的所有信息。您的退出绝不会影响现在以及将来的学术身份以及在校状况。研究项目结束后,所有个人隐私相关数据将由领导研究员(Yu-Hua Chen 博士)保管,并且只有参与此项目的专业研究人员有权查阅。

宁波诺丁汉大学已根据研究道德检查程序对这项研究项目进行审查。具体审查程序参照大学研究行为和研究道德的行为标准。如果您现在或将来有任何疑问,请联系领导研究员 Yu-Hua Chen 博士。如果您对该项目中的研究行为或研究道德有任何质疑,请联系宁波诺丁汉大学伦理委员会。

此致,

Yu-Hua Chen

联系信息

领导研究员: Yu-Hua Chen 博士 (yu-hua.chen@nottingham.edu.cn)

辅助研究员: Simon Harrison 博士 (simon.harrison@nottingham.edu.cn)
David Oakey 博士 (david.oakey@nottingham.edu.cn)
Shanru Yang 博士 (shanru.yang@nottingham.edu.cn)

诺丁汉大学研究道德委员会秘书: Joanna Huang 女士
(Joanna.Huang@nottingham.edu.cn)

Research project: The University of Nottingham Ningbo China Corpus of Chinese Academic Written and Spoken English (UNNC-CAWSE)

Project leader: Dr. Yu-Hua Chen (School of English, UNNC)

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.

- I understand the purpose of the research project and my involvement in it.

- I understand that I may withdraw from the research project at any stage and such withdrawal will in no way affect my academic status or standing in the university, now or in the future.

- I understand that I may be video- and audio-recorded in different situations related to teaching and learning, and these recordings will be made available in the online corpus for future researchers.

- I understand that personal information such as my name and student number, along with references to these in the data, will be anonymised, but that I may be recognizable by voice or image in the audio and video recordings that will be made available in the online corpus by project members and researchers.

- I understand that the video (including still photographs from video), audio, and written samples, as well as information about my sociolinguistic/demographic background (such as gender, language experience), will be made publicly available for purposes of research, teaching (including seminars and/or conferences), and/or project website(s).

- I understand that the data will be stored in accordance with data protection laws.

- I understand that I may contact the researcher if I require more information about the research, and that I may contact the Research Ethics Sub-Committee of the University of Nottingham, Ningbo if I wish to make a complaint related to my involvement in the research.

Signed ………………………………………………………………. (participant)

Print name ………………………………………….**Date** ………………………

Student ID number (for student only)………………………………………….

Staff E-mail address (for staff only) ……………………………………………….

Contact details

Project leader: Dr Yu-Hua Chen (yu-hua.chen@nottingham.edu.cn)
Co-investigators: Dr Simon Harrison (simon.harrison@nottingham.edu.cn)
Dr David Oakey (david.oakey@nottingham.edu.cn)
Dr Shanru Yang (shanru.yang@nottingham.edu.cn)
UNNC Research Ethics Sub-Committee Coordinator: (joanna.huang@nottingham.edu.cn)

参与者同意书

项目标题　.........宁波诺丁汉大学中国书面及口头学术英语语料库.........

领导研究员　… Yu-Hua Chen 博士(宁波诺丁汉大学英语系)…

- 本人已阅读声明，项目组织者已经给我解释了研究项目的性质和宗旨。本人理解并同意参与。
- 本人理解项目的目的和在项目中的参与作用。
- 本人明白可以在研究项目的任何阶段退出，不会因此影响现在以及将来的学术身份以及在校状况。
- 本人知道我将会在与教学相关的各种情形下被录音和录像，这些录音和录像文件将被上传至本次调研项目建立的线上语料库中，以便于所有研究人员及感兴趣的相关工作者查阅。
- 本人了解我的个人信息(如姓名，学生证号)以及与此相关的数据将经过匿名处理，但有经由录音或录像被辨认出的可能性。项目成员及相关研究者可通过线上语料库查阅这些音频视频。
- 本人了解我的音频视频(包括视频中截取的照片)和书面语言样本数据，以及我的社会语言学/人口统计学信息(如性别，语言学习经历)将被存储在本次调研项目的网站上，未来会是开放的资源被用于研究，教学(包括讨论课和研讨会)。
- 本人了解被采集的数据会根据数据保护相关法律进行存储。
- 本人知道，若需要进一步有关研究的信息可以联系研究者；若需要对参与研究过程提出投诉则可以联系宁波诺丁汉大学科研伦理小组委员会。

参与者姓名..

参与者签名…………………………………………………………………………………………

学生证号 （仅适用于学生）…………………………………………………

邮件地址 （仅适用于教师）…………………………………………………

日期…………………………………………………………………………………………．

联系方式

领导研究员： Yu-Hua Chen 博士 (yu-hua.chen@nottingham.edu.cn)

辅助研究员： Simon Harrison 博士 (simon.harrison@nottingham.edu.cn)
David Oakey 博士 (david.oakey@nottingham.edu.cn)
Shanru Yang 博士 (shanru.yang@nottingham.edu.cn)

诺丁汉大学研究道德委员会秘书： Joanna Huang 女士
(joanna.huang@nottingham.edu.cn)

University of Nottingham Ningbo

Research Ethics Checklist for Staff and Research Students

[strongly informed by the ESRC (2012) *Framework for Research Ethics*]

A checklist should be completed for **every** research project or thesis where the research involves the **participation of people**, **the use of secondary datasets or archives relating to people and/or access to field sites or animals**. It will be used to identify whether a full application for ethics approval needs to be submitted.
You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate administrative staff.

The principal investigator or, where the principal investigator is a student, the supervisor, is responsible for exercising appropriate professional judgement in this review.

Completing the form includes providing brief details about yourself and the research in Sections 1 and 2 and ticking some boxes in Sections 3 and/or 4, 5, 6. **Ticking a shaded box in Sections 3, 4, 5 or 6 requires further action by the researcher**. Two things need to be stressed:

- Ticking one or more shaded boxes does **not** mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.

- Avoiding the shaded boxes does **not** mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics - for everyone and in every project – should involve an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

SECTION 1: THE RESEARCHER(S)

1.1: Name of principal researcher: Dr. Yu-Hua Chen

1.2: Status: ☒ Staff

☐ Postgraduate research student

1.3: School/Division: School of English

1.4: Email address: yu-hua.chen@nottingham.edu.cn

1.5: Names of other project members (if applicable): Dr. Simon Harrison

1.6: Names of Supervisors (if applicable):

	Yes	No

1.7: I have read the University of Nottingham's *Code of Research Conduct and Research Ethics* (2010) and agree to abide by it: http://www.nottingham.edu.cn/en/research/researchethics/ethics-approval-process.aspx	☒	☐
1.8: (If applicable) I have read the University of Nottingham's *e-Ethics@Nottingham: Ethical Issues in Digitally Based Research* (2012) and agree to abide by it. http://www.nottingham.edu.cn/en/research/documents/e-ethics-at-the-university-of-nottingham.pdf	☒	☐
1.9: When conducting research on people (Section 5) I will prepare both a *participant consent form* as well as a *participant information sheet.* I am aware that the following templates are available on the Ethics webpage: http://www.nottingham.edu.cn/en/research/researchethics/ethics-approval-process.aspx • Participant consent form 1 • Participant Information Sheet English and Chinese	☒	☐

SECTION 2: THE RESEARCH

2.1: **Title of project:** University of Nottingham Ningbo China - Corpus of Academic Written and Spoken English (UNNC-CAWSE)

Please provide brief details (50-150 words) about your proposed research, as indicated in each section

2.2: **Research question(s) or aim(s)**

The aim of this project is to build a large collection of students' English language samples from the University of Nottingham Ningbo China (UNNC). As one of the few EMI (English-medium instruction) universities in China, UNNC creates a unique environment for teaching and learning and also provides exciting opportunities for linguistic studies into Academic English from diverse theoretical and analytical perspectives. The final product of UNNC-CAWSE, therefore, will offer open-access electronic resources (including a multi-modal pilot corpus) available for all researchers and practitioners who are interested in a wide range of topics, including for example Second Language Acquisition, English for Academic Purposes, World Englishes, and many other aspects of the Written and Spoken English unique to this new corpus. The research project is funded by the Ningbo 3315 grant with an award of 1,000,000rmb to Dr. Yu-Hua Chen, Assistant Professor of Applied Linguistics and English Language Teaching within the School of English at the University of Nottingham Ningbo China.

2.3: **Summary of method(s) of data collection**

The data collected for this project will be of three main kinds: written, oral, and multimodal (meaning oral-gestural). The written data will be collected from

samples of students' written work, produced either as part of coursework (e.g. essays) or other academic activities (e.g. learning logs). We will use audio recorders to collect samples of oral data, and we will use video recorders to collect our multimodal data. In the case of assessed coursework or presentations, marks and tutors' written feedback may be collected as part of the metalinguistic data. As an additional fourth method of data collection, we also plan to conduct post-study questionnaires and/or post-study interviews where relevant.

2.4: **Proposed site(s) of data collection**

In the first stage of the project, the campus at the University of Nottingham Ningbo China is the principal site of data collection. At a later stage, we may wish to extend our investigation beyond the confines of UNNC, at which point we would consult with the relevant ethical committees and submit a revised ethics approval form as appropriate.

2.5: **How will access to participants and/or sites be gained?**

The Centre for English Language Education (CELE) has agreed to work with the researchers on this project as the main collection site for our data at UNNC, and therefore, the Director of CELE is the Gatekeeper for our data. Over the course of the project, we will be working closely with the Director of CELE (currently Richard Silburn). Additionally, we have developed this research ethics application in close consultation with and approval from the CELE Head of Assessment (currently Jeanne O'Connell) and the CELE Ethics Officer (currently Dr. Godwin Ioratim-Uba).

For the pilot data that we wish to collect this Academic Year 2015-2016, please note that all students in the Centre for English Language Education (CELE) were informed that the samples of written and spoken language that they submitted to CELE during their preliminary year for assessment and other purposes could be used for teaching and learning development as well as research, and at that point, they were also given the choice to opt in or out of consent. With permission from the Gatekeeper and in consultation with the CELE Ethics Officer (see above), our research project will therefore fall within the remit of CELE Ethical procedures and comply with the purposes for which the students have already given consent for their data to be used.

There are two exceptions to this. The first exception arises because we wish to collect information from our participants that was not originally collected when they gave consent to participate in the research. This involves basic demographic information (e.g. age, gender, educational background) and sociolinguistic information (e.g. mother tongue, level of English, years of experience using English as medium of instruction). We intend to collect this data along with consent to use it by circulating a post-study questionnaire or conducting a post-study interview with the participants whose original linguistic data we wish to use in our research. The additional demographic and sociolinguistic data would be managed so that its consequent analysis and presentation would be anonymous.

The second exception arises because we wish to use the video data in a way that the Center for English Language Education did not originally specify. The solutions

and safeguards for this are described below when relevant issues arise in the checklist (see response to Section 6.38).

From Autumn semester 2016 onwards when the project is expected to collect data on a much larger scale, an agreement has been reached in consultation with our Gatekeeper and the CELE Ethics Officer that the specific features of our project will be added to the CELE information and ethics forms. Drafts of the 'Participant Information Sheet' and the 'Participant Consent Form' that would be used in these cases are therefore included in this application of ethics approval (See more details in 6.38).

In terms of tutors' written feedback, as agreed with the CELE Director, the feedback may be collected as part of the metalinguistic data. As also agreed with the CELE Ethics Officer, we will request informed consent from the tutors involved too.

SECTION 3: RESEARCH INVOLVING USE OF SECONDARY DATASETS OR ARCHIVES RELATING TO PEOPLE

If your research involves use of secondary datasets or archives relating to people all questions in Section 3 **must** be answered. If it does not, please tick the 'not relevant' box and go to Section 4.

NOT RELEVANT	☒

Please answer each question by ticking the appropriate box.

	Yes	No
3.1: Is the risk of disclosure of the identity of individuals low or non-existent in the use of this secondary data or archive?	☐	☐
3.2: Have you complied with the data access requirements of the supplier (where relevant), including any provisions relating to presumed consent and potential risk of disclosure of sensitive information?	☐	☐

SECTION 4: RESEARCH INVOLVING ACCESS TO FIELD SITES AND ANIMALS

If your research involves access to field sites and/or animals all questions in Section 4 **must** be answered. If it does not, please tick the 'not relevant' box and go to Section 5.

NOT RELEVANT	☒

Please answer each question by ticking the appropriate box.

	Yes	No
4.1: Has access been granted to the site?	☐	☐
4.2: Does the site have an official protective designation of any kind?	☐	☐
If yes, have the user guidelines of the body managing the site a) been accessed?	☐	☐
b) been integrated into the research methodology?	☐	☐

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4.3: Will this research place the site, its associated wildlife and other people using the site at any greater physical risks than are experienced during normal site usage?	☐	☐
4.4: Will this research involve the collection of any materials from the site?	☐	☐
4.5: Will this research expose the researcher(s) to any significant risk of physical or emotional harm?	☐	☐
4.6: Will the research involve vertebrate animals (fish, birds, reptiles, amphibians, mammals) or the common octopus (*Octopus vulgaris*) in any capacity?	☐	☐
If yes, will the research with vertebrates or octopi involve handling or interfering with the animal in any way or involve any activity that may cause pain, suffering, distress or lasting harm to the animal?	☐	☐

SECTION 5: RESEARCH INVOLVING THE PARTICIPATION OF PEOPLE

If your research involves the participation of people all questions in Section 4 **must** be answered.

Please answer each question by ticking the appropriate box.

A. General Issues

	Yes	No
5.1: Does the study involve participants age 16 or over who are unable to give informed consent? (e.g. people with cognitive impairment, learning disabilities, mental health conditions, physical or sensory impairments?	☐	☒
5.2: Does the research involve other vulnerable groups such as children (**aged under 16**) or those in unequal relationships with the researcher? (e.g. your own students)	☒	☐
5.3: Will this research require the cooperation of a gatekeeper* for initial access to the groups or individuals to be recruited?	☒	☐
5.4: Will this research involve discussion of sensitive topics (e.g. sexual activity, drug use, physical or mental health)?	☐	☒
5.5: Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?	☐	☒
5.6: Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?	☐	☒
5.7: Will this research involve people taking part in the study without their knowledge and consent at the time?	☐	☒
5.8: Does this research involve the internet or other visual/vocal methods where people may be identified?	☒	☐
5.9: Will this research involve access to personal information about identifiable individuals without their knowledge or consent?	☐	☒

5.10: Does the research involve recruiting members of the public as researchers (participant research)?	☐	☒
5.11: Will the research involve administrative or secure data that requires permission from the appropriate authorities before use?	☐	☒
5.12: Is there a possibility that the safety of **the researcher** may be in question?	☐	☒
5.13: Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?	☐	☒

Gatekeeper- a person who controls or facilitates access to the participants

In response to how we plan to deal with the issues raised in the shaded boxes:

5.2. i.e. Does the research involve other vulnerable groups such as children (**aged under 16**) or those in unequal relationships with the researcher? (e.g. your own students)

The data we collect will primarily be from Centre for English Language Education (CELE) students, some of whom will go on to become our students in the School of English after their preliminary year. Furthermore, as School of English staff we contribute on some modules run in CELE, so there is a possibility that students who participate in this research may also be students whom we teach. Moreover, when we extend our data collection beyond CELE, we may explicitly collect data within the School of English. This could mean collecting data from our own students.

We plan to deal with this problem in the following ways. First of all, collection of consent from the students will not be done by the researchers on the project— consent will be collected via sheets distributed at general information sessions run by personal tutors, program coordinators, and teachers other than the lead researchers on the project, or electronically via a dedicated page set up on Moodle (such as is done by CELE during their preliminary year induction sessions, actually making data collection for the current project already ethically approved via our Gatekeeper). In the case that we do need to collect consent outside of such a session (this kind of case is discussed below in response to point 3.8.), we will ask an intern, PhD student, or other assistants working on the project to collect the consent for us. We feel that both these measures will minimise pressure on the students to participate, and they will minimise the chance of students inaccurately perceiving a causal relationship between giving consent to take part in the research and their relationship to tutors and grading practices.

Furthermore, all data will be processed and anonymised before analysis. This means that the lead researchers (and potential teachers of the participants) will be working with anonymised data and not the personal details of the students.

5.3: Will this research require the cooperation of a gatekeeper* for initial access to the groups or individuals to be recruited?

Please see Section 2.5. above.

5.8. Does this research involve the internet or other visual/vocal methods where people may be identified?

This research involves the internet because the data we collect will be used to compile open-access electronic resources available for all researchers and practitioners who are interested in and have legitimate reasons for doing research on our data. We explain this point in more detail below (see response to point 6.38).

The research involves other visual/vocal methods too, because the data for this project will be collected in collaboration with CELE by using both audio and video recording equipment. All participants in this research will have been made fully aware of the visual and vocal nature of the data we are collecting, as well as the methods we are using to collect the data (see response to 2.5. above).

B. Before starting data collection

	Yes	No
6.12: My full identity will be revealed to all research participants.	☒	☐
6.13: All participants will be given accurate information about the nature of the research and the purposes to which the data will be put. (*An example of a Participant Information Sheet is available for you to amend and use* at xxxxx) *http://www.nottingham.edu.cn/en/research/documents/participant-information-sheet-in-english-and-chinese.doc*	☒	☐
6.14: All participants will freely consent to take part, and, where appropriate, this will be confirmed by use of a consent form. (An example of a Consent Form is available for you to amend and use at: http://www.nottingham.edu.cn/en/research/researchethics/ethics-approval-process.aspx)	☒	☐
6.15: All participants will freely consent to take part, but due to the qualitative nature of the research a formal consent form is either not feasible or is undesirable and alternative means of recording consent are proposed.	☐	☒
6.16: A signed copy of the consent form or (where appropriate) an alternative record of evidence of consent will be held by the researcher.	☒	☐
6.17: It will be made clear that declining to participate will have no negative consequences for the individual.	☒	☐
6.18: Participants will be asked for permission for quotations (from data) to be used in research outputs where this is intended.	☒	☐
6.19: I will inform participants how long the data collected from them will be kept.	☒	☐
6.20: Incentives (other than basic expenses) will be offered to potential participants as an inducement to participate in the research. (Here any incentives include cash payments and non-cash items such as vouchers and book tokens.)	☐	☒
6.21: For research conducted within, or concerning, organisations (e.g. universities, schools, hospitals, care homes, etc) I will gain authorisation in advance from an appropriate committee or individual.	☒	☐

C. During the process of data collection

	Yes	No

	Yes	No
6.25: I will provide participants with my University contact details, and those of my supervisor (*where applicable*) so that they may get in touch about any aspect of the research if they wish to do so.	☒	☐
6.26: Participants will be guaranteed anonymity only insofar as they do not disclose any illegal activities.	☒	☐
6.27: Anonymity will not be guaranteed where there is disclosure or evidence of significant harm, abuse, neglect or danger to participants or to others.	☒	☐
6.28: All participants will be free to withdraw from the study at any time, including withdrawing data following its collection.	☒	☐
6.29: Data collection will take place only in public and/or professional spaces (e.g. in a work setting)	☒	☐
6.30: Research participants will be informed when observations and/or recording is taking place.	☒	☐
6.31: Participants will be treated with dignity and respect at all times.	☒	☐

D. After collection of data

	Yes	No
6.32: Where anonymity has been agreed with the participant, data will be anonymised as soon as possible after collection.	☒	☐
6.33: All data collected will be stored in accordance with the requirements of the University's Code of Research Conduct	☒	☐
6.34: Data will only be used for the purposes outlined within the participant information sheet and the agreed terms of consent.	☒	☐
6.35: Details which could identify individual participants will not be disclosed to anyone other than the researcher, their supervisor and (if necessary) the Research Ethics Panel and external examiners without participants' explicit consent.	☒	☐

E. After completion of research

	Yes	No
6.37: Participants will be given the opportunity to know about the overall research findings.	☒	☐
6.38: All hard copies of data collection tools and data which enable the identification of individual participants will be destroyed.	☐	☒

In response to how we plan to deal with the issues raised in the shaded boxes:

6.38: i.e. All hard copies of data collection tools and data which enable the identification of individual participants will be destroyed.

The uniqueness and value of this project—the UNNC Corpus of Academic Written and Spoken English (CAWSE)—lies in the fact that the final product of UNNC-CAWSE will offer open-access electronic resources available for all researchers and practitioners who are interested in doing research on our data (i.e. a wide range of topics, including for example Second Language Acquisition, English for

Academic Purposes, World Englishes, and many other aspects of the Written and Spoken English unique to this new corpus).

It is important to note that 'Open-Access' does not mean 'freely available on the internet'. As with other such projects (see below), researchers wishing to use data collected by the UNNC-CAWSE project will need to apply for access codes and passwords to gain access to the data. Alternatively they must purchase a CD-Rom. During this application process, applicants need to provide credentials for legitimate use of the data, as well as sign an agreement to use the data only in ways specified by the lead researcher on the CAWSE project. This agreement will mean that researchers who are granted access to the corpus will not be able to share the data outside of the terms of the agreement, such as to upload onto the internet or to make copies to distribute on their own.

This format is increasingly common in linguistic research at cutting-edge institutes. Examples of open-access corpora for studies in Applied Linguistics include the International Corpus of English (currently hosted by the Chinese University of Hong Kong) and the International Corpus of Learner English (currently hosted by Université catholique de Louvain). Although those corpora do not provide explicit information about ethics on their public websites, they exemplify the way the data is not actually available without a detailed application and vetting process:

The International Corpus of English (ICE)
http://www.ice-corpora.net/ice/

The International Corpus of Learner English (ICLE)
http://www.uclouvain.be/en-cecl-icle.html

Alternatively, the researchers on this project may develop an online interface with search functionality to allow researchers/practitioners to conduct corpus enquiries without having to download the data. This type of access will only allow viewing of fractions of the whole corpus data. Often a registration process which verifies credentials such as work email addresses may be required to allow a larger number of online queries per day. Some examples of such open-access corpora include the following:

Corpus of Contemporary American English (COCA)
http://corpus.byu.edu/coca/

British Academic Written English Corpus (BAWE)
British Academic Spoken English Corpus (BASE)
https://the.sketchengine.co.uk/open/

Michigan Corpus of Upper-level Student Papers (MICUSP)
http://micusp.elicorpora.info/

Michigan Corpus of Academic Spoken English (MICASE)
http://quod.lib.umich.edu/m/micase/

Because some of the samples of language collected on this project will be audio-visual, meaning that the students will be visible and potentially recognisable in the data (see response to 5.8. above), the researchers on this project in consultation with the CELE Ethics Officer have agreed that an additional information form and consequent choice to opt in or out of consent must be provided specifically to those students whose samples of audio-visual data could later be accessible through our open-access corpus. This is only necessary for any

such data collected during the 2015-2016 year, because from Autumn semester 2016 onwards, an agreement has been reached in consultation with our Gatekeeper and the CELE Ethics Officer that a note about this specific feature of our project can be added to the CELE information and ethics forms.

We are therefore including drafts of the 'Participant Information Sheet' and the 'Participant Consent Form' that would be used in these cases. The same precautions in informing students and requesting consent will be taken as outlined in response to Section 5.2. above.

*If you have **not** ticked any shaded boxes,* please send the completed and signed form to the School's Research Ethics Officers, with any further required documents, for approval and record-keeping.

If you have ticked any shaded boxes **you will need to describe more fully how you plan to deal with the ethical issues raised by your research**. Issues to consider in preparing an ethics review are given below. Please send this completed form to the Research Ethics Officer who will decide whether your project requires further review by the UNNC Research Ethics Sub-Committee and/or whether further information needs to be provided.
Please note that it is your responsibility to follow the University's **Research Code of Conduct** and any relevant academic or professional guidelines in the conduct of your study. **This includes providing appropriate information sheets and consent forms, and ensuring confidentiality in the storage and use of data. For guidance and UK regulations on the latter, please refer to** the *Data Protection Policy and Guidelines* of the University of Nottingham:

Policy - http://www.nottingham.ac.uk/%7Ebrzdpa/local/dp-policy.doc

Guidelines -http://www.nottingham.ac.uk/~brzdpa/local/dp-guidance.doc

Any significant change in the project question(s), design or conduct over the course of the research should be notified to the School Research Ethics Officer and may require a new application for ethical approval.

Signature of Principal Investigator/Researcher:
Signature of Supervisor (where appropriate):
Date

Research Ethics Panel response

√   the research can go ahead as planned

☐   further information is needed on the research protocol (see details below)

☐   amendments are requested to the research protocol (see details   below)

School REO   (School of Education REO)   Date April 29th 2016

A. LIST OF POINTS TO CONSIDER WHEN SUBMITTING AN ETHICS REVIEW (taken from ESRC (2012) *Framework for Research Ethics*).

Risks
1. Have you considered risks to:
      the research team?
      the participants? *Eg harm, deception, impact of outcomes*
      the data collected? *Eg storage, considerations of privacy, quality*
      the research organisations, project partners and funders involved?
2. Might anyone else be put at risk as a consequence of this research?
3. What might these risks be?
4. How will you protect your data at the research site and away from the research site?
5. How can these risks be addressed?

Details and recruitment of participants
6. What types of people will be recruited? *Eg students, children, people with learning disabilities, elderly?*
7. How will the competence of participants to give informed consent be determined?
8. How, where, and by whom participants will be identified, approached, and recruited?
9. Will any unequal relationships exist between anyone involved in the recruitment and the potential participants?
10. Are there any benefits to participants?
11. Is there a need for participants to be de-briefed? By whom?

Research information
12. What information will participants be given about the research?
13. Who will benefit from this research?
14. Have you considered anonymity and confidentiality?
15. How will you store your collected data?
16. How will data be disposed of and after how long?
17. Are there any conflicts of interest in undertaking this research? *Eg financial reward for outcomes etc.*
18. Will you be collecting information through a third party?

Consent
19. Have you considered consent?
20. If using secondary data, does the consent from the primary data cover further analysis?
21. Can participants opt out?
22. Does your information sheet (or equivalent) contain all the information participants need?
23. If your research changes, how will consent be renegotiated?

Ethical procedures
24. Have you considered ethics within your plans for dissemination/impact?
25. Are there any additional issues that need to be considered ? *Eg local customs, local 'gatekeepers', political sensitivities*
26. Have you considered the time you need to gain ethics approval?

27. How will the ethics aspects of the project be monitored throughout its course?
28. Is there an approved research ethics protocol that would be appropriate to use?
29. How will unforeseen or adverse events in the course of research be managed?
Eg do you have procedures to deal with any disclosures from vulnerable participants?