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INTRODUCTION

Language acquisition in interaction

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For more than 40 years, Professor Eve V. Clark has been teaching Introduction to Language Acquisition in the Department of Linguistics at Stanford University. It is known as one of the most demanding and work-intensive classes in the department. Students (both undergraduate and graduate) go to a nursery school every week to work on their class assignments. They collect conversational data and transcribe it, run small experiments, and write essays addressing theoretical questions. The format of the class reflects one of Eve's foundational contributions to the field of language acquisition – an emphasis on interpersonal interaction as a driving force in how children learn to talk. Eve's work has consistently highlighted the importance of looking at conversational exchanges between children and adults, and of studying language acquisition as it occurs within those conversations.

An emphasis on the role of interaction in learning was rare when Eve started out her academic career in the 1960's. In the context of Universal Grammar – with its focus on innate and abstract linguistic knowledge – few studies examined the ways in which interaction and communication shape the acquisition process. But Eve's stance on the essential role of interaction set her apart, impacting the research questions she asked and the methods she used to study them. In her seminal work, Eve showed how pragmatic forces affect children's assignment of meaning. Existing theories suggested that innate constraints guide how children learn unfamiliar words. Meaning is considered to be assigned through the application of constraints like the Whole-object assumption (Markman & Wachtel, 1988) or the Basic-level assumption (Mervis, 1984). Eve proposed instead that two pragmatic principles guides children's acquisition of meaning: The principle of Contrast – different forms have different meanings – and the more general principle of Conventionality – learning language involves learning the linguistic conventions of your speech community (Clark, 1983; Clark, 1987; Clark, 1990a). Together, these principles provided a general theory of lexical development that goes beyond the acquisition of concrete nouns. The principles make concrete predictions about how children acquire various linguistic elements (nouns, verbs, adjectives,

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particles, constructions) by analysing their attribution of meaning in different interactional contexts.

Among the many domains Eve examined are relational terms such as *before* and *after*, and locative and orientation terms such as *on* vs. *under,* the meanings of which are not easily constrained by perceptible features of events or states (e.g., Clark, 1971; 1972; 1973; Clark & Garnica, 1974). Her work on this topic carefully outlined the gradual steps young learners take towards constructing a complex semantic network. Children first latch onto frequently-used and conceptually more accessible terms, and then generalize the use of these terms unless they receive evidence of competing, and more conventionalized forms to express a subset of the meaning (e.g., Clark, 1971; 1973; 1977; 1983; 1987; 1990a; 1993).

A crucial assumption behind this proposal is that lexical knowledge does not only consist of simple associations of word forms and their denotations (e.g., objects and actions). By choosing a word, the speaker chooses a perspective that highlights properties pertinent to the goal of the discourse (e.g., *before* vs. *after*, *front* vs. *back*, *come* vs. *go, the dog vs. my friend* when referring to the same pet dog). Word learning, therefore, inevitably includes acquiring knowledge about how a given word uniquely specifies the speaker's perspective, as well as pragmatic reasoning as to why the speaker picked the word in the context at hand. Eve's work has illuminated the multitude of ways in which children and adults collaboratively embark on this task of word learning, which leads to the acquisition of paradigmatic relationships between words (e.g., *dog* vs. *cat*) as well as taxonomic relationships (e.g., *dog* vs. *pet*) or context-dependent choices of referential expressions (e.g., *dog* vs. *he*) (e.g., Clark, 1990b, 1997).

Eve's work provides many examples from spontaneous conversational exchanges to show that children and adults go through countless sequences of questions, clarifications, and ratification, all gravitating towards negotiation of mutual understanding. Her examples also illustrate how children actively use their current word-forming resources to coin terms for things they have no word for yet (e.g., *plate-egg* for a fried egg; Clark, Gelman & Lane, 1985; Clark & Berman, 1984; Clark & Hecht, 1982; see also Clark & Clark, 1979 for examples of adults' creative uses of nouns as verbs). Likewise, in comprehension, children assign novel forms they hear to fill gaps in their lexical knowledge (e.g., Clark, 1987; Clark, 1990a). Communication thus guides children to innovatively expand their lexicon while also motivating them to give up idiosyncratic word uses.

Over the years, more work in linguistics and psychology has acknowledged the importance of communication in language learning and change. This shift in perspective was impacted by the development of new theoretical paradigms that emphasized the links between language use and language structure (e.g., Barlow & Kemmer, 2000; Bates & McWhinney, 1982; DuBois, Kumpf, & Ashby, 2003; Fox,

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Jurafsky, & Mchaelis, 1999; Goldberg, 1995; Tomasello, 1998, 2003a). In particular, the development of usage-based approaches to language learning (e.g., Tomasello, 2003b), and the expansion of tools for studying children in interactional contexts have led to an increased interest in the role of interaction in language learning. The development of large-scale corpora collections like CHILDES (MacWhinney, 2000) has allowed researchers to examine children's conversational settings in detail, tracking the way interactional settings and input statistics impact learning trajectories (e.g., Clark & Kelly, 2006; Goldberg, 2006; Tomasello, 2003b).

In recent years, the role of interaction and communication has been investigated in domains as diverse as word learning (e.g., Frank, Goodman, & Tenenbaum, 2009), statistical learning (e.g., Lieven, 2010), lexical and grammatical development (e.g., Berman & Slobin, 1994; Goldberg 2006), and the content of speech directed toward children (e.g., Chounaird & Clark, 2003; Clark & Bernicot, 2008). The idea that communicative needs and pressures play an important role in shaping how we learn and use language has been applied not only in first language acquisition, but also in the study of cross-linguistic or cross-situational variation (e.g., Arnon & Clark, 2011; Evans & Levinson, 2009); the relation between learnability and the typological distribution of word order and case-marking (e.g., Culbertson et al., 2012; Fedzechkina et al., 2012), the cultural evolution of language (e.g., Griffiths, Kalish & Lewandowsky, 2008; Kirby, 2011; Scott-Phillips & Kirby, 2010) and the relation between human's socio-pragmatic skills and their unique language capacity (e.g., Herrmann et al., 2007).

Despite recent heightened interest, however, there are many open questions about the way interaction impacts language learning. One challenge is to turn our knowledge about the effect of *input* on language learning into a theory on *interaction,* which captures reciprocal and spacio-temporally coordinated nature of adult-child conversations. In many studies, looking at input means pooling together types and tokens of particular sounds, words or constructions. While informative, a great deal of information is lost in this process of abstraction about why and how each piece of linguistic data was given at each point of time. Another challenge has to do with the definition of the interactional context: to study the effect of interaction we need to clearly define what the relevant context is and how it may differ across speakers and communicative goals. A further challenge is to examine how interactional patterns differ between populations (e.g., monolinguals vs. bilinguals, Western vs. non-Western societies) and learning situations. As in many domains, a lot of our knowledge about what interactional contexts comes from a rather restricted pool of participants. A theory of interaction in language acquisition must account for both the consistency and variability across different learners and learning situations.

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With various collaborators, Eve has touched upon many of these issues. She provided detailed analyses of how adults talk to young children at different stages of language development. She asked questions such as: How do adults maintain children's attention and invite them into interactions (Estigarribia & Clark, 2007)? How do they introduce new words and new information in common ground (Clark & Wong, 2002; Clark & Amaral, 2010)? How do they ratify children's utterances and recast incorrect usages (Chouinard & Clark, 2003; Clark, 2004, 2007; Clark & Bernicot, 2008; Clark, 2010, Clark & de Marneffe, 2012)? Eve and her colleagues have also looked at the paralinguistic cues used to mark communicative intent in conversations with children, such as prosody, gestures, gaze, and facial expressions (Clark, 1978; 1980; 2001; Clark & Estigarribia, 2011).

In this book, we hope to both pay tribute to Eve's long-standing and significant contributions to the field of language acquisition while also presenting a timely response to the field's renewed interest in the social and interactional aspects of language learning. We focused on several challenges facing the study of interactional effects on language learning. In the first part, we ask what constitutes an interactional context and how this differs across languages and speakers (e.g., monolingual and bilingual, high and low socio-economic status). In the second part, we examine the range of paralinguistic cues available to children (joint attention, gaze, gesture) and ask how these cues affect language learning, and how the effects may differ for different populations (e.g., hearing vs. deaf children). In the third part, we ask how pragmatic forces impact the course of language learning in several domains (bilingual language choice, word learning, construction learning). In the fourth part, we consider interaction more broadly to ask what role it plays in adult language use and in language change. Together, these four parts provide us with a comprehensive view of the role interaction in language acquisition while also highlighting the challenges of conducting research on such a multi-dimensional aspect of human behavior.

The five chapters in Part 1: *The social and interactional nature of language input* examine the differences and similarities in the interactional contexts of different children. **Ervin-Tripp** provides a theoretical overview of the factors shaping children's bilingual development. While presenting the unique nature of bilingual acquisition, Ervin-Tripp draws our attention to commonalities in the effects of communication on monolingual and bilingual development. This chapter shows how inter-personal communication and language acquisition are influenced by multiple variables including institutional and socio-economical status (SES) of languages and their speakers. **Weisleder and Fernald** further highlight the effect of SES on language development. They review new research showing that the amount and quality of child-directed speech in infancy contributes to the development of language processing skills, which in turn facilitate

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vocabulary growth. **Brown** looks at caregiver-child interactions in a Tzeltal Mayan community to examine the effect of culture on interaction. The chapter raises questions about what we think of as a stereotypical form of parental speech. Brown provides a number of examples to illustrate that, compared to a western standard, adult Tzeltal speakers are far less likely to direct their speech to young children. The examples are then used to discuss how these interactions differ from those reported in much of the literature on language learning, much of which is based on the experiences of Western children. **Veneziano** explores what it is that makes conversation such a prime location for learning in general, and language learning in particular. She focuses on the aspects of exchange and accommodation inherent in conversation that make successful coordination and collaboration possible. **Casillas** examines how children can hold the floor to maximize their contribution to an interaction. This way, they manage themselves the language input they hear and can modulate the feedback they receive from adults. In particular, the author shows that differentiation of two common delay markers, *uh/er* and *um/erm*, happens before the age of four, with *um* signaling longer delays just as in the adult language.

The second part: *The role of paralinguistic information in language learning*, contains three chapters looking at the effect of gaze, gesture and attention on language learning. **Kelly** provides evidence for the role of gesture-speech timing as a motor of children's transition towards multiword combinations. Kelly argues that children's acquisition and automatization of the synchronous use of gesture and speech is a necessary cognitive precursor for gesture and speech to be used synchronously to designate different meaning, prefiguring two-word combinations. In so doing, she points out how caregivers' interpretations of gestures can both help determine referents and paves the way from co-referential to non-co-referential speech-gesture combinations. **Morgenstern** explores how deaf infants learn to achieve joint attention through the exclusive use of the visual modality (as opposed to visual and auditory modality combination), and how signing children learn to grammaticalize gesture and gaze. The author shows that gaze is recruited by signing children more often as a means to check and manipulate the caregiver's attention. Moreover, pointing gestures are gradually replaced by deictics in the hearing child's speech, but they appear grammaticalize earlier in the deaf signing child. **Goldin-Meadow** similarly shows how gestures provide non-verbal practice in producing conversational contributions, hence predicting the onset of sentences and more complex constructions in later speech. Importantly, this happens in a context where parents use information gleaned from child gestures. They adjust their language level and provide the input necessary for the acquisition of the linguistic feature prefigured by the gesture.

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The five chapters in the third part: *Pragmatic forces in language learning* illustrate the effect of pragmatic information on learning of various linguistic domains. **Stephens and Matthews** review the literature on adults' referential pacts and link it to child experimental studies in the same vein. They link these results to Eve's Principles of Convention and Contrast, and draw an elegant link between adult and child behavior on the same tasks showing how children are sensitive to these principles in establishing reference. **Tare and Gelman** take us into the bilingual realm, looking at how children acquire the skill to identify and address speakers in the appropriate language across different interactional tasks. They discuss the roles of external (types of interactions) and internal (Theory of Mind, language ability) skill sets that may enable children to do this successfully. **Frank** provides a formal account of what pragmatic forces might look like for computational models of word learning. He discusses how statistical learning over the course of time can be integrated with within-context pragmatic inferences to inform children's learning of word meanings. **Küntay and Özge** bring together two apparently disparate views – *language-as-product and language-as-action* – on children's acquisition of flexible word order. They conclude that experimental and naturalistic complement one another in revealing how interaction and linguistic skills play out together in children's structural and pragmatic interpretations of word order. **Clancy** provides a longitudinal analysis of the copula construction produced by two young Korean-speaking children and their mothers. The primary goal of the chapter is to explore the discourse basis of the construction over developmental time. Because of its structural simplicity and its identifying and naming functions, the copula construction can appear in child's utterances from early on. However, the full functionality and appropriate encoding of information structure and the speaker's perspectives are acquired only gradually through repetitive uses and negotiation with conversational partners. **Berman and Lustigman** conduct a detailed corpus study of early clause combination in the speech of three Hebrew-acquiring girls in self-initiated autonomous constructions compared to three types of interlocutor--supported contexts. They document the gradual increase in the number and complexity of clause combinations and suggest that interactive contexts play a role in advancing the consolidation of early complex syntax.

The final part of the book: *Interactional effects on language structure and use*, expands the scope of inquiry to adult language, language change, and the development of non-linguistic skills. **Bybee** asks how interaction impacts the process of language change for constructions. She presents a corpus analysis over several decades of American English to show how contexts of use influence the development of the minor construction from an idiom: *not have two Xs to rub together.* **Slobin** presents case study of a particular kind of speech-for-self produced by a preschool-aged girl, characterized as "externalized dramas." This unique conversational setting

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– where a conversation takes place between two voices of the same participant – is seen as a platform for practicing and refining pragmatic devices while dealing with extra-linguistic concerns such as emotional states and other minds. Using examples from spontaneous conversation, **Herb Clark** illustrates how grounding facilitates communication between parents and their young children, and how it affects the forms of child-directed speech, as well as adult conversation.

The papers in this volume do not only pay tributes to Eve's work, but also critically reexamine some of its assumptions or suggest alternative views. We feel this is a true reflection of Eve's intellectual voice and her commitment to critical and rigorous scientific investigation. In keeping with her scholarship, we attempted to provide an overview of various approaches without concealing or smoothing out any disagreements among them. With our respect to Eve's contribution to the field as a common thread, the papers in this volume will provide a point of departure for our future investigations.

We would like to end this introduction with a note on Eve's influence as a teacher, advisor, and mentor. When you interact with Eve even for a short while, it becomes immediately clear that she is an extremely charming person with a warm heart (spiced up with her lovely British accent). At the same time, Eve is an honest and fierce discussion partner who will not let any inaccurate comments slide, or accept any conjectures that are not attested in the data. In this, she embodies a great interactional partner – one who listens, understands, recasts, rephrases, and encourages us to try again. With you, Eve, "language acquisition in interaction" is not a mere theory or a hypothesis: We all learned to speak our academic language through interactions with you. This volume is our thank-you note, and an attempt to open up our conversations with you – and the deep insights they generate – to a wider audience.

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