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First language acquisition

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20.1 The first year

What are the general developments observable in the first year of life, and how do they relate to the emergence of language? We start by looking at infants and what they can do and what they can communicate before they begin to rely on language. Then we take up the changes that occur as children begin to acquire the language of the community around them.

20.1.1 Early interactions

Infants begin to acquire interactive skills during familiar activities with their care-givers. Everyday routines of feeding, diaper changing, bathing and playtime provide rich contexts in which children and their care-givers can practice interacting with well-defined, consistent roles. In these contexts, care-givers coordinate their own behavior to fit neatly with the child's, vocalizing in response to or in unison with the child's movements, laughter and vocalizations, as in (1) and (2) – both exchanges between a Thai mother and her young son. In doing so, care-givers impose an interactive structure on their infants' behavior that leaves room for the infants to make their own contributions once they become ready to do so.

(1) *Simultaneous vocalizations*. Mon (0;6) is being held up by his mother to face his sister. While he vocalizes, his mother comments on his actions and intersperses pitch-matched vocalizations between her son's ongoing verbal behavior (Luksaneeyanawin 2000) ['yyy' indicates unintelligible speech or non-speech vocalizations]:
Child: yyy [vocalizing as Mother speaks]
Mother: *naj4 jim3 lOO1 haj2 phii2 kOOn1 jim3 lOO1 ʔUU0 ʔaa0 rom0 dii0 lxxw3 chaj2 maj4 jim3 lOO1 lxxw3 chaj2 maj4*
'Smile handsome, smile to your older sister first.' [Matching her pitch movement to child's ongoing vocalizations] 'You're in a good mood, right? You can smile, right?'
Child: yyy [vocalizing while Mother speaks]

Mother: *ʔUU0 naj4 phii2 saaw4 saaw4 juu1 naj4 phii2 saaw4 saaw4 ʔUU0 phii2 saaw4 saaw4 juu1 troN0 nii3 nii2 ʔeeN0*
[Matching her pitch movement to the child's ongoing vocalizations]
'Where is your older sister? Where is your older sister? Your older sister is right here.'

(2) *Alternating vocalizations*. Mon (0;6) is looking at and reaching for a box covered in colorful pictures of castles and children:
Mother: *duu0 si3 khOON4 khraj0 mii0 ʔa1 raj0 baaN2 luuk2 ʔa1 maa0 duu0 si3 paj0 ʔaan1 duu0 si3*
'Look what children are there. Come and look. Go on and read.'
Child: yyy
Mother: *ʔaan1 ʔOOk1 pa1*
'Can you read?'
Mother: *ʔaw2 paj0 cap1 si3 luuk2 paj0 cap1 nii2*
'Go grab the children. Grab here.' [taps finger on box]
Child: yyy [grabs at box]
Mother: *aj0 maj2 daaj2 si1 wooj0 waaj0 si1*
'You can't go on (so) cry out.
Child: yyy!
Mother: *paj0 maj2 daaj2 si1 wooj0 waaj0 ʔa1 chuuaj2 chuuaj2 chuuaj2 nOj1 chuuaj2 nOj1*
'You can't go on. (So) cry out. I'll help, I'll help, I'll help a little bit, I'll help a little bit.' [brings child closer to box]
Child: [places hand on box]
Mother: *nii2 duu0 si3 mii0 ʔa1 raj0 baaN2 hUUm4*
'Look here. What's there? Hm?'

These early interactions create a contingent relation between infant and care-giver actions. Such co-dependence is crucial for infants in developing the skills they will need for interactional coordination and collaboration – both basic requirements in human communication. The repetitive nature of early interactions allows children to become active participants while benefiting from familiar routines and action exchanges. Conversation-like exchanges between infants and care-givers begin when infants are as young as two to three months, and consist primarily of the participants taking turns at 'talking.' These proto-conversations become more elaborate as the infants get older, and as care-givers expect more sophisticated responses. Compare (2) with (3).

(3) *Alternating linguistic turns* (from the same child as in (1) and (2)). Mon (1;11) and Mother are playing with a set of small plastic toys on the living room floor:
Child: *len2 ʔa1*
'Play.' [kicks toys]
Mother: *ca1 len2 kOO2 len2 si1 ʔa1 te1 tham0 maj0 ʔa1*
'If you're playing, then play. Why are you kicking?'
Child: *len2 len2 len2 ʔa1 len2 len2 len2 yyy len2 ʔa1*
'Play play. Play. Play. Play play. yyy play.'
Mother: *ʔa1 raj0 nii2 kxxw2 naam3*
'What? This is a mug.'

Child: *naam3 yyy naam3 yyy naam3*
'Water yyy. Water yyy. Water.' [picks up mug]
Mother: *dUUm1 dUUm1*
'Drink. Drink.'
Child: [makes a drinking motion]
Mother: *ʔa1 hUUt3 luuk2 hUUt3 kOOn1 hUUt3 kOOn1*
'Slurp, child. Slurp first, slurp first.' [makes slurping sounds]

Turn-taking routines also appear in non-verbal interactions toward the end of the first year. For example, in social games like peek-a-boo or toy-passing, infants rehearse the same types of alternating behaviors that they later need in verbal interaction. They often appear to initiate such games with the goal of practicing the act of exchange, and take delight in anticipating what will happen next at each point in the interaction.

Timing becomes a key component in these interactions rather early in the first year. Vocal exchanges before the age of six months display minimal switching pauses between parent and child vocalizations. The rapid timing of turns appears at first to mirror speech patterns in adult conversation. However, infants' vocalizations overlap with their care-givers' speech on nearly 40 percent of the turns, suggesting that six-month-olds have not yet acquired the ground rules for conversational alternation: one speaker at a time with precise speaker transitions. But from around six months onwards, infants begin to latch onto the basic turn-taking system, with longer overall gaps and fewer overlaps (Hilbrink *et al.* in preparation). Infants also appear to be sensitive to the timing of their care-givers' responses even before that. When they experience paused, delayed, or otherwise non-contingent signals from their mothers, they react by looking away more often, vocalizing less or differently, working to repair the interaction, and sometimes becoming upset. In tracking timing, then, young infants tune into coordinated interaction, with structured access to linguistic and non-linguistic information from their care-givers.

Conversation and interactive routines are infants' primary sources of linguistic input, with both sources offering structured settings for their subsequent language acquisition. One consequence of this interactive input is that the language they hear, understand and produce occurs within organized sequences of turns that change as children develop – care-givers adapt their speech and word choices to their children's current state of development. In a nutshell, adult child-directed speech in the first year derives jointly from child and adult actions, and adult contributions tend to match children's current interactive skills.

20.1.2 Emerging knowledge about language

While honing their interactive skills, infants learn a lot about language. Although many children do not produce their first words until the end of their first year, they recognize some properties of their native language within hours of birth. Prosodic information (rhythm and pitch) makes its way to babies' ears in the womb, and newborns tested two to five days after birth can distinguish between the rhythm type of their native language and other rhythm types, e.g. syllable-timed like French, compared to stress-timed like Russian. By the time they are six to nine months old, infants prefer the prevalent stress patterns of the surrounding language: those learning English prefer trochaic sequences ('BAby') to iambic ones ('balLOON'), consistent with the typical stress pattern of English. Prosodic information can even mislead infants: eleven-month-olds have fairly well-specified representations of the sound composition of familiar words, but mis-stressing and making changes to stressed syllables delays their word recognition (Vihman *et al.* 2004).

Although infants can discriminate between native and non-native rhythmic types from birth, they do not attend selectively to the sound segments of their own language until around ten months of age. Each language has a set of sound segments (phonemes) that can be combined in words to carry contrasting meanings (e.g. ***ball*** versus ***tall***). For example, English speakers who listen to the Korean syllables /tʰal/ and /tal/ 'hear' hear two tokens of the word *tall*. But Korean speakers hear two different words: 'mask' and 'moon,' respectively. This is because the phonemic inventory of Korean includes three types of alveolar stop that differentiate word meanings (e.g. /tʰal/ 'mask,' /tal/ 'moon' and /t̪al/ 'daughter'), whereas English only has two (e.g. /tʰal/ 'tall' and /dal/ 'doll'), such that tokens from the third Korean type (/tal/) get categorized with the sound perceptually closest to it in English (/tʰal/). Until nine or ten months of age, infants can discriminate between many phoneme pairs that are not relevant to their native language phonology. For example, at six to ten months, English-learning infants readily distinguish non-native contrasts such as /t̪a/–/ʈa/ and /ʔki/–/ʔqi/, native to Hindi and to Thompson Salish (British Columbia), respectively. But by ten to twelve months, only Hindi- and Thompson Salish-learning infants continue to discriminate these sounds, while infants learning English do not (Werker and Tees 1984).

This apparent loss of linguistic skills is more likely a *shift in attention* to the sounds in the ambient language. In fact, when nine-month-old infants interact regularly with a speaker of a new language, they appear to regain the ability to discriminate sounds in that language. Interestingly, though, this holds only for new language input that children experience during interaction – not, for example, from overhearing a new language. Generally speaking, interactive language experience throughout the first year, whether monolingual or bilingual, appears to continually shape sound category representations (Kuhl *et al.* 2006). It may at first seem surprising that children are so flexible in their discrimination of phonemes, but this ability is essential for young bilinguals – and at least half of the world's population is estimated to be bilingual. Children who acquire two languages natively also need to attend to which phonemic contrasts belong to which languages. While this can cause further changes in perception early on, it has a minimal effect on bilingual children's achievement of landmarks in the process of language acquisition.

20.1.3 Categories, contexts, and (proto-)representations

One way that children break into the linguistic signal is by exploiting tendencies in language use and structure. For example, they may learn about the categorization of vowel sounds by leveraging the way vowels cluster in acoustic space. They can use information about the clusters to identify existing categories and to classify ambiguous vowel sounds as tokens of nearby categories, though their classifications too may be modulated by interaction.

At six months, infants know quite a bit about the prosody of their language, a little about its sounds (phonology), but nothing yet of its lexicon or syntax. But with each step in development, they can combine any partial linguistic knowledge with detectable statistical patterns to gain a foothold in new linguistic structures. For example, at eight months, infants recognize recurring sequences of sounds in the speech stream by attending to the transitional probabilities between phones. Such recurrent sequences become some of the first 'words' they identify.

Although language can be viewed as comprising many layers of structure, it is important to remember that infants and young children do not wait to master one level of linguistic representation (e.g. sounds) before moving onto the next (e.g. words). By using partial information at multiple levels, even very young children learn about prosody, phonology,

lexicon, and syntactic structure simultaneously. For example, by using phonology to learn new words while also using words to learn more phonology, children can bootstrap their learning in both domains.

20.1.4 Gaze, gesture, and the ambient language

Breakthroughs in one developmental domain can profoundly affect other domains. Infants' access to visual information in the world changes dramatically as they learn to control eye and head movements. And once infants can grasp objects and hold them up, they gain added control over which parts of an object they can see and touch. As any care-giver knows, once infants begin to crawl and then walk, they can access much larger domains for exploration – a cause for both joy and exasperation. Many of the objects children see and hold come with linguistic commentary from care-givers that, combined with children's first-person perspective, helps narrow down the relation between labels and referents in each context (Yurovsky *et al.* 2013).

Children attend to other people's gaze from early on – and rightly so since gaze coordination is key for establishing joint attention in communicative contexts. Two- to five-day-old infants look longer at images of faces that gaze directly at them than faces gazing away from them, and by four months old, they process images of faces gazing directly at them faster than faces gazing away. This is consistent with natural adult–infant coordination: three-month-olds smile less when adults look away and then they smile again when the adult's gaze returns to them (Farroni *et al.* 2002).

By four months, infants begin to follow others' direction of gaze, but only show a preference for gaze over head direction from ten months on. Gaze-following is fundamental to joint attention and interactional coordination, and gaze-following predicts some early language development: ten-month-olds who vocalize while following gaze have larger receptive vocabularies at fourteen months. And infants' early responses to bids for joint attention predict their later *comprehension* vocabulary, while their early propensity to initiate joint attention predicts their later *production* vocabulary (Carpenter *et al.* 1998).

Young children's early 'speech' is characterized by a combination of gaze, vocalization, and gesture. Infants begin to use gestures such as points, reaches and head movements soon after six months of age. Pointing, in particular, typically becomes part of their communicative repertoire between eight and fifteen months, with early pointing often taking a 'whole-hand' form, where infants extend their arm toward the interesting object or event, rather than the prototypical Western index-finger hand shape. Finger and whole-hand pointing differ qualitatively, with finger pointing emerging later, from around ten months, and predicting children's comprehension of others' pointing behavior (Liszkowski and Tomasello 2011).

Even as young children produce their first words, they continue to rely on gesture (head nods, shakes, points, reaches, etc.) to identify or reject objects, and to make repairs in interaction. By age one, they supplement their turns with words, often combined with gesture. Children who produce gesture-plus-word combinations early also use two-word combinations early, as long as the combinations of gesture and word supplement each other (e.g. as when a child points at a hat and says *daddy*, to mean 'that's daddy's hat' or 'there's daddy's hat'). Parents and care-givers also rely on gesture along with speech as they interact with their young children (e.g. Rader and Zukow-Goldring 2010).

Children display enormous changes in their interactive and linguistic abilities during the first year. From the start, care-givers and infants attend to sounds, gestures and gaze in the other, and they make increasing use of these elements to infer each other's intentions. They

engage in exchange games of all kinds, antecedents to verbal turn-taking, and they rely on gaze, gesture and vocalization to tailor their communications as they build on fragmentary linguistic knowledge. These developments reveal which information infants can access, understand and convey during the first year. They provide the basis on which they will continue to build.

20.2 Getting into language

As children begin to understand more words, they begin to produce linguistic *forms* – words and the constructions they appear in. But when they produce their first words, it is clear that they often start out with just fragments of the conventional meaning for a term. For example, they may initially assign just the meaning of 'four-legged' to the word *dog* or *horse*, and only later work out exactly how the meaning of *horse*, say, contrasts with those for *cow*, *donkey* and *zebra* (Clark 1993). Or they might appropriately assign the meaning of motion to a verb like *jog* and only later learn just how it contrasts in meaning with *run* and *stroll*. As they hear more uses of each word, in a range of contexts, and as they encounter the occasional misunderstanding of their own uses, children adjust their initial meanings until they more or less coincide with adult usage.

Mastering the adult meanings of words can take several years, but the amount of overlap in meaning at the beginning of this process is often enough for quite successful communication, especially within the family. Ultimately, though, children must learn how to use forms and meanings for communicating with a variety of others in the speech community. One central factor in doing this is the attention children pay to other speakers and their intended meanings in context.

20.2.1 Joint attention and physical co-presence

Achieving joint attention can be complicated, but adults typically accommodate to their children: When young children show that they are attending to something by pointing and looking at it, adults 'follow in' and talk about that object or event. When adults instead take the lead in establishing joint attention, they rely on name-use, exclamations like *Hey!* or *Look!*, and point to the locus of attention (Estigarribia and Clark 2007). In both cases, adult and child establish joint attention to some object or action that is visible to them both and, typically, physically present. Joint attention and physical co-presence are the conditions that allow adults to be reasonably sure that children will identify the intended target of their talk – what they are labeling or talking about on that occasion. Children can then combine information from timing, discourse cues, communicative intentions and consistent word–object associations across many instances of object naming, to make links between the labels they are offered and the things or events they see (e.g. Clark and de Marneffe 2012).

Reliance on joint attention and physical co-presence in talking to young children results in most talk being about the here-and-now, whether it is a matter of looking at a rabbit in the garden, or describing what adult and child can see in a series of photographs. Joint attention is critical to adult–adult interactions too, of course, but physical co-presence is not as crucial since adults can use language to conjure up past events, future possibilities and all kinds of abstract ideas and arguments. For young children, though, attaching meanings to new words depends critically on physical co-presence: this offers children a starting point for assigning some meaning to terms like *top*, *doggie*, *shoe* or *eat*.

20.2.2 Identifying intentions

As they interact with different people in different settings, children need to assess the goals and beliefs of those they interact with. Knowledge about someone else's goal is useful for predicting both what that person is going to do and how to respond. Once children can attribute mental states like intentions, beliefs and goals to others, they have come to understand that different people can have different beliefs and goals, and know different things. When and how children begin to model others' mental states is still a matter of debate (see Baron-Cohen *et al.* 2013), but children as young as twelve to fourteen months old can make some inferences about others' goals. For example, fourteen-month-olds behave rationally in imitating an adult after watching her act on a novel object: if the demonstrator's hands are occupied (e.g. holding a shawl round her shoulders) and she presses a large button on the novel object with her forehead, infants are unlikely to imitate her. Instead, they press the button with their hands. But if the demonstrator's hands are free when she presses the button with her forehead, they are far more likely to copy her action than to use their hands. This suggests that one-year-olds expect rational behavior from the demonstrator – if she could have used her hands but did not, she must have *intended* to use her forehead instead. In short, different actions signal different intentions.

However, these young children could have been making inferences only about the actions, and how they differed, rather than about the demonstrator's intentions. Appreciation of others' beliefs (Theory of Mind) has generally been attributed to children only when they observe a scene and can identify the false beliefs of particular participants. A typical test goes as follows: If Ann puts her shoes under the bed and then, when she is not looking, Bob moves them to the closet, does Ann still believe they are under her bed? Where will Ann look first once she returns to get her shoes? Children can answer such questions about false beliefs only at around age four, but appropriate answers in such tasks depend on both memory and linguistic skill. These tasks may also be difficult for young children because they always make the child an observer rather than a participant. Studies of younger children's spontaneous non-linguistic (and linguistic) responses give evidence of false-belief attribution at two or younger (e.g. Baillargeon *et al.* 2010). The evidence suggests that children assume rationality in navigating interactions *before* they necessarily associate actions and goals with more abstract mental states. Making this early assumption of rationality enables even young children to make inferences about the causes of others' actions, hence discerning their communicative intentions, and so coordinating with their interlocutors.

20.2.3 Partial word meanings

While the first meanings children assign to words often overlap with (part of) the adult meaning, they rarely fully coincide with it. One result is that young children over-extend their first words, and for instance, produce *doggie* to pick out dogs, cats, sheep, squirrels and goats, and *ball* for anything small and round. Over-extensions like this appear to result from too small a vocabulary in production, rather than from any inability to discriminate kinds. Indeed, when shown pictures of a dog and a cat, and asked 'Where's the dog?' one-year-olds consistently choose only the dog. This suggests that young children simply make do, at this stage, with whatever words they can retrieve and produce (here, *dog*) to denote things that are similar in some respect to the target referent.

How do young children decide which word to use under such circumstances? They rely heavily on shape in selecting a word, and this accounts for the majority of their

spontaneous over-extensions, as well as for elicited extensions to unfamiliar objects. Reliance on similarity of shape allows young children to label new objects quite readily. At the same time, when their label for a category instance is erroneous, adults typically correct it by offering the conventional term for that category in the next turn. One-year-olds over-extend around 30 percent of their first seventy-five words in production, but generally stop doing this by twenty-four to thirty months, just as they start asking innumerable *What's that?* questions to elicit words they do not yet know or have difficulty retrieving (see Clark 2009). Finally, the initial meaning young children first attach to a word in context has been characterized as 'fast mapping,' but this captures just the starting point in meaning acquisition. Arriving at the conventional meaning of a term can take many months and even years.

20.2.4 Getting word forms right

With linguistic forms, children must master the phonology and prosody of their language as they learn its vocabulary (Stoel-Gammon 2011). On the one hand, this means making the production of their words recognizable to others. But children need time to gain the necessary articulatory skill, and even after they can produce recognizable one-syllable words, they may rely for some time on simplified interim templates in producing two-syllable words such as *blanket* or *slinky*. When learning multisyllabic words like *elevator* and *kangaroo* (often first produced as 'EH-vatuh' and 'ROO'), they also need to keep track of where word-stress appears in addition to any preliminary meaning they assign. With larger linguistic units, they have to assign phrasal and sentential stress, with phrase-final stress normally identifying new information ('Jim brought the CAKE'). But they also need to be able to use contrastive stress, regardless of its position in the clause ('The CAT, not the dog') (Clark 2009).

To make themselves understood, young children need to produce words with their local, conventional pronunciation and construct sentences with the appropriate conventional word order. In short, they need to plan each utterance in light of the addressee it is destined for. In achieving this, even very young children monitor what they say and how they say it. They make spontaneous self-repairs to the forms of words from age one on, and respond to requests for repair from others, usually by making changes to the forms of the words they produce. As they get older, children tend to make spontaneous self-repairs to whatever part of the system they are currently mastering: repairs to phonology emerge early and persist as a major repair-type until age three or so. Repairs to morphology – noun and verb inflections – emerge around age two as children begin to establish the noun and verb paradigms of their language, while syntactic repairs tend to appear only later, once children have begun to distinguish different construction-types. Finally, repairs to lexical choices, like phonological repairs, emerge early and continue well past age four (Clark 2009).

20.2.5 Setting up semantic domains

Children accumulate words in a variety of domains from early on. By the time they can produce about fifty words (at eighteen to thirty months), they use words for people such as *baby*, *mama* or *mummy*, *daddy*, *dada* or *papa*, and *man*; for food – *juice*, *milk*, *cookie*, *bread* and *drink*; for body-parts – *eye*, *nose*, *mouth* and *ear* first; for animals – *dog*, *cat* or *kitty*, *bird*, *duck* or *hen*, *cow*, *horse* and *sheep*; for toys – *ball*, *block*, *book* and *doll*; for household items – *spoon*, *cup*, *brush*, *bottle*, *key*, *clock* and *light*; for clothing – *hat*, *shoe*, *diaper* or

nappy, and *coat*; for vehicles – *car*, *boat*, *truck* and *train*; and for common routines – *pat-a-cake*, *peek-a-boo*, *upsy-daisy*, *incy wincy spider*, *this little pig*, *bye-bye* and *night-night*.

As they add more words, they start to link terms related in meaning, gradually organizing them into semantic domains. For example, they link words for animals (*cats*, *dogs*, *foxes*, *wolves*; *rabbits* and *hares*; *frogs*, *newts*, *lizards* and *snakes*; *birds*, *owls*, *ducks*, *pigeons*, *swallows*) with words for their characteristic sounds (*moo*, *neigh*, *bellow*, *roar*, *squeak*, *hiss*), with words for how they move (*hop*, *trot*, *slither*, *climb*, *fly*), and words for what they eat and where they live. For spatial relations, children add locative adverbs (*here*, *there*, *outside*), prepositions (*in*, *on*, *beside*, *over*), verbs of motion (*come*, *go*, *walk*, *run*, *hop*, *slide*, *skip*, *ride*), and nouns for places (*house*, *hill*, *road*, *path*, *shelf*, etc.). They steadily add new words to current domains and, as they acquire more words, they also add new domains.

As children add to their repertoire of words, they also start to make choices to reflect the perspective they want to convey. They may call something a *waste-basket* when dropping paper into it, but a *hat* when holding it upside down over their head. And in pretend play, a block is a *block* when building a tower, but a *telephone* when held up to the ear. Children use their words from as young as eighteen months on to present things to their addressee from a particular perspective (Clark 1997). These semantic relations and alternative perspectives help children impose different kinds of organization on the conceptual categories picked out by the terms they produce.

20.2.6 Word classes

Children appear to grasp quite early on that some words are used for talking about concrete objects (nouns), others for talking about actions (verbs), others still for talking about properties (adjectives) and relations (verbs, prepositions). The word classes in many languages are distinguished in part by the kinds of things they denote: People, places and things are denoted with nouns; actions and states with verbs; relations with verbs and prepositions (and occasionally with nouns). Children appear to make use of this semantic information as they start to make generalizations about different kinds of words. For example, two- and three-year-olds are adept at picking out appropriate referents for count and mass nouns and for verbs.

Adult reliance on frequent frames helps children recognize nouns and verbs even before they have assigned any meanings. By attending to where specific words and word-types appear in adult speech (*This is a—*; *He is –ing*), they could reliably extract nouns and verbs, and even identify the relevant inflections for each word class. In addition to identifying inflections, they must also identify the meaning each inflection adds to core word-stems – case, gender and number, for instance, on nouns, or tense, mood and aspect as well as person and number on verbs. Although many of children's first words in comprehension are for familiar objects, their recognition of words for events, properties and relations begins to emerge early in the second year. They also attend to the relative frequency of specific word combinations and to recurring phrases, making use of well-entrenched patterns when they imitate phrases or retrieve irregular word forms.

20.2.7 Filling semantic gaps

One strategy that compensates for a limited vocabulary is for children to coin new words when they need them. Most languages offer a variety of options, differing in productivity, for such coinages. Derivation adds affixes to the word-stem (e.g. *a puller* for someone who's

pulling something); compounding allows the combination of word-stems into root compounds (e.g. *PLANT-man* for 'gardener'), or synthetic compounds containing affixes as well (e.g. *my RUNNing-stick*, 'a stick carried while running').

Children start to make use of some options early on, often before age two, but they rely initially only on what is most productive in the language being acquired (Clark 1993). In Germanic languages like English, children's earliest coinages tend to be root compounds (NOUN+noun, with primary stress in English on the first, modifying, noun) and denominal verbs (derived from noun stems, with no affixation). These emerge before children start to produce coinages with derivational affixes (e.g. agentive *–er*). In Romance languages, compounding is much less productive than derivation, and children's first coinages tend to be words formed by adding affixes to a stem. But since identifying affixes and their meanings takes time, children acquiring French, for instance, make relatively little use of this option before age three.

20.3 Early conversations

By soon after their first birthday, children have acquired a set of pre-linguistic, interactional and pragmatic skills that they can draw on for basic conversation: they understand and can produce a small number of word-like chunks, they point for others and track adult gaze, they respond to bids for attention and requests for action, they make inferences about the goals of others, and they have begun to take turns in speaking. Parents respond to these changes by increasing their verbal engagement with their children in conversational exchanges. By asking questions, initiating side-sequences and requesting repairs, parents offer children extensive feedback as they check up on what their child's intended meaning might have been. After ambiguous or erroneous utterances from the child, parents frequently reformulate the child's (apparent) meaning in the next turn. This offers the child an interpretation in conventional form that contrasts with what the child actually said (see Chouinard and Clark 2003). Parents also talk more to their children as they do things with them, from constructing block towers to reading a picture book, and in doing so they 'display' the language to be acquired, and how to use it, as in the exchanges between a Spanish-speaking mother and child in (4) and an English-speaking mother and child in (5).

(4) *Reformulation.* Mendía (1;8.03) and her mother are drawing with pencils on a pad of paper. By following up what the child says, the mother gives feedback by using adult word forms and so grounding her interpretation of what the child says (Nieva Ramos 2013).

Mother: El sol.
'the sun.'
Child: *Tita tita!* (= pinta pinta)
'paint. paint.'
Mother: Tú qué vas a pintar?
'what are you going to paint?'
Child: *Má.*
'sea' (= [mar] 'sea' or [mas] 'more').
Child: *Ta to.* (= sol sol)! *Pá-*
'sun sun! pa-'
Mother: El mar. Pintas el mar? [wrong guess]
'the sea. Are you painting the sea?'

Child: *To!* (= sol) [child repair]
'sun'
Mother: El sol.
'The sun.'
Child: *To!* (= sol)
'sun'
Mother: El sol.
'the sun.'
Child: *To!* (= sol)
'sun'

(5) *Displaying the language*. While feeding Naima (1;0.14) kidney beans, her mother talks about a range of topics related to eating and food preparation (Demuth *et al.* 2006).
Child: əmæˈni. (= more bean)
Mother: I'm giving it to you. I'm trying to take the skin off with my fingers. There you go. Are you eating beans? Are you eating beans for supper? Is that what you're doing? You're eating some bean? Mmmm, how delicious.
Child: mæˈni mæˈni. (= more bean more bean)
Mother: OK. I'm peeling the bean for you.
(a few seconds later)
Child: mæˈni mæˈni mæˈni. (= more bean more bean more bean)
Mother: OK, I'm peeling it with my fingers. Fingers. See what I'm doing with my fingers? I'm peeling the skin off the kidney beans very, very slowly. Mmmm, you're hungry.

Soon after their first birthday, children start producing chains of single words that precede true multi-word utterances, e.g. '*Daddy. Peach. Cut*' (e.g. Bloom 1973). Parents rely on repeats and co-construction of utterances to fill the gaps in these early word combinations and they often provide conventional forms for children's intended meanings. In doing this, adults provide extensive framing for their children's turns at the one-word stage, helping them provide new information in response to questions while simultaneously displaying linguistic forms across a variety of communicative contexts. As children develop linguistically, they also acknowledge new information offered by their parents, as in (6), and start to contribute new information themselves, mainly in answering questions, as in (7).

(6) *Acknowledging new information*. Naima (1;0.28) and her mother are looking at a photo album. Naima acknowledges new information in her mother's utterances (Demuth *et al.* 2006).
Mother: Naima and Daddy make coffee. That's the photograph book we made.
Mother: There's the coffee grinder.
Child: (imitates the sound of a coffee grinder) [acknowledgement]
Mother: Is that the noise it makes?
Child: ˈtɪkə ˈtɪkə ˈtɪk (continues imitation) [acknowledgement]
Mother: And there's Daddy with Naima.
Mother: And there's the milk.
Child: *Milk.* [acknowledgement]
Mother: Milk. That's the milk being poured into the coffee in that picture.

(7) *Adding new information*. In this exchange, Damon (1;6.11) and his mother jointly recount for his father what happened when twelve-year-old Philip let his budgerigar out for Damon to see. It had fluttered onto Philip's head, then flew over and landed on Damon's, which startled him. Damon provides new information in response to his mother's questions. The questions frame the episode being recounted (Clark, diary data).
Mother: Did you see Philip's bird? Can you tell Herb?
Child: *head, head, head.* [new information]
Mother: What landed on your head?
Child: *bird.* [new information]

Care-givers, as the experts, not only offer children feedback on how to say things and display to them many aspects of language use; they also make explicit offers of new words along with information about how these words are connected to other words in the same domain. In making such offers, adults typically rely on particular syntactic frames like 'It's a —,' 'It's called a —,' or 'That's a —,' as shown in (8) and (9).

(8) *Explicit offer of a new word–1*. Mother and child (1;7.19) looking at an animal book; child points at the page.
Mother: Yeah. (laughs) It's called a kangaroo. Kangaroo.
Child: *roo*.

(9) *Explicit offer of a new word–2*. Mother and child (1;7.19) still looking at the animal book.
Mother: What are these? Those are birdies.
Child: *birdies*.

When offering new words explicitly in this way, adults often relate the new word directly to another familiar word in the same domain, by adding information about class-membership, as in (10), or information about parts and properties, as in (11)–(13).

(10) *Information about class-membership*. Mother and daughter Naomi (1;10.11) are looking at a picture of a seal.
Child: *birdie birdie.*
Mother: Not a birdie, a seal.
Child: *seal.*
Mother: Seal, uhhum.
Child: *birdie.*
Mother: Seal is a kind of a mammal.

(11) *Information about a part*. Mother and child (1;7) looking at a picture.
Mother: Here's a train. Here are the wheels.

(12) *Information about a property*. Father and daughter Naomi (2;7.16) talking about gloves.
Child: *mittens.*
Father: Gloves.
Child: *gloves.*

Father: When they have fingers in them they are called gloves and when the fingers are all put together they are called mittens.

(13) *Information about a function*. Father and child (2;6) with a picture of a walrus.
Father: The walrus has tusks. Tusks are like teeth.

Adults also supply information about neighboring categories ('It looks like a snake but it's an eel'), often in response to children's erroneous labels; about habitat; about characteristic sounds and ways of moving. They offer definitions and also give hints about what (familiar) things are called ('It looks like a donkey, don't you think?') (e.g. Clark and Estigarribia 2011). In doing this, they offer children extensive examples of how to describe objects and events, how to tell stories, and how to give instructions, all the while offering new terms and information about category structure as well. This all adds to what children know about the meanings of the forms they hear and use.

In these interactions, care-giver feedback helps to guide children's decisions in conveying their communicative goals, whether with gestures and word-and-gesture combinations during the earlier stages (Olson and Masur 2013), or with more precise referring expressions as they get older. Getting feedback about their referring expressions leads children as young as two to redesign their referring expressions to pick out a target referent. Again, to succeed, children must take into account what their addressee already knows, and hence the precise kind of information needed in order for the other to identify the target referent successfully.

20.3.1 Words and constructions

As children amass more words and produce more word combinations, they must attend to the larger constructions specific words appear in. Nouns occur in noun phrases, combined with articles (*the*, *a*), quantifiers (*some*, *all*), and adjectives (*big*, *blue*, *noisy*). Such noun phrases are used to express different verb arguments. Intransitive verbs appear only with a single argument, the actor (*the girl runs fast*) or the object-affected (*the ship sank*), as subject. Transitive verbs, often causative, take two arguments, the agent and the object-affected (*the boy broke the branch*; *the man moved the cup*), as subject and object respectively. Specific verb–argument combinations may appear in some syntactic constructions and not others. Constructions for intransitive versus transitive motion (cf. *The cat ran off* versus *The cat caught the bird*), for resultative (*Jan painted the bike blue*) or for ditransitive (*Mel made his friends a pie*) contribute their own meaning, over and above the meanings of individual verbs and nouns.

Children's early word combinations and their reliance on formulaic sequences in early utterances suggest that they make use of many ready-made pieces as they produce constructions. Later, they analyze the components inside those chunks, and learn which constructions contribute a particular meaning to an ordered sequence of words (see Ambridge and Lieven 2011). Learning which constructions express intransitive versus caused motion, for example, requires that children attend to whether a verb is intransitive or transitive, and to the specific argument-types that occur with each verb, as they plan which construction to use to convey a particular meaning. Like adult speakers, children must start planning with some intention to communicate, access the relevant words along with the most appropriate construction (intransitive, caused motion, resultative, etc.), insert the words into that construction, and then spell out the phonological sequence needed for articulation.

20.3.2 Adding complexity

Children steadily add complexity as they master the pronunciation of multisyllabic words, as they modulate the meanings of nouns and verbs with specific inflections, as they master different constructions, and as they learn how to combine clauses, for example, to express contingency and conditionality (Clark 2009), as in (14):

(14) a. *Contingency*:
Adult: What are umbrellas for?
Lauren (2;7): *When rain comes, we put umbrellas on top of us.*
b. *Conditionality*:
Adult: What if you fall in the water?
Lauren (2;8): *I'll get eaten by a shark.*
c. *Conditionality* (*predictive*):
Amanda (2;11): *When I older than Lindsay, then I'm the big sister.*
d. *Conditionality* (*generic*):
Adult: Do you go to bed at night?
Amanda (2;11): *We go to bed when it's dark.*
e. *Conditionality* (*hypothetical*):
Ryan (2;10): *If Bulldozer man saw a fire, he would call the Fire Department.*

They add complexity as they learn how to express temporal relations between events with conjunctions like *before* and *after*, as in (15):

(15) a. Adult: When did the boy jump the fence? (target = after…)

Child (3;2, pointing at spot on the table): *Right here!*

b. Adult:	What happened first?	(target = the boy patted the dog, first of two events)
Child (3;5):	*He patted the dog,*	
c. Adult:	When did the boy pat the dog?	(= first of two events)
Child (4;3):	*He did it before.*	
d. Adult:	When did the boy throw the ball?	(= second of two events)
Child (4;5):	*When… before … when he opened the gate.*	(target = after)

And they add complexity as they learn how to talk about causality, at first without distinguishing direct from indirect causation in the lexical expressions chosen, as in (16):

(16) a. C (2;11, putting pencil into pencil-sharpener): *I'm gonna sharp this pencil.* (sharpen)
b. E (2;4, screwing top on bottle): *Don't tight this 'cause I tight this.* (tighten)
c. Jaime (2;11, repeating what the witch says in Hansel and Gretel): *I'll put you in two cages and fat you up.* (fatten)
d. C (3;1, pulling string of music-box cow): *I'm singing him.* (making X sing)
e. E (3;0): *Don't giggle me.* (make me giggle)

f. E (2;1, holding toy up in the air and wriggling it): *I wanta swim that.* (make that swim)

Also they add complexity as they learn how to tell stories. Young children begin to tell some kinds of stories quite early, as in the mealtime narrative in (17):

(17) Child (2;3, at the table, after looking pensive for a minute):
I in Mommy's tummy. Then I come out. I baby.
I not know how to cook. I not know how to pour. I not know how to do puzzles.
I not know how to walk. I not know how to stand. I not know how to talk.
I not know how to crawl. Then, I growed up.
Mother: What could you do when you grew up?
Child: *I could do puzzles!*

But they take many years to learn how to maintain a story line, foregrounding events that move the story forward and backgrounding information about the setting; how to talk about the main protagonist compared to less prominent characters, and how to convey interior states that motivate the action (Berman and Slobin 1994). On top of this, children have to learn the conventions for story-telling as a social activity within each culture ('Once upon a time… The end!'). This all takes time and practice.

Children also add increasing complexity to their language as they learn how to use specific forms to do particular things. They gain increasing skill in cajoling, persuading and negotiating with their parents, as when they try to persuade them to buy toys, for example, as in (18):

(18) a. Luca (6;0): *Mamma guarda questi Lego! A mi me piacerebbe averlo!*
'mummy, look at these Legos. I'd like to have one'
Mother: Ma questo costa tanto.
'but this one is too expensive'
Luca: *Ma io devo averli tutti i Lego.*
'but I must have all of the kinds of Legos.'

b. Michele (7;0): *Mamma, aspetta. Guarda* (points at some monsters) *ce li hanno tutti!*
'mum, wait. Look, everybody's got them'
Silvia (9;3, touching a small puppet): *Guarda, mamma, cosí piccoli non li vendono mai.*
'look, mum, they never sell such small ones'

By age five to six, they also become more skilled at telling jokes and making puns, giving explanations, justifications and instructions as well as mastering the many other skills that, as adult speakers, we take for granted in our everyday uses of language.

20.4 Later conversations

As children get older, their participation in conversation relies on myriad linguistic, pragmatic and cognitive skills, skills that children practice and practice until they can answer questions, make relevant assertions and requests, and participate in a timely way in all kinds of communicative exchange. These skills all demand extensive practice, and they benefit

from extensive feedback as well. Getting the words and constructions right, assessing common ground (and adding to it), and getting the timing right, all demand careful coordination with one's addressee(s). This coordination depends in large part on: (1) maintaining joint attention in order to facilitate use of physical and conversational co-presence; and (2) care-giver feedback that impels children to keep track of what is being said and what is happening, so that their own turns at talk are both relevant and produced in a timely manner (Casillas 2014; Clark 2015).

Common ground plays a central role both in inferring speaker intentions and in planning responses that are relevant. Care-giver feedback helps children attend to common ground in conveying their communicative goals, whether they do this with gestures and word-and-gesture combinations during the earlier stages, or later on, with more precise referring expressions. Interaction provides children with practice in picking out the information they need, to convey what they want to say successfully.

In the ideal, speakers take turns with no gaps and no overlaps. But in fact, young children have difficulty timing their turns. They need to plan not only the content of each utterance but also manage its timing in relation to the preceding speaker. Since children come in much more slowly than adult speakers, in multiparty exchanges they often miss making their contribution at the right time. They take time to retrieve the appropriate words and constructions, and even when they have begun to speed up in answering simple yes/no questions, for example, they slow down when they have to provide more complex answers. In effect, each new acquisition – each new *Wh* word mastered, say – appears to slow them down again, even as they are becoming more skilled at retrieving the words they need. As a result, they only begin to approach adult timing at around age four or even later (Casillas 2014).

Over the course of their first six years, children also gradually come to observe Grice's Co-operative Principle in conversation – to be informative, relevant, truthful and brief – as adults implicitly guide them in how to use language to express their communicative goals in a wide range of contexts with a variety of different interlocutors. But to attain these skills, children need extensive practice and feedback. These two elements are central to the *learning* of a first language.

20.5 In conclusion

Children acquire the meanings and uses of linguistic forms in interaction. They discover forms – words and phrases – and assign meanings to them as they talk with others. And they then make use of these meanings when they want to convey information or requests to others. They acquire some of the interactive routines they will need for language use during infancy. They get these in part from care-givers as parts of daily routines, for example, with favorite phrases repeated every time they give the baby a bath, change a diaper, take them out of a stroller or highchair, or hand them a toy. Care-givers present infants with a directly interactive framework from as young as two to three months, as they 'take turns' in talking. Infants also learn to alternate in exchange games. In short, they are being prepared and preparing for communicative language use from the start.

As one-year-olds produce their first words and then combine words into longer utterances, their interactions with their care-givers, expert speakers, present them with extensive information about language and language use in a range of contexts. Adults talk to their children as they do all sorts of activities with them, from constructing block towers to reading picture books, and in so doing, they 'display' the language to be acquired and used.

They also offer feedback on the errors children make, typically while checking up on what they meant on that occasion. They reformulate what they thought the child had intended to say, in the next turn, and thereby offer an interpretation in conventional form for the child to accept (or reject). These reformulations contrast directly in form with what the child has just said.

Even though children have become quite skilled at using language by age six, like adults, they continue to rely on communicative resources that emerged early in their pre-linguistic development for communication, during their first year. They make ongoing use of gaze, gesture, body posture and facial expression as they use language to communicate with others. This symbiotic development of general communicative skills alongside mastery of language underlies our unique human ability to access and to communicate information about people, objects, events and ideas in the world around us. As expert speakers of the language and knowledgeable informants about the everyday world, parents and care-givers work in tandem with their children to provide input that simultaneously gives children guidance on language structure and provides them with practice in language use.

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