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Children's sensitivity to caregiver cues and the role of adult feedback in the development of referential communication

A. Beyza Ateş-Şen* and Aylin C. Küntay*,#

* Koç University, Turkey / # Utrecht University, The Netherlands

Many studies have examined when children are (in)competent in making appropriate referential choices based on their listeners' requirements. Traditionally, child-level social-cognitive abilities have been invoked in explaining the increasing sophistication of referential skills with age. However, recent research has generated interest in the contributions of interactive partners and motivations to the developmental process. This chapter presents and critically evaluates research emphasizing the influence of adult behavior and feedback on the development of children's referential skills. The first section reviews studies examining how children's skills improve by developing sensitivity to adults' verbal and non-verbal communicative cues. The second section reviews training studies that investigate how adult feedback affects children's improvement in referential communication. The third section provides some concluding remarks and future directions.

Keywords: training studies, adult feedback, nonverbal referential behavior, social-cognitive abilities, epistemic cues, attentional cues, vocal cues, contextual cues, incentives, syntactic-pragmatic priming, conversational interaction, crosslinguistic research, crosscultural research

1. Introduction

The communicative effectiveness of children's ways of referring to things and people can only be judged in relation to a certain conversational context. The interlocutors' previous interaction with the child and their contributing turns to the unfolding interaction are important components of that conversational context. The relationship between the child and the interlocutor determines the shared knowledge and practices, making certain referential communicative

devices more apt than others. While talking to his mother about a neighbor a 4-year-old child can use a proper name to say “Leyla invited me to her birthday party”, although using the same name would be inappropriate while mentioning the same person for the first time to his preschool teacher. In the latter situation, a clarification question such as “Who is Leyla?” might enable the child to provide a more elaborate referential form such as in “She lives one floor above us”. Thus, signs of non-comprehension and feedback of adult interlocutors allow children to use more informative choices as the conversation develops. This chapter will review and evaluate research that examines how feedback/training and general interaction with adults have an impact on children’s development of referential communication.

Child-level social-cognitive abilities (e.g., visual perspective taking, metalinguistic monitoring, and memory; see De Cat, this volume) and motives are frequently invoked to explain the developing sophistication of referential communication skills. Crosslinguistic and crosscultural research in pragmatic development examines whether and under what conditions young children are (in) competent in making appropriate referential choices in accordance with the information needs of their listener in different languages and cultures (Küntay, Nakamura, & Ateş-Şen, 2014). However, recent research has generated interest in the contributions of interactive partners and interactive motivations in the developmental process. Of interest here are how referential communication ability evolves as a function of children’s increasing tendency to accommodate to various audience cues and demands, and how this development is scaffolded by caregivers’ responses. To pursue this research goal, most studies use ingenious experimental designs. However, as Bishop and Adams (1991) observed, experimental setups do not include the types of actual pragmatic difficulties and facilitations that children encounter in their daily conversations. Therefore, this chapter presents and critically evaluates both experimental and naturalistic research focusing on how caregivers use verbal and non-verbal devices to complement toddlers’ nascent referential attempts in conversational exchanges. The first section reviews studies examining how children improve their referential skills by showing sensitivity to verbal and non-verbal communicative cues in their interactions with adults. The studies in this first section focus on epistemic cues such as conceptual availability and addressee’s knowledge state; social or attentional cues such as eye gaze, gestures and facial expressions; vocal cues such as speech disfluencies and vocal affect; and contextual cues such as physical status of referents and discourse context. The second section reviews training studies that investigate how adult feedback plays a role in children’s improvement in referential communication. The third section provides concluding remarks and future directions.

2. Referential adjustment to communicative partners: Verbal and non-verbal devices

Caregivers scaffold children's language learning by modifying their child-directed speech (motherese), actions (motionese; Zukow-Goldring, 1996), and gestures (gesturese; Grimmering, Rohlfing, & Stenneken, 2010; Iverson, Capirci, Longobardi, & Caselli, 1999) in accordance with their children's communicative requirements. During referential communication, caregivers use verbal (e.g., referential speech) and often implicit non-verbal signals or cues (e.g., attentional status, eye gaze, referential gestures, speech disfluencies, vocal affect) that direct their children's attention to a new referent or topic. The use of certain devices via child-directed speech, actions and gestures is thought to vary in relation to the developmental stage (i.e., Piaget's sensorimotor intelligence stages; Colas, 1999), developing language skills, and changing conceptual levels of children (Grimmering et al., 2010; Iverson et al., 1999; Namy & Nolan, 2004). For example, Namy and Nolan (2004) observed parent-child interactions in free-play sessions at 1;0, 1;6, and 2;0. Analyses of group and individual patterns yielded different results. For the group data, the frequency of parents' verbal labeling did not change across the three time points; however, the frequency of gestures decreased towards their lowest level when the children reached 2 years of age. However, analyses of individual patterns indicated that parents' use of verbal labeling and gestures did not follow the group trends, but rather parents used verbal and non-verbal tools differently from each other in accordance with their children's distinct communicative needs. Moreover, parental uses of verbal labels and gestures were not related to each other except at the second time point when children usually experienced a vocabulary spurt. The authors interpreted these results as suggesting that parents have distinct communication styles based on their children's needs, and that parents' use of verbal and non-verbal tools are usually independent. However, when necessary, parents coordinate the verbal and the non-verbal communication channels to use gestures to facilitate children's vocabulary development.

In a related study, Estigarribia and Clark (2007) asked caregivers to successively introduce six unfamiliar objects to their children between the ages of 1;4 and 3;2. Verbal attention getters were used more frequently for objects presented earlier than objects introduced later as children got familiar with the procedure. For the younger children (around 1;6) caregivers used more verbal attention getters, deictics (e.g., "here", "look", "this"), and interjections (e.g., "hey", "wow") whereas fewer attention getters and anticipatory comments (e.g., "ready for the next one?") were employed for the older children (around 3;0).

Caregivers also use non-verbal tools, especially pointing gestures related to the target referent, to reinforce and disambiguate their spoken message (O'Neill,

Bard, Linell, & Fluck, 2005). Grimmering et al. (2010) found that mothers of late talkers used more pointing gestures and were more likely to retain their gestures throughout the whole utterance than mothers of children with typical lexical development.

Through communicative exchanges with adult interactants, children increasingly gain mastery of various communicative devices and, using these tools, they can modify their verbal and nonverbal behaviors depending on the requirements of their communicative partner and the conversational context. The following sub-sections focus on research about how children benefit from (1) epistemic cues (i.e., conceptual availability and interactants' knowledge state), (2) social or attentional cues (i.e., affective expressions, eye gaze, and gestures), (3) vocal cues (i.e., speech disfluencies and vocal affect), and (4) contextual cues (i.e., physical status of referents and discourse context) in their referential choices.

2.1 Epistemic cues: Conceptual availability and interactants' knowledge state

Some studies have examined whether children's referential communication behaviors are adjusted to interactants' knowledge state or attentional status. For instance, Liszkowski, Carpenter, and Tomasello (2007, 2008) showed that infants adjusted the frequency of their pointing gestures depending on the knowledge state of their communicative partner. Twelve-month-olds exhibited more pointing gestures for 'ignorant' adults (i.e., not yet attending to the target event) than 'knowledgeable' adults (i.e., already attending to the target event) to inform them about an interesting event. Twelve-month-olds' pointing gestures to an interesting event also changed depending on the reactions of their communicative partner. They used more pointing gestures across trials and extended the duration of their pointing gestures when the communicative partner showed attention (i.e., gaze alternation between the event and the child) and interest (i.e., excitement) about the event. On the other hand, they exhibited more repeated (insistent) points within the trial when the interactant only looked at the target event without sharing any excitement with the child, or when she looked at the child and emoted to her without showing attention (i.e., no looks) or interest for the event (Liszkowski, Carpenter, Henning, Striano, & Tomasello, 2004).

There is also a vast amount of research showing that children are sensitive to various epistemic cues of adult speakers when learning new words. Some of these word-mapping studies are relevant from the point of view of referential communication, especially when they consider how shared experiences with (or previous knowledge about) communicative partners contribute to direct children's

attention to a specific referent and help them to achieve referential clarity even in ambiguous situations. For example, Krogh-Jespersen and Echols (2012) examined how the credibility of information provided by a speaker affects children's word mappings between the ages of 24 and 25 months. Children listened to a speaker's labeling of an object in one of five 'speaker type' conditions. In *the accurate condition*, the experimenter correctly labeled a familiar object ("That's a car") whereas in *the inaccurate condition*, she gave an incorrect label for a familiar object (the experimenter held a cup and said "That's an apple"). In *the knowledgeable condition*, the experimenter used phrases implying that she knew the object ("I know what that is") whereas in *the ignorant condition* she used phrases that implied her lack of knowledge ("I don't know what that is"). In *the uninformative condition*, the experimenter used neutral sentences that did not provide any information about her information status ("Look at that", "See that"). Children in each condition participated in one of two novel label learning trials where the object label was manipulated as a function of object familiarity. In the first label condition, they heard a novel label for an unfamiliar object (e.g., "That's a Danu" for a wooden bell-shaped toy) while in the second label condition they heard a novel label for a familiar object (e.g., "That's a Danu" for a toy dog). After the learning trials, children's novel word learning was tested. Children were more likely to map novel words to familiar objects as a second label when they decided that the informant was reliable (i.e., accurate and knowledgeable) rather than unreliable (i.e., inaccurate and ignorant).

Chow, Poulin-Dubois, and Lewis (2008) examined whether infants' prior knowledge about the credibility of interactants affected their referential decisions. Fourteen-month-olds saw an adult who looked visibly happy while looking inside a container with an interesting toy (i.e., reliable looker condition) or an empty container (i.e., unreliable looker condition). Following this experience, the infants watched the same adult while looking at a target referent placed either in front of or behind a barrier. The infants in the reliable looker condition followed the adult's gaze to a referent behind the barrier more frequently than the infants in the unreliable looker condition. Nilsen, Graham, and Pettigrew (2009) examined how the manner of initiation of a referential interaction and the specificity of information about a referent provided by a speaker affected children's word mappings. An adult presented various pairs of unfamiliar objects together with a specific statement of intent that introduced a novel word (e.g., "Let's find a *fep*"), or by a general statement of intent which that did not include a novel word (e.g., "Are you ready to look at something?"). Following the presentation of the objects, the adult interacted with the target object in the pair while giving either specific information that distinguished the target object from the alternative (e.g., "See this one, you can squeeze this one") or general information about it (e.g., "See this

one, it is on the table”). After the presentation of the information, children were asked to choose the referent object corresponding to the novel word (e.g., “Show me a *feɸ*”). The results indicated that how the interaction was initiated affected children’s novel word mappings. Children tended to map a novel word to a target referent when the speaker introduced the novel word first and then gave specific information that disambiguated the object from the alternative(s).

In short, both infants and older word learners use indicators of their interlocutors’ epistemic and attention states in relation to a referent, adjusting their referential gesture and form, and word-mapping strategies accordingly.

2.2 Social and attentional tools: Affective expressions, eye gaze, and gestures

Adults display, implicitly or explicitly, various social or attentional cues that help children to figure out their referential intent. For instance, infants between their first and second birthday can use a speaker’s gaze direction as a cue to map a novel word to its referent even when the location of the referent is out of view or reach (e.g., the object is placed in an opaque bucket; Baldwin, 1991, 1993; Carpenter, Nagel, & Tomasello, 1998; Moore, Angelopoulos, & Bennett, 1999). Furthermore, children show sensitivity to an adult’s pointing gesture by shifting their attention in the direction of pointing. Dynamic or moving pointing gestures, rather than static ones, are especially helpful to shift children’s attention to the target referent (Rohlfing, Longo, & Bertenthal, 2012). Rader and Zukow-Goldring (2012) also examined how the different nature of ‘show’ gestures (dynamic vs. static) and the synchronization of speech and ‘show’ gestures affects children’s attention to an unfamiliar referent and learning a novel word (e.g., *gepi*, *tano*) associated with the referent. Rader and Zukow-Goldring (2012) presented novel object-word pairs in one of three conditions: *synchronous dynamic* (i.e., each syllable of the word is synchronized with each part of the looming gesture), *static* (i.e., no movement of the object), and *asynchronous dynamic* (i.e., the loom gesture is presented when the novel word is introduced). The results indicated that infants looked at the object more during the presentation of the novel word and were more likely to learn the novel word which corresponded to the novel object in the presence of *dynamic* and *synchronous* as compared to *static* or *asynchronous* show gestures.

Although we know that gestures, especially deictics, help communicators to disambiguate a referent, the question of how primordial caregivers’ gestures and other nonverbal channels of communication are for learning to develop referential communication is an area of active research. As an example of experimental work, Grassman and Tomasello (2010) examined the extent of 2- and 4-year-olds’

reliance on two different sources of information (i.e., verbal and non-verbal) that were at odds with each other in a referential setting, including pairs of familiar and unfamiliar objects. They found that when the experimenter pointed to an unfamiliar object while naming it with a familiar word (e.g., *car*) that conventionally labels the other object in the pair (e.g., a car), in more than 70% of the trials the object selection of children followed the pointing rather than the label. The authors argued that pointing is a more fundamental act of reference than conventional lexical reference, and is used as a cue by young children to extend the referential scope of a known word. Using a naturalistic and longitudinal approach, Zukow-Goldring (1996) examined the role of perceptual tools in educating infants' attention and resolving referential ambiguity. She investigated how mothers used verbal information (i.e., increases or decreases in linguistic specificity) and accompanying non-verbal cues (i.e., gestures such as *show*, *demonstration*, *point*, etc.) to direct infants' attention to new referents or events in the presence of multiple alternative choices. She also looked at how mothers resolved referential ambiguity by (re)adjusting their speech and gestures when the infants did not understand the communicative message. The results indicated that caregivers sensitively modified their gestures and became linguistically more specific (such as using a nominal form subsequent to a pronominal form) following a communicative breakdown. However, during the preverbal and the one-word periods, caregivers provided their infants with additional perceptual cues in response to communicative breakdowns. Increases in perceptual cues (but not increases or decreases in linguistic specificity) improved children's achievement of consensus with their caregivers (i.e., caregivers' judgment of infants' response to a communicative message as adequate). The authors argued that non-verbal (gestures) rather than verbal (words) cues contribute to the establishment of common ground with infants. Both Grassmann and Tomasello (2010) and Zukow-Goldring (1996) showed that young children rely on non-verbal signals to determine referents and to repair communicative breakdowns.

Children also attend to affective cues in their referential interactions. For example, Leekam, Solomon, and Teoh (2010) investigated the effect of adults' facial expressions on children's ability to evaluate various symbols (i.e., an arrow, a pointing sign, and a replica) to find a hidden object. Children were asked to find a hidden object under one of three containers while an adult was producing a symbol that located the referent object in one of the conditions of *engaging face* (i.e., the adult's face with an engaging, smiling expression is visible), *no face* (i.e., the adult's face was hidden), *no face and no hands* (i.e., the adult's face and hands were hidden) and *neutral face* (i.e., the adult's face was visible with a neutral expression). An engaging face increased children's tendency to successfully find a hidden object following an arrow, a pointing sign, and a replica. Moreover, the effect

of an engaging expression was more pronounced than the effects of the presence of a neutral adult face with eye contact or the presence of an adult's hands.

2.3 Vocal cues: Speech disfluencies and vocal affect

Some studies have investigated how speech disfluencies, vocal affect cues, and speech rate (Banse & Scherer, 1996) contribute to young children's developing referential skills. For instance, Kidd, White, and Aslin (2011) showed that young children (over the age of 2 years) benefit from disfluencies in discourse (e.g., filled pauses *uh* and *thee*) to predict a speaker's intended referent. Speech disfluencies mostly occur before a novel word or a referent that is not previously mentioned in discourse and help children to make predictions about the likely referent of an upcoming word (Kidd et al., 2011).

Berman and colleagues (Berman, Chambers, & Graham, 2010; Berman, Graham, & Chambers, 2013) also found that young children responded to a speaker's vocal affect in the identification of a target referent when there was referential ambiguity. For instance, as a response to a speaker's referentially ambiguous instruction (e.g., "Look at the doll"), 4- and 5- (but not 3-) year-olds showed implicit referential behavior by looking at the broken doll when the speaker used a negative (sad) sounding voice and by looking at the intact alternative (e.g., the intact doll) when the speaker used a positive (happy) sounding voice. However, only 5-year-olds also exhibited explicit referential behaviors by pointing to the target referent as a response to vocal affect cues (Berman et al., 2013). With age, children develop additional competence in using vocal affect cues in their referential decisions.

2.4 Contextual cues: Physical status of referents and discourse context

Several studies focus on the effect of contextual cues on children's and caregivers' choices of specific referential forms (Ateş-Şen, 2010; Ateş-Şen, Demir, & Küntay, 2011; Clancy, 1993; Guerriero, Oshima-Takane, & Kuriyama, 2006; Huang, 2012; Hughes & Allen, 2013, 2015; Narasimhan, Budwig, & Murty, 2005; Paradis & Navarro, 2003; Rozendaal & Baker, 2008, 2010; So & Lim, 2012). Caregivers mostly use lexical forms rather than omitted forms (e.g., null or pronominal forms) for new referents (i.e., previously not mentioned in the discourse) (Guerriero et al., 2006; Huang, 2012; Hughes & Allen, 2013, 2015; Paradis & Navarro, 2003; Rozendaal & Baker, 2008, 2010) and absent referents (i.e., physically not available to the addressee) (Huang, 2012; Hughes & Allen, 2013, 2015; Paradis & Navarro, 2003). They are also more likely to use lexical forms (as compared to zero forms) for referents in contrastive contexts (Huang, 2012; Paradis & Navarro, 2003) or

in interrogative contexts (i.e., places within a question or in response to a question; Huang, 2012; Paradis & Navarro, 2003). However, they are less likely to use overt forms in the presence of joint attention (Ateş-Şen et al., 2011; Hughes & Allen, 2013, 2015). Moreover, caregivers also use more gestures when talking about new referents whereas they produce fewer gestures while talking about given (i.e., previously mentioned) referents (So & Lim, 2012). Importantly, Guerriero and colleagues (2006) found that children's verbal- and non-verbal referential choices resembled their caregivers' referential choices. For example, Japanese-speaking children, whose parents used either non-lexical or lexical forms for 'new' referents, and English-speaking children, whose parents basically used lexical forms for 'new' referents, displayed the same patterns as their parents. These results might suggest two different explanations: (1) The mastery of discourse-pragmatic devices is earlier for children who are exposed to input that consistently includes appropriate use of these devices, (2) As suggested by Guerriero and colleagues, Japanese-speaking children learnt from their mothers a specific communication style that is typical of Japanese speakers. That is, interactions between Japanese-speaking adults showed that when the speaker and the listener are familiar to each other (with previous shared experiences and knowledge), the speaker is not expected to explicitly express the intended communicative message. The onus is on the listener to predict the intended message from the contextual information (Clancy, 1986). Therefore, based on Guerriero et al.'s (2006) argument, we suggest that interactions with adults also play an important role in children's learning of specific communicative cases; for example, using different referential forms to map onto the same discourse function is acceptable. As So and Lim (2012) suggested, this finding supports the claim that regularity and consistency in the mapping between referential expressions and discourse-pragmatic functions are conducive to children's uptake of the relevant strategies.

In our own work, we investigated whether topically continuous discourse dubbed as 'referential sets' serve as a model for toddlers with regard to referential communication skills (Ateş-Şen, 2010). Referential sets refer to a sequence of utterances that track a referent across at least three successive utterances in child-directed speech. Turkish allows dropping nouns referring to the same referent across utterances. Ateş-Şen, et al. (2011) found a tendency to keep using overt nouns for previously mentioned referents in discourse among 12- to 22-month-old children and their caregivers. Caregivers tended to repeat lexically explicit nouns in extended discourse about the same topic, and young children tended to repeat the nouns used by their caregivers.

A similar study (Frank, Tenenbaum, & Fernald, 2013) observing the interactions of 6- to 20-month-old children with their mothers during object-centered play also showed that 'reference continuity' or 'discourse continuity' (i.e., whether

the speaker talks about the same referent as in the previous utterance or utterances) can help children to identify a referent. They calculated the probabilistically combined effects of contextual cues (i.e., the presence of toys in the view of the learner), social cues (i.e., mothers' looks, touches, and points to the referent), attentional cues (i.e., children's looks, touches, and points to the referent) and discourse-related cues or 'discourse continuity' (i.e., the repetition of a referent at least three times throughout the discourse) on children's skills to determine referents. The results indicated that children would make a better (but not perfect) prediction of a speaker's intended referent in the presence of the aggregated effect of social cues (i.e., mothers' looks, touches, and points) and of discourse continuity as opposed to when only their individual effects were considered.

Although many studies show the sophisticated nature of children's developing referential strategies in infancy and preschool ages, some studies indicate that performance in referential tasks does not reach adult levels even for elementary school-age children (Bahtiyar & Küntay, 2009; Serratrice, 2008). In fact, children's referential abilities are not target-like even in the adolescent years (Dickson, 1982). As their language skills increase throughout middle childhood, children face the challenge of engaging in a higher number of communicative contexts with different types of partners, and experience linguistically and socially more complex situations that require more advanced levels of referential understanding. For example, throughout elementary school (with the tasks of reading, writing and presentations) the nature of necessary referential skills changes. Children's adaptation of their existing referential skills to the requirements of such novel and challenging situations takes time. Communicative partners might affect and facilitate such adaptations. An important question is how children's referential speech and behavior change depending on distinct contexts (e.g., dyadic vs. multi-party, formal vs. informal, familiar vs. unfamiliar) with different communicative partners (e.g., siblings, strangers, teachers, peers, etc.). This question has unfortunately not been addressed adequately, especially with children older than preschool ages. 'Training studies' examining how children benefit from training by adults in developing referential communication skills also mostly focus on the preschool period. Similar experimental studies should be implemented with school- and older-age children.

In the next section, we will cover a number of training studies that help us to examine how adults provide feedback to young children's referential communication skills and how children benefit from feedback-based interactions.

3. Mentoring children's referential skills: Training studies

Golinkoff (1986) observed communications of mother-infant dyads during lunch-time and found three types of communicative episodes: negotiations (i.e., mothers did not understand infants' communicative messages immediately and assisted them to correct or clarify these messages), immediate successes (i.e., mothers correctly comprehended infants' communicative messages), and missed attempts (i.e., mothers missed infants' communicative signals). Negotiation episodes were composed of four parts, namely 'infant's initial signal', 'the mother's comprehension failure', 'infant repair' and 'episode outcome'. Golinkoff (1986) suggested that observing changes in these components helps us to understand how preverbal infants' communicative skills develop. The present section of this chapter focuses on children's repairs and also on how adults play a role by giving feedback to children in order to make them notice and repair their communicative failures.

Early training studies that focused on children's ability to adjust their communicative behaviors in response to listener feedback yielded contradictory results. Experimental studies indicated that preschool children have limited skills to repair their communicative failures based on listener feedback (Glucksberg & Krauss, 1967; Peterson, Danner, & Flavell, 1972). On the other hand, research examining spontaneous interactions between adults and children found that children at pre-school ages are capable of understanding that their messages are ambiguous (Robinson & Robinson, 1981) and are able to reconstruct these messages in view of an adult's response (Gallagher, 1977). However, there are a few studies examining the effect of adult feedback on communicative reconstructions of younger children (Matthews, Butcher, Lieven, & Tomasello, 2012; Matthews, Lieven, & Tomasello, 2007; O'Neill & Topolovec, 2001) and some of these studies have demonstrated that toddlers do not sufficiently benefit from feedback to resolve referential ambiguity (O'Neill & Topolovec, 2001). For instance, O'Neill and Topolovec (2001) examined referential repairs of toddlers at the age of 2;8 in response to clarification questions. A sticker was hidden under one of two boxes while the mother's eyes were closed and children were asked to help their mother to find the sticker. The boxes had different pictures on them (e.g., a boat and a train) and were placed either adjacently or away from one another. In the condition where the boxes were close to each other, labeling the picture on the box rather than pointing would help mothers to find the hidden sticker. In the condition where the boxes were located far away from each other, either labeling the picture or pointing worked for directing the mother's attention to the sticker. Following the testing trials, children were also provided with two feedback trials and one subsequent testing trial if they failed to use labels to identify the target box in their initial response. In the feedback trials, the children were provided with a general

prompt (“which one?”) and if necessary with a more specific second prompt (“the boat?” or “the train?”). Eight out of 16 children (50%) never named the label on the box in the first testing trial. Five of those (62.5%) used the label after they had been provided with the general prompt while 3 of them (37.5%) of them required the specific prompt to use a label. However, in the second feedback trial, only one child (12.5%) spontaneously produced a label, transferring knowledge gained through feedback to a new trial.

Countering the generalization that toddlers do not benefit from feedback to reconstruct or repair their communicative messages and resolve referential ambiguity, Matthews et al. (2007) suggested that children’s failure in O’Neill and Topolovec’s (2001) study resulted from insufficient numbers of feedback and testing trials. Comparing children’s performance in studies with systematically different numbers and duration of training and testing trials can help us to understand whether children require a certain training regimen to acquire or improve their referential communication skills. Although children’s initial communicative attempts are usually not sufficiently informative and often include a communicative failure, some early training studies demonstrated that children can repair their communicative failures by (1) directing their attention to the contrastive features of objects in referential settings (e.g., Asher & Wigfield, 1981; Lefebvre-Pinard & Reid, 1980), (2) observing adult models who are competent in referential communication (Whitehurst, 1976; Whitehurst, Sonnenschein, & Ianfolla, 1981), (3) experiencing (rather than observing) communicative breakdowns of their own (Deutsch & Pechmann, 1982; Robinson & Robinson, 1985; Sonnenschein & Whitehurst, 1984), and (4) getting explicit feedback about the reason(s) for the inadequacy of their communicative message (Sonnenschein & Whitehurst, 1984; Whitehurst, 1976; Whitehurst et al., 1981). A recent study (Matthews et al., 2007) found that the best way to boost children’s referential performance was by enabling them to experience communicative breakdown and repair. In fact, even very young children (i.e., 2-year-olds) improved their referential strategies after participating in three 10-minute training sessions that included feedback about their own communicative attempts. Interestingly, the second best way to facilitate children’s referential strategies was by observing modeled communicative breakdowns and repairs between two adults (Matthews et al., 2007). Although we could not find any study that systematically focuses on the effect of referential communication among third parties on children’s own referential skills, there is a growing literature demonstrating that children exposed to multi-speaker contexts are able to acquire novel words through overhearing interactions between two communicative partners (Akhtar, 2005; Akhtar, Jipson, & Callanan, 2001; Floor & Akhtar, 2006; Schneidman, Buresh, Shimpi, Knight-Schwarz, & Woodward, 2009). These studies consider the possibility that various communicative contexts

bring in different types of challenges and facilitations for the development of children's referential skills. To explore this, Carmiol and Vinden (2013) tested 3- and 4-year-olds' judgments about a listener's knowledge of the content of a box. In the pretest trials, an experimenter played a hiding game with the child and two dolls (e.g., Ernie and Bert). She hid an object into a box while the child and the speaker doll (e.g., Bert) were able to see the object, but the listener doll (e.g., Ernie) was not able to see it. After the experimenter hid the toy, children watched a scene where the speaker doll provided the listener doll with either informative (e.g., "Hey Ernie, the plate is in the box") or ambiguous (e.g., "Hey Ernie, it's in the box") verbal messages related to the content of the box. Following the scene, they were asked to predict whether the listener doll (e.g., Ernie) knew the content of the box and also to explain the reasons for their predictions. Between the pre- and post-test trials, the children were exposed to one of the training conditions. In the *general feedback* condition, they were informed about the listener's knowledge state (i.e., whether the listener knew the content of the box or not). In the *specific feedback* condition, in addition to the listener's knowledge state, they were also informed about the clarity of the verbal message provided to the listener (i.e., why the listener knew or did not know the content of the box). In the *no feedback* condition, they were not provided with any information related to the listener's knowledge state or the clarity of the verbal messages. Only the *specific feedback* condition helped children to evaluate the ambiguity of the verbal messages and link this information to the listener's performance in the hiding game. At the end of the experimental trial, there was a transfer task (i.e., a modified version of the *doodles transfer task* developed by Ruffman, Olson, & Astington, 1991). In the task, the children saw restricted views of two object pictures (e.g., a shark and a witch) that had a similar component (e.g., a *triangle* fin, a *triangle* hat). In the informative trials, big windows were used, which enabled children to see the target object from a larger perspective and easily identify whether it was a shark or a witch. In the ambiguous trials, small windows were used, which made the identification of the target referent difficult since children could only see the component common to the two alternative referents (e.g., a triangle). The results indicated that children in both the *general feedback* and the *specific feedback* conditions improved their initial evaluation of the quality of verbal communicative messages. However, children in all groups performed poorly in the transfer task which required judging visual cues in order to identify the target referent. Merely giving feedback helps children to improve their existing referential skills in a specific task, but it does not help them to transfer these skills to a new task even if the overall structure of the two tasks is highly similar. However, as suggested by Carmiol and Vinden (2013), the distinct nature of the two tasks (judging verbal quality vs. non-verbal or visual clarity of the messages) can be an alternative

explanation for children's failure to transfer their improved skills from the main task to the second task.

Differences in the nature of referential cues or messages can also be observed in children's daily life, when they are in different communicative contexts or with various communicative partners. Moreover, different communicative contexts and partners perhaps provide children with distinct kinds of communicative advantages and disadvantages. For example, Oshima-Takane, Goodz, and Derevensky (1996) investigated first- and second-born English-speaking toddlers' acquisition of personal pronouns (i.e., *me* and *you*) at 21 and 24 months of age. Children's spontaneous interactions with their caregiver, their sibling, and the experimenter were examined in a lab environment. A pointing task (i.e., pointing at a body part of the experimenter, the caregiver, or the child and asking the owner of that body part) and a picture task (i.e., showing photos of the experimenter, the caregiver, or the child and asking who the person was in the picture) were also administered. The results showed that second-born children were better than first-born children at pronoun production at both ages. The authors attributed this result to the finding that, in triadic interactions, second-borns heard more pronouns in overheard-speech conditions (i.e., the child overheard the conversation between the caregiver and the sibling) than in addressed situations (i.e., the caregiver directly talked to the child).

In addition to sibling interactions, children's interactions with peers are another important source to examine how children's referential interactions change depending on various communicative partners and conditions. Frequently interacting with peers rather than with adults might provide children with more opportunities to experience and repair communicative breakdowns, which is one of the most efficient contexts to improve referential strategies as demonstrated by recent research of Matthews et al. (2007). Alternatively, such peer interactions might offer fewer opportunities to observe advanced models of referential communication and benefit from adequate feedback, which is another important context for development of children's referential skills (Whitehurst, 1976; Whitehurst et al., 1981). Further research is needed to study the contribution of various types of communicative interactions with distinct features on the development of referential communication.

There are also studies that show that children's strategies to repair their breakdowns change depending on the type of feedback provided (Anselmi, Tomasello, & Acunzo, 1986; Coon, Lipscomb, & Copple, 1982; Fagan, 2008; Nilsen & Mangal, 2012; Wilcox & Webster, 1980). For example, specific feedback elicits more informative repair statements (Coon et al., 1982; Matthews et al., 2012) while vague feedback (e.g., "huh?" or "what?") elicits more repetitions of the initial request

(Anselmi et al., 1986; Nilsen & Mangal, 2012; Wilcox & Webster, 1980). Similar to specific feedback, goal substitution (i.e., selecting an incorrect but plausible referent among the alternatives) leads to repairs with new information (Nilsen & Mangal, 2012).

Some recent research (Bahtiyar & Küntay, 2009; Varghese & Nilsen, 2013) has also indicated that the motivational context plays an important role in young children's learning of appropriate referential behavior. Bahtiyar & Küntay (2009, Study 2) examined how children's referential requests changed when only the target (e.g., a small scissors) was available to both the listener and the speaker and a competitor referent (e.g., big scissors) was exclusively accessible to the speaker (i.e., privileged ground condition), or when both the target and the competitor were in the common view of both the speaker and the listener (i.e., the common ground condition). Five-year-old children were instructed to request the target object from a confederate using either general (i.e., "Tell the listener to pick this up") or polite (i.e., "Ask politely for the object") request forms. Children who were prompted to use polite forms produced more request constructions and discriminating adjectives to identify a referent when there was referential ambiguity (as in the common ground condition). Varghese and Nilsen (2013) investigated the effect of incentives on children's referential clarity. Preschool (3- and 4-year-old) and school-age (6- and 7-year-old) children were asked to describe a target referent (i.e., a sticker on a book) to an imaginary listener in another room under either the *incentive* or the *no-incentive* condition. In the *incentive* condition, children were promised that they would get the sticker they described at the end of the session if their description was correct and it allowed their listener to find it. In the *no-incentive* condition, children were not given extra information and only asked to describe the sticker to the listener. The results showed that promising an incentive increased school-age children's (but not preschoolers') informative descriptions. However, incentive goals did not reduce children's redundant use of descriptions and pointing gestures that could not be seen by the listener. The author concluded that incentives provided by others trigger behaviors that enable children to reach their goals, but do not help them to notice or upgrade their inefficient communication strategies. This study shows that children can be motivated with incentives to improve the clarity of their referential descriptions in formulating descriptions for others, but it does not consider how caregiver feedback might interact with incentives. It could be that preschoolers would benefit from incentives as well as the school-age children if they were provided with some feedback about their ineffective referential strategies.

Syntactic-pragmatic priming by adults also plays an important role in young children's learning of referential clarity (Sarilar, Matthews, & Küntay, 2015).

Children participated in a matching-sticker selection task, where they were asked to choose the target sticker (among an array of stickers) from a board on the wall in order to complete the missing parts in their own book in comparison with the pictures in the complete adult version of the book. After a pretest, the children were exposed to another selection task where they were exposed to different kinds of feedback related to their selection. In one of three experimental conditions, the children either heard a relative clause that uniquely identifies the referent, or a demonstrative-noun phrase (i.e., “that sticker”), or just a positive approval statement related (i.e., “You did a nice selection”). The use of uniquely identifying referential forms increased most when the children were exposed to relative clauses. Moreover, children’s use of naturalistically infrequent relative clause constructions in Turkish (Slobin, 1986) increased when the feedback included a relative clause.

In summary, young children have difficulty performing appropriately in various types of referential communication tasks (Golinkoff, 1986; O’Neill & Topolovec, 2001). However, adult interactive partners can contribute to children’s referential skills by supplying sufficient information about children’s breakdowns in conversational exchanges and by presenting appropriate models of referential behaviors. However, we do not exactly know how the effect of different types of feedback changes depending on the nature of the referential task (e.g., familiarity of the task), the characteristics of the communicative context (e.g., dyadic, multi-speaker contexts) and the communicative partners (e.g., age, familiarity of the interactants, and the difference in the competence level or knowledge status of partners). We also need to examine whether different kinds of feedback are useful for children who exhibit distinct levels of communicative competence and who experience different types of communicative failures.

Although the research surveyed in this chapter underlines the importance of the role of adults in the development of children’s referential communication, this is not to say that children are passive learners in communicative exchanges with their caregivers. In a recent study, Morisseau, Davies and Matthews (2013) showed that children seek out interlocutor cues from their conversational partners. Morisseau et al. (2013) examined 3- and 5-year olds’ reactions (i.e., requests for clarifications or comments, reaction times to response, and gaze checks to the experimenter) to adult’s under- or over-informative sentences in a referential communication task. Children were asked to fill empty slots in a wooden grid with appropriate picture cards according to the target model in a booklet. The children’s task was to choose the target from a set of cards on a table according to the experimenter’s instructions. The presence of a modifier (modified vs. non-modified condition) and also whether there were one or two objects from the same category (contrast vs. no contrast condition) were manipulated. There were

four different instruction types when these two factors were crossed: (1) under-informative condition (e.g., saying “the banana” in the presence of one peeled and one unpeeled banana), (2) optimal condition without modification (e.g., saying “the train” in the presence of only one train), (3) over-informative condition (e.g., saying “the cat with a tail” in the presence of a stereotyped cat), and (4) optimal condition with modification (e.g., saying “the house with windows” in the presence of one house with windows and one house without any windows). Both 3- and 4-year olds showed sensitivity to the under-specified instructions and made verbal or non-verbal (i.e., looking at the experimenter) requests for clarification, checking the experimenter's gaze, or showing slower responses (only 5-year olds). However, only 5-year-olds showed sensitivity to over-informative instructions by responding more slowly after the instructions, checking the experimenter's gaze, and verbally specifying that the instruction was unusual. Therefore, it seems that children build up specific hypotheses about which entity or entities will be referred to in a certain communicative context and actively look for information from their caregivers about why certain referring expressions are chosen in that context. If their expectations are not met, they take action to find out why.

4. Conclusion

To explain developmental gradients in referential communication, children's developing social-cognitive abilities have been more readily invoked than caregiver influences. Recent research, though, uses both naturalistic and experimental study designs to show how the interaction between adults (especially caregivers) and children might help young learners to improve their referential skills. Both naturalistic and experimental studies examining the effect of various communicative cues on children's referential skills show that beginning from very early on, children can adapt their referential expressions by tapping into their interlocutors' verbal and non-verbal cues. Further, gestures (especially deictic ones) help speakers to disambiguate a referent, although we do not yet know the extent to which gestures and other non-verbal channels of communication are fundamental for the development of children's referential skills.

Experimental training studies also indicate that scaffolding children's communicative attempts with consistent and appropriate feedback helps them to adapt their existing skills to the increasing demands of new communicative situations. However, there are few studies that examine how parents (rather than adult confederates) provide feedback to their children during spontaneous interactions. Moreover, to our knowledge, there are no studies that systematically

investigate the effects of caregivers' own communicative breakdowns and repairs on children's referential communication. Whether interventions in the caregivers' referential strategies will contribute to children's referential skills is also an important question of theoretical and practical relevance for development of referential communication. Although referring is a fundamental linguistic and pragmatic ability, research has barely scratched the surface in terms of determining how child-level social-cognitive factors affect and benefit from child-directed and child-surrounding interactions in development of referential communication.

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