Introduction: an overview of the acquisition of reference

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Introduction: An overview of the acquisition of reference

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1. Why reference?

Language is a social tool that allows us to speak to others about the world. In doing so we need words that pick out those entities that we want to talk about. Linguistic expressions that identify such entities are known as referential or referring expressions, including proper names (Laura), natural kind terms (water, gold, tiger), indexicals (you, I, she), and definite descriptions (the dog, the smallest positive number). The mechanisms of reference have been the subject of intense speculation, and the debate over descriptive (Frege 1892/1948; Searle, 1958) vs. causal (Kripke, 1972/1980) or hybrid theories of reference (Evans, 1973) is still rife in the semantics literature (Genone & Lombrozo, 2012; Lam, 2010; Martí, 2014). Whatever the theoretical approach to reference, from a developmental perspective the three key questions are the following: What is the trajectory of language learners' comprehension and production of referential expressions? To what extent, and in which contexts, do children abide by the same linguistic constraints as adults in their referential choices? How do cross-linguistic differences shape the process of referential choice acquisition?

Referring to entities in the world around us is an integral part of communication and, as such, a key area of interest in the study of language development. Cross-linguistically, names for things are among the first and most frequent words in children's early vocabularies (Bassano, 2000; Gentner, 1982; Kauschke & Hofmeister, 2002; Nelson, Hampson, & Shaw,

1993) and, even before the appearance of first words, children can track and identify referents through gesture and eye gaze (Baldwin, 1993; Gliga & Csibra, 2009). This volume brings together some of the most influential research on the study of children's comprehension and production of reference in the last fifteen years.

The aim of this edited collection is to take stock of the developments that have occurred in the field since the late 1990s when some of the limitations of syntax-only (generative) approaches to the acquisition of reference started to become apparent. A number of researchers began shifting the focus from the role of syntactic constraints, and a deficit model of argument realization, to children's early sensitivity to discourse-pragmatic constraints. This approach situated the use and acquisition of referential expressions in a model of language development where children are interlocutors in a dialogue. What children choose to say, and which referential expressions they select, is determined not only by the phonological and morpho-syntactic affordances and limitations of the language(s) they are learning to speak, but crucially by aspects of the discourse to which their utterances belong. Whether a child realizes the subject of a sentence as a null form, a pronoun or a noun phrase is therefore analysed not only in terms of whether the language is a null-subject language or not, but also in terms of what the child knows and understands about unambiguously identifying a referent for the benefit of an addressee. All the chapters in this volume acknowledge the contribution of phonology and morphosyntax in the distribution of referential expressions, but they reserve a special place for the role of discourse pragmatics in both naturalistic corpora and experimental settings.

Another major focus of the current volume is the breadth of its cross-linguistic coverage. Wherever possible authors have drawn on evidence from several different languages in their analysis of the same linguistic phenomena, teasing apart language-universal from language-specific constraints on the acquisition of reference. Data from more

than 25 languages are discussed, ranging from Ukranian to Korean and from Amharic to Catalan. These include languages that typically require the use of overt subjects and objects to realize referents (e.g., French, Norwegian), as well as those that permit the use of null forms to realize subjects (e.g., Italian, Spanish), and those that permit the use of null forms to realize both subjects and objects (e.g., Inuktitut, Mandarin).

In the following section we lay the foundation for the volume, stepping back some 35 years to review the recent origins of the study of children's referential choice, beginning with the early systematic investigation of argument realization in a generative framework. The groundbreaking contribution of this research still informs our understanding of how children deal with expressing subjects and objects. Although some of the earlier arguments have now been superseded (see Hyams, 2011, for a recent review), it is important to take a historical perspective to appreciate the current state of the field. This initial focus on generative syntactic approaches to argument realization is then followed by an overview of information structure approaches. Sections 3 and 4 cover the thematic content of the chapters in this volume including discourse-related and child-internal influences on referential choice. We conclude with a short reflection on future directions.

2. A historical approach to argument realization in child language

2.1 The 1980s and 1990s: Syntactic and processing limitation accounts of argument realization

The interest of generative linguistics in child argument realization started with Hyams's seminal work on the null-subject parameter in the 1980s (Hyams, 1983, 1986) and its

subsequent incarnations (Hyams, 1992; Hyams & Wexler, 1993; Sano & Hyams, 1994). This work focused on syntactic accounts of subject drop and in particular on the relationship between root infinitives and argument omission. The omission of arguments, in particular the omission of subjects, has been studied extensively from a generative perspective in English (see Hyams, 2011, for a recent overview) and in several other languages (Pierce, 1989, for French; Clahsen & Penke, 1992, for German; Haegeman, 1995, for Dutch; Rhee & Wexler, 1995, for Hebrew; Hamann & Plunkett, 1998, for Danish; Guasti, 1993/1994, and Valian, 1990, for Italian; Valian & Eisenberg, 1996, for Portuguese).

The common finding in cross-linguistic research is that, regardless of whether children are acquiring a pro-drop (i.e., Null Subject language, henceforth NS) or a non-pro-drop language (i.e., a Non-Null Subject language, henceforth NNS), they all go through an initial, and variedly protracted period, in which their language is characterized by subject omissions. One of the most influential syntactic accounts of this phenomenon proposed that ungrammatical null subjects in NNS languages are the result of the initial mis-setting of the pro-drop parameter to the [+pro-drop] value; in essence children exposed to an NNS language assume that they were in fact learning an NS language (Hyams, 1983; 1986). This initial hypothesis quickly ran into a number of theoretical and empirical problems. The learnability problem allegedly posed by the assumption that NNS language learners set the parameter to [+pro-drop], and hence to a superset grammar, was quickly discounted by Hyams (1983, 1986) on the grounds that an NNS language like English and an NS language like Italian are not actually in a subset-superset relationship since the former includes expletive subjects (*it, there*) but the latter does not. Empirical issues that were not as easy to dismiss related to the finding that children's null subjects in NNS languages tend to be disproportionately more frequent with non-finite verb forms (Root Infinitives, RIs), and that they do not appear in object *wh*-questions and in embedded clauses, both of which are

syntactic contexts that are grammatical for null subjects in NS languages. A subsequent

parametric account, the Morphological Uniformity Hypothesis (Jaeggli & Hyams, 1988), ran

into additional empirical problems when it became apparent that English-speaking children

still used ungrammatical NS even after they had realized that their language does have some

tense and agreement marking verbal inflections and after they were using present and past

tense verb forms.

Another grammatical model of subject omission, Rizzi's (2005a, 2005b) Root Subject

Drop (RSD) and truncation hypothesis, has so far fared better in terms of empirical adequacy.

Capitalizing on Rizzi's (1993) clausal truncation hypothesis, the central argument of the RSD

is that children may optionally fail to produce - i.e., truncate - the full extent of functional

projections that are associated with finite clauses in the adult grammar. If we think of the

clause as a tree, and of functional projections as progressively higher branches starting from

the Verb Phrase (VP), then truncation at different levels will give rise to the attested range of

finite and non-finite clauses and of overt and null subjects. Truncation at the level of the VP

would account for the co-existence of RIs and null subjects, and would additionally explain

why null subjects are not found in embedded clauses. Rizzi, however, does not provide a

clear explanation of what would terminate children's initial reliance on RSD and of how they

would converge on the adult target. It is also not clear how the RSD interacts with the pro-

drop parameter in NS languages and what the prediction would be in terms of the attested

cross-linguistic difference in term of subject drop.

Just before Rizzi's RSD account, the parametric account was again revisited and

revived by Yang (2002) with the proposal of a 'variational' multiple grammar model where

grammars are rewarded or penalized on the basis of how successful they are at parsing the

input. In the specific case of NS, according to this approach, children would simultaneously

entertain an Italian pro-drop grammar, a Chinese topic-drop grammar, and an English NNS

grammar. Learners of an NNS language like English should quickly discard an Italian-style grammar on the basis of the absence of unambiguous verbal agreement; this would leave them with both a topic-drop and an NNS grammar. Yang's (2002) approach to the co-existence of a Chinese-style topic drop-grammar alongside the grammar of English provides a principled account of some interesting asymmetries relative to the proportion of subject and object drop, and to the omission of subjects in adjunct *wh*-questions (e.g., *Where go*?) but not in object *wh*-questions (e.g., unattested *What did see?*). Nevertheless the association between NS and non-finite verbs, as well as the absence of NS in embedded clauses, remain unexplained. Therefore, this more recent parametric account still falls short of a principled account of the empirical data.

Alongside parametric accounts, a host of processing limitations accounts were also proposed in the 1990s (Bloom, 1990; Valian, 1991); their aim was to situate the locus of children's non-target argument realization outside of purely grammatical constraints. Some of the claims made did not stand up to empirical scrutiny (e.g., that lexical noun phrases would be omitted more frequently than pronouns). Others initially did (e.g., the trade-off between VP length and subject realization), but were re-assessed as pragmatic rather than developmental issues in a later re-analysis (Hyams & Wexler, 1993).

2.2. The new millennium: Information structure and perspective taking

While the 1980s and the 1990s were mostly focused on making sense of argument omission in terms of syntactic and processing limitation accounts, the beginning of the new millennium saw a renewed interest in the role of discourse-pragmatic constraints on argument realization. In seminal papers that capitalized on earlier insights provided by Greenfield & Smith (1976), Clancy (1993, 1997) and Allen (2000) started a prolific line of research where a great deal of

attention is paid to understanding how children comprehend and produce referential expressions in interaction. This means trying to make sense of how the choice of a pronoun, a null form or a lexical noun phrase is probabilistically determined by a number of factors that sometimes compete and sometimes are complementary. A non-exhaustive list of factors include the preceding discourse, the mental state of the speaker and of the addressee, the physical context and the type of linguistic task (e.g., naturalistic conversation vs. experimental set up), the monologic vs. dialogic nature of the interaction (e.g., a narrative vs. a dialogue), the interlocutor's response, the use of gestures, access to more than one language (e.g., the case of bi- and multilingual children), limited access to mental representations, and reduced processing capacities (e.g., the case of atypically developing children).

By the end of the 1990s it became clear that a syntax-only approach to children's argument omission was always going to fall short of explanatory adequacy of the empirical data. A grammatical model provide categorical instructions on the licensing and identification conditions for null and overt arguments, but what it cannot deal with is the probabilistic information that determines when a certain referring expressions will be used over another. For instance, the syntax of an NS language like Italian allows both null and pronominal subjects as syntactically grammatical options. What the syntax does not specify, however, is when we should use one form over the other. This kind of choice is determined by the information structure of the sentence (IS), i.e., the encoding of which part of the sentence is more informative in relation to a particular context. This approach is situated in a theoretical model where language is seen as the vehicle for the exchange of a message that requires both a speaker and an addressee. While syntactic accounts of sentence structure focus predominantly on sentence-internal issues of structural consistency, IS accounts of language are more preoccupied with the use of language in interaction. Whatever the speaker says cannot therefore be considered in isolation and purely on syntactic grounds, but must be

understood in the context of, minimally, a dyadic interaction between a speaker and a listener. Chafe (1970, 1974) put consciousness at the centre of referential choice since he believed that "well-known linguistic phenomena such as intonation, pronominalization, and to a lesser extent word order, are governed in a crucial way by these assumptions [i.e., a speaker's assumptions as to what is in his addressee's consciousness at the time of speech]" (Chafe, 1974, p. 111). Clark (1996) referred to similar notions and introduced the concept of 'common ground': "the mutual knowledge, beliefs and assumptions shared by the speaker and addressees" (Clark, Schreuder, & Buttrick, 1983, p. 247) that has informed much of the research on argument realization in child language over the last fifteen years.

The notions of consciousness and of common ground were also appropriated by Ariel (1988, 1990, 1991) through the prism of accessibility, and by Gundel and colleagues (Gundel; Hedberg, & Zacharsky, 1993) in the guise of cognitive status, with specific reference to the form of referential expressions. In her 1994 paper, Ariel identifies two questions that are germane to the Accessibility Hierarchy: the diagnostic question and the coding question. The diagnostic question asks what determines the degree of accessibility; the coding question posits three universal criteria that map the cognitive accessibility of a referent onto a linguistic expression: informativity, rigidity and attenuation. For 'old' referents – i.e., those that have been previously mentioned – crucial determinants of accessibility include recency of mention, competition, and prominence (particularly in connection with how closely referents are represented within a unit). Conversely, entities that are 'new' to the discourse call upon representations that are less accessible in memory and therefore less activated. Drawing upon a variety of written texts, Ariel (1994) showed an association between accessibility states and referential expressions that varies along a continuum from zero forms, for the most accessible entities, to full name + modifier for the least accessible ones. Ariel (1994) claimed that the scale is universal and that three criteria

are to be used to linguistically codify the psychological concept of accessibility: informativity, rigidity, and attenuation. Informativity refers to the amount of lexical information that is necessary to retrieve the appropriate entity. Rigidity relates to how uniquely identifiable the entity is and how uniquely referring the expression is in turn. Attenuation is closely connected to the notion of informativity as fuller expressions are necessary to maximize informativity; nevertheless, when the length of the linguistic expression is not in question, less attenuated forms are needed for entities that are lower on the accessibility scale (see for example the distinction between stressed and unstressed pronouns). Although Ariel (1994) argued that the Accessibility Hierarchy is valid cross-linguistically, she also acknowledged that this universal validity must be understood in relative rather than absolute terms and that different languages will allocate slots on the scale in different ways – see for example cross-linguistic differences in the distribution of personal pronouns.

Another referential hierarchy that has been proposed in the literature and that has inspired much subsequent developmental work is Gundel and colleagues' Givenness Hierarchy (Gundel et al., 1993). Similarly to Chafe (1974), Gundel et al. (1993) recognize that the form of referring expressions is determined by the assumed cognitive status of an entity in the listener's mind. They propose a scale of six cognitive statuses: in focus, activated, familiar, uniquely identifiable, referential and type identifiable. Each of the six statuses represents a necessary and sufficient condition for the use of a specific referring expression. Unlike Ariel's Accessibility Hierarchy, where the statuses associated with different forms are mutually exclusive, the Givenness Hierarchy is an implicational hierarchy in the sense that each status implies all the lower statuses but not vice versa. So, for example, an entity that is activated is also familiar, uniquely identifiable, referential and type identifiable. However, an entity that is type identifiable is not referential, uniquely

identifiable, familiar, activated or in focus. Claims of universal applicability are also valid for the Givenness Hierarchy, and Gundel et al. (1993) draw on a range of languages to show how the cognitive statuses map onto referential expressions in universally relative terms.

Developmental research since Clancy's (1993, 1997) and Allen's (2000) work has drawn on this theoretical literature to answer the questions of developmental trajectories, constraints and cross-linguistic differences in children's choice of referring expressions in naturalistic and experimental settings. Throughout this research, numerous discourse-relevant and child-related factors are identified that have a strong influence on the forms that children select to express referents, the strategies that they use to interpret referents, and the ease with which both production and interpretation occur. We review several of these factors in the following two sections, highlighting those that are significant themes in the chapters of the present volume.

3. Discourse-relevant influences on children's referential choice

3.1 Accessibility

One of the strongest discourse-relevant influences on children's referential choice is the accessibility of referents in the interaction (Allen, 2000; Clancy, 1993, 1997; Huang, 2011; Hughes & Allen, 2013; Narasimhan et al., 2005; Serratrice, 2005). Like adults, children must choose a referential form that takes into account how active the referent is in the mental representation of the interlocutor, and thus how easy it is for the interlocutor to access it. Many studies focus on the newness of the referent to the discourse: whether it is being introduced for the first time, has already been introduced and is now being maintained, or is

being reintroduced after intervening focus on another referent (Guerriero, Oshima-Takane, & Kuriyama, 2006; Rozendaal & Baker, 2008; Salazar Orvig, Marcos, Morgenstern, Hassan, Leber-Marin, & Parès, 2010). Other factors include whether the referent is ambiguous in the discourse because of potential competitor referents or not, whether the referent is absent from or perceptually available within the discourse context, whether the referent is inanimate or animate, and whether both interlocutors are attending to the referent in question or not (see review in Allen, Skarabela, & Hughes, 2008).

The basic finding is that children, like adults, typically use high information forms such as lexical noun phrases for referents that are not accessible to the interlocutor, and low information forms such as pronouns and null forms for referents that are accessible to the interlocutor (Allen et al., 2008). Similarly, children hearing a high information form tend to interpret the corresponding referent as new or less available in the discourse, while children hearing a low information form tend to interpret the corresponding referent as easily accessible and already familiar. Further, accessible referents appear predominantly as subjects of transitive verbs, while inaccessible referents appear predominantly as objects, in a pattern known as Preferred Argument Structure (Allen & Schröder, 2003; Clancy, 2003; Du Bois, 1987; Huang, 2012a; Narasimhan et al., 2005).

Aspects of accessibility also affect use of indefinite vs. definite determiners with noun phrases, use of gestures for referent disambiguation, and ordering of object referential expressions with respect to the verb, negation, or scope particles – all with implications for children's referential expression. For example, at least two studies have found that Russian-speaking children aged 1;6-2;3 did not consistently use target-like object-verb word order for specific objects, despite their ability to produce this syntactic structure (Avrutin & Brun, 2001; Dyakonova, 2004). The authors attributed this to the children's lack of ability to infer their interlocutor's knowledge of the specificity of the referent, and thus to their difficulty in

integrating accessibility information with syntax to produce the target-like structure. Schaeffer (2000) posed a similar explanation for somewhat older Dutch-speaking children's non-target-like ordering of object and negation. Another set of studies shows that 3- and 4-year-old speakers of English, Chinese, and Turkish use gestures to specify the identity of inaccessibile referents when insufficiently informative forms (pronoun, null) are used to express those referents in speech (Demir, So, Özyürek, & Goldin-Meadow, 2012; So, Demir, & Goldin-Meadow, 2010), although adults do not do so (So, Kita, & Goldin-Meadow, 2009).

The effect of accessibility on children's referential choice is a consistent theme throughout the present volume. Chapter 6 (Allen, Hughes, & Skarabela) reviews this literature in detail, while Chapters 7 (Salazar Orvig & Morgenstern), 8 (Hickmann, Schimke, & Colonna), 11 (De Cat), and 13 (Serratrice & Hervé) each include sections on the effect of accessibility on the selection of referential forms. In addition, several chapters highlight the effect of accessibility on particular aspects of referential expression: Chapter 2 (Bassano) on the production of determiners, Chapter 3 (Bentzen) on the production of object-verb word order, Chapter 4 (Chen) on referent intonation, Chapter 5 (Ng, Demir, & So) on referential gesture, and Chapters 9 (Sekerina) and 10 (Ateş-Şen & Küntay) on referent interpretation. Finally, Chapters 9 (Sekerina) and 12 (Chondrogianni) focus on a particular type of accessibility – referential choice in the context of within- and across-clause co-reference with pronouns and reflexives (i.e. Principles A and B).

3.2 Type of interaction: Differences in cognitive load

A second important discourse-related influence on how children realize referents is the type of interaction the child is involved in. Target-like referential choice is exhibited as early as age 1;6 in spontaneous speech (Clancy, 1993; Schmitz, 2007; Serratrice, 2005), but is

typically revealed later in narratives and experimental situations (Hickmann, 2003b; Theakston, 2012).

This difference is partly due to the degree of support and familiarity that children experience in the different tasks. Interaction within spontaneous speech is much more likely to focus on familiar topics, and on people and concrete objects present in the interaction. It also typically occurs in collaboration with familiar interlocutors who scaffold the interactions with devices such as repetitions and questions, and who support understanding with cues like gestures and gaze (McNeil, Alibali, & Evans, 2000; Morford & Goldin-Meadow, 1992; Salazar Orvig et al., 2010; Skarabela, 2007a). In contrast, narratives are typically less concrete, focusing on activities depicted in books or remembered from previous experience, and distanced in time and place from the context of interaction (Berman, 2015; Hickmann, 2003a, b). Narratives are also typically produced by the child alone, rather than in scaffolded collaboration with an interlocutor. Experimental situations are often even more challenging, since they frequently take place in an unfamiliar setting or with unfamiliar interlocutors, involve constrained or unusual interactions in order to carefully control the relevant variables, and often require the children to cope with competing variables (Serratrice, 2008; Theakston, 2012; Wittek & Tomasello, 2005).

Further, the additional demands of providing a particular type of response in an experiment also affects children's ability to reveal their knowledge of referential expression. For example, Bergmann, Paulus, and Fikkert's (2012) review of a large number of published studies found high variability (16% to 82% correct) in children's response accuracy in off-line pronoun resolution tasks depending on the type of task, which they attributed to the impact of the task itself. Each type of response required in an experiment assumes that the child has certain cognitive abilities and is able to integrate those with the relevant linguistic

knowledge to complete the task. Studies such as Bergmann et al. (2012) increasingly call such assumptions into question (see also discussion in Section 4.1).

The different degrees of support and familiarity in interactions crucially affect cognitive load: the less familiar the setting and the greater the number of factors to be attended to, the higher the cognitive load for the child, and thus the more the difficulty in revealing knowledge of target-like referential choice. The production of referent intonation is also affected by cognitive load: children are better able to use intonation to differentiate referents in contexts where the referents differ in only one dimension and appear in the child's own speech, such as in a simple picture description task, than in contexts where referents differ in multiple dimensions and occur in dialogues, such as in spontaneous speech (Chen, 2011; de Ruiter, 2010).

The type of interaction affects not only production but also interpretation of reference. In particular, children's referential choice abilities are revealed differentially in off-line vs. on-line studies (Bergmann et al., 2012; Clackson, Felser, & Clahsen, 2011; Papadopoulou, Peristeri, Plemenou, Marinis, & Tsimpli, 2015; Sekerina, Stromswold, & Hestvik, 2004). On-line tasks such as self-paced listening and eye tracking reveal the child's processing in real time, often showing subconscious knowledge. They are also relatively undemanding as the child does not need to perform any particular behavior to illustrate his/her knowledge. Off-line studies such as picture selection tasks, grammaticality judgments, act-out tasks, and verbal responses reveal the child's knowledge after some period of reflection. On the one hand, they offer more time to the child to demonstrate his/her knowledge; on the other hand, they require a behavioral response which may be demanding enough that the child's ability to demonstrate his/her knowledge is impeded.

These themes of interaction type and related cognitive load are central to Chapters 7 (Salazar Orvig & Morgenstern) and 8 (Hickmann et al.), and are also covered in Chapters 4

(Chen), 5 (Ng et al.), and 6 (Allen et al.). Chapters 9 (Sekerina), 11 (De Cat), and 12 (Chondrogianni) highlight the role of extra-linguistic cognitive demands in task performance and the need to attend to those more closely. While most of the chapters in this volume report primarily off-line tasks, Chapter 9 (Sekerina) explicitly focuses on the results of on-line tasks.

3.3 Prosody

Prosody is a third discourse-related factor that influences referential choice. Early on, the trochaic structure of utterances influences whether referents are realized or not: referential expressions that would fall under weak stress within the trochaic structure tend to be omitted more frequently than those that fall under strong stress (Gerken, 1991). By the age of 3 years, children are consistently producing referents where they are required in the target, and have begun to use prosody to mark certain types of referents. At age 3 to 4 years, they can use intonational prominence to mark contrastive referents, although this ability becomes more target-like with development (Müller, Höhle, Schmitz, & Weissenborn, 2006; Wonnacott & Watson, 2008). Use of intonational prominence to mark new referents takes longer to master (Chen, 2009). Chapter 2 (Bassano) discusses the role of prosody in children's production of determiners, while Chapter 4 (Chen) deals extensively with prosody and intonation in children's referential production.

3.4 Caregiver input

A fourth relevant factor is caregiver input. Although caregivers do not typically explicitly teach language to their children, they nonetheless provide input to children about target-like referential forms to be used in a variety of contexts. First, caregivers provide positive models

of production and comprehension through their interactions in conversation (Gallaway & Richards, 1994), and scaffold children's developing skills in referential expression through gestures, labeling, repetition, questions, and the like (Namy & Nolan, 2004; Salazar Orvig et al., 2010). Caregiver input is particularly relevant for bilingual children, in the sense that the amount and quality of input in each language is one determinant of language dominance in the child, which has implications for patterns of cross-linguistic influence in referential expression (Paradis & Navarro, 2003; Silva-Corvalán, 2014).

Second, caregivers often 'recast' children's non-target-like utterances (e.g., Child: *Grandma like flower*; Caregiver: *Yes, Grandma really likes flowers*), thus providing implicit feedback about ways children should change their utterances to make them more understandable (Saxton, 2005). This is relevant even at very young ages (younger than 18 months) where children express referents solely through gesture and caregivers recast this to model how to express the referent in speech (e.g., Child: point at bird while saying *Nap*; Adult: *Yes, the bird's taking a nap*; Goldin-Meadow, Goodrich, Sauer, & Iverson, 2007). This type of implicit feedback is also relevant for the ways that children align their referential choices with those of their caregivers in the context of interaction (Matthews, Lieven, Theakston, & Tomasello, 2006).

Third, caregivers provide explicit feedback through signals of lack of comprehension such as questions of understanding (*What? Who are you talking about?*) or responding in ways that the child did not expect as a result of misunderstanding (Gundel & Johnson, 2013; Matthews, Butcher, Lieven, & Tomasello, 2012). Even a relatively small amount of explicit feedback can influence children to become much more target-like in the informativeness of their referential expressions (Matthews et al., 2012).

Although every chapter assumes that children take up information from the model of caregiver input, it is a particular focus of Chapters 2 (Bassano), 4 (Chen), 10 (Ateş-Şen &

Küntay), and 13 (Serratrice & Hervé). The role of scaffolding is central to Chapters 7 (Salazar Orvig & Morgenstern) and 10 (Ateş-Şen & Küntay), while the role of explicit feedback in children's referential choice is discussed in Chapters 6 (Allen et al.) and 10 (Ateş-Şen & Küntay).

4. Child-related influences on referential choice

In addition to factors primarily relevant to the discourse and interaction, numerous factors related to the child himself or herself also affect referential choice.

4.1 Developmental factors: Age, language ability, cognitive ability

Perhaps the most obvious child-related influences are developmental factors such as age, language ability, and cognitive ability. Typically, children's abilities to select and interpret referential expressions in a target-like way increase as they get older, have more facility with language in general, and have greater cognitive capacity

The relevance of children's cognitive ability to referential expression is a relatively recent focus of interest, spurred by recent increased discussion of the role of executive functions within monolingual and bilingual language processing. De Cat (this volume) outlines several cognitive abilities that children must possess to successfully encode and decode referents, in addition to the relevant linguistic competence: "(i) attentional resources, (ii) working memory, (iii) the ability to distinguish one's perspective from that of one's addressee, (iv) the ability to inhibit one's perspective, (v) the ability to integrate visual and verbal information into a coherent situational model, and (vi) the ability to maintain and

update that situational model. And these cognitive resources need to be sufficiently integrated for the child to be able to make use of them adequately." Most research on children's referential expression has not taken such factors into account. However, they clearly should be attended to in future studies.

All chapters discuss the role of development in referential choice to some extent, with respect to either age or language ability or both, given that all chapters are focused on children's acquisition of reference. Chapters 5 (Ng et al.) and 8 (Hickmann et al.) are specifically structured around stages in development of children's referential expression. In addition, sections on development are found in Chapters 2 (Bassano), 4 (Chen), 6 (Allen et al.), and 9 (Sekerina). The role of cognitive ability, and especially executive function skills, is the main topic of Chapter 11 (De Cat); this chapter highlights the cognitive skills that are likely to play a key role in referential expression, and lays out desiderata for future research taking these skills into account. Chapter 12 (Chondrogianni) focuses on the acquisition of reference in children with language disorders where the effects of language ability and cognitive ability can be dissociated.

4.2 Language spoken: Cross-linguistic differences in monolinguals and cross-linguistic influence in bilinguals

Another child-related influence is what language the child speaks. Children's acquisition of reference has been studied in many languages, of which more than 25 are covered in the present volume. Each language has its own repertoire of linguistic forms, not all of which are equally easy to produce, understand, or learn. The complexity of referential forms differs across languages in terms of phonological, morphological, syntactic, and pragmatic characteristics. For example, some languages permit realization of referents using null forms

(e.g., Japanese, Italian), which are obviously easier to produce than overt forms such as pronouns and noun phrases, and which tend to be overused in all languages at early stages of referent production (Huang, 2012b; Hyams, 2011). Some languages (e.g., French) opt for complex syntactic structures such as presentationals (*c'est Jean qui dort* 'it's John that's sleeping') and dislocations (*Jean, il dort* 'John, he's sleeping') to express referents that in other languages (e.g., English) are typically expressed by simple SVO structures; these more complex forms typically take children longer to learn (De Cat, 2004; Salazar Orvig et al., 2010).

Further, a particular form may be harder to learn in one language than in another for a variety of reasons. For example, numerous studies have shown that determiners emerge some six months later in Germanic languages (Dutch, German) than in Romance languages (Catalan, French, Italian, Spanish) (Bassano, Korecky-Kröll, Maillochon, & Dressler, 2013; Guasti, De Lange, Gavarró, & Caprin, 2008; Kupisch, 2006; Lleó, 2001; Lleó & Demuth, 1999; Rozendaal & Baker, 2008). One explanation for this difference derives from morphological complexity: French-speaking children need only attend to two genders and two cases to produce the correct forms, while German-speaking children must juggle three genders and four cases in a system with many homophonous forms that leads to considerable lack of transparency (Bassano et al., 2013). A second explanation focuses on the ways in which determiners are prosodified across the languages. French determiners are all monosyllabic, unaccented, and regularly prosodified with the following noun. In contrast, German indefinite determiners may be bisyllabic and accented, unaccented articles may not prosodify with the following noun or may even prosodify with a preceding word such as a verb or preposition (Lleó, 2001; Lleó & Demuth, 1999). A third explanation derives from differences in the frequency of determiner use in the input: Rozendaal and Baker (2008) show that determiners are used much more frequently in French child-directed speech than in

Dutch child-directed speech in their study. In sum, children demonstrate earlier target-like use of the structural options which are less complex, more consistent, fit within an easy prosodic pattern, or for which they have more or clearer evidence – all of which may differ across languages.

Influences from language structure are particularly relevant for bilingual children, who speak two languages and thus must juggle referential forms and norms of referential choice in two different systems. Sometimes these systems converge, both using the same form in the same context. Sometimes these systems are at odds, however. For example, Italian selects null forms for given referents while English selects pronouns (Serratrice, 2005). Under certain conditions, cross-linguistic influence occurs such that bilingual children use the pattern from one language when speaking the other, at least some of the time.

Every chapter in this volume deals with data from more than one language, and thus the theme of cross-linguistic differences in acquisition arises in each of them. In that light, it is particularly interesting to think about what patterns in the acquisition of reference are universal, and which are language-specific. The role of cross-linguistic differences in referential expression is a main theme of Chapter 8 (Hickmann et al.), and at least one section is explicitly devoted to this topic in Chapters 2 (Bassano), 3 (Bentzen), 5 (Ng et al.), 6 (Allen et al.), and 12 (Chondrogianni). Referential expression in bilingual children, taking into account the degree of structural overlap across their two languages, is the focus of Chapter 13 (Serratrice & Hervé), and is also touched on to some degree in Chapters 5 (Ng et al.) and 6 (Allen et al.).

4.3 Prerequisites for referential expression

A final issue is what prerequisites a child must possess to produce or comprehend referents in a target-like manner. Much of the literature attributes children's referential choice to their understanding of their interlocutor's knowledge of the discourse situation. For example, Gundel and Johnson (2013) state that children have an early stage of 'theory of mind' in which they can assess the cognitive status of their interlocutor and select referential forms in accord with what the interlocutor already has activated in memory or not. However, others believe that children do not have such a strong sensitivity to the information needs of the listeners, at least at very young ages (up to age 3). For example, Matthews et al. (2006) propose that children are sensitive to alignment in the discourse such that they simply follow the discourse model of their interlocutor – using a noun phrase for the first mention of a referent, and a pronoun for the second and subsequent mentions. As an alternative, Demir et al. (2012) and Serratrice (2013) propose that children are influenced in referential choice by their own discourse model and not by that of their interlocutor, such that they use more complex forms when the referents are difficult for them to distinguish, regardless of whether it is difficult for the interlocutor. These issues are touched on in Chapters 6 (Allen et al.), 7 (Salazar Orvig & Morgenstern), and 11 (De Cat).

5. Looking to the future

Children have much to learn when tackling referential choice. A wide range of referential forms is available to choose from, and many factors influence when to choose what form. The research presented in this volume consolidates our current knowledge about the course of children's acquisition of referential skills and opens up new lines of inquiry, some of which we signpost here.

5.1. Individual differences and change over time

We still know relatively little about how individual differences play a role in connection with referential skills. Children can vary greatly in the extent to which they understand and produce discourse-appropriate expressions. These differences are likely to be determined by a combination of environmental and child-internal factors including characteristics of the input and of the home language environment, as well as cognitive abilities, in particular perspective-taking and executive function skills that are related to theory of mind. It is not yet entirely clear whether children's early sensitivity to accessibility in their referential choice is best explained by early theory of mind in the form of understanding of others' cognitive status, by following a discourse model within ongoing conversation, or by the child's own discourse model.

Focusing on individual differences is important in order to create language profiles that can identify children who may be at risk for poor communication skills. A better understanding of individual differences can not only inform our theoretical understanding of the phenomenon, but can also have practical therapeutic and pedagogical implications with both typically and atypically developing children. For instance, recent evidence on the use of first and second person pronouns in native-signing children with autism shows that, despite the fact that pronouns in sign transparently identify their referents, deaf children with autism perform similarly to their hearing counterparts in using more proper names than pronouns (Shield, Meier, & Tager-Flusberg, 2015). The use of names in sign language instead of pronouns, despite the absence of the ambiguity that is inherent in first and second person pronouns in spoken language, points to issues with representation of self as a main underlying cause of the observed difficulties with pronoun production.

Insights into individual differences can be informed by extending the types of studies undertaken related to referential choice. To date, research in the field has largely focused on cross-sectional data. The field would benefit from more longitudinal studies of referential choice, as well as prospective studies that could clarify links between early and later referential abilities, and between referential abilities and other aspects of language competence in the pre-school years such as vocabulary size which we know to be highly predictive of later academic achievement. Additionally, research on the relationship between executive functions and referential choice will identify cognitive factors that underlie language abilities.

5.2 Methodological issues: Data collection methods, conversational partners and cross-linguistic comparisons

Corpus analyses and offline comprehension and production experiments have so far provided a wealth of information on children's referential choices. However, we still know very little about children's interpretation of referential expression in real time, and even less about their real-time processing for production. Non-invasive online methods like eye-tracking and ERP can make an important contribution to unveiling differences between offline and online behaviour, and thus refine our understanding of changes over time. Also very relevant would be more research comparing children's strategies for referential choice in comprehension vs. production. To date, these lines of research have largely proceeded independent of each other, and focus on different mediating factors and theoretical questions. However, there are sound theoretical reasons to believe that comprehension, production and acquisition are intimately connected, and that the incremental prediction of upcoming information formulated by the

production system is instrumental in fine-tuning the acquisition process (Dell & Chang, 2014).

Another limitation of most of the studies of referential choice so far is failing to consider that language is a multimodal phenomenon (Vigliocco, Perniss, & Vinson, 2014). During face-to-face spoken and sign language communication, gestures, facial expressions, posture and eye gaze accompany the language signal in both the oral and the manual modality. We know that children can attend to these non-linguistic cues from an early age, but the integration of this complex information in developmental studies of comprehension and production of referential expressions still has a long way to go. Within the spoken signal itself, the use of intonation is an area ripe for further study, both in contexts other than spontaneous speech and narrative production – such as reading aloud or comprehension – and in interaction with influences on referential choice other than newness and contrastiveness.

Moving on from the language signal to the speakers and listeners of the signal, it is an interesting discrepancy that young children's privileged interlocutors are their caregivers and other children, and yet in experimental set-ups children almost exclusively interact with unfamiliar adult experimenters (but see Köymen, Rosenbaum, & Tomasello, 2014, for an example of a peer-to-peer experimental set-up). The privileged role of parents, especially of fathers, is still not fully understood, especially in more demanding experimental situations. Peer-to-peer communication is another important missing piece of the puzzle given that a significant proportion of children's time, especially when they start school, or even earlier in day care, is spent listening and talking to other children. For some children, and perhaps especially for bilingual children, peers may be the only or main source of input in the majority language. Knowing more about peer-to-peer referential communication, both in terms of speaker and listener roles, would shed light on a hitherto unexplored aspect of children's language experience.

Finally, we end with a plea for more carefully planned cross-linguistic studies adopting the same methodology (e.g., Bassano et al., 2013; Rozendaal & Baker, 2008) as they would make an important contribution to teasing apart language-universal and language-specific issues in referential communication. Some of the evidence coming from a range of different languages is so far limited by methodological differences in data collection, coding and analysis that make direct comparison difficult or impossible. The same applies to the study of referential choice in bilingual children: more studies of potential cross-linguistic influence in bilingual children in a wider range of language pairs and structures than investigated so far would help us gain more insight into the effect of language structure on the relationship between accessibility and referential choice.

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