Inaugural address

Learning to talk about chairs (and other things)

Emergence and development of language-and-communication in children

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Learning to talk about chairs (and other things):
Emergence and development of language-and-communication in children

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Inaugural address as Professor to the Prince Claus Chair

in Development and Equity 2012-2014.

May 22 2013

Utrecht University

Your Majesty, Rector, Ladies and Gentlemen,

I feel privileged to give this inaugural lecture in your presence today.

As Prince Claus said in 1988 during his acceptance speech of the Honorary Fellowship at the Institute of Social Studies, "while money is important as a means of promoting the economic development process, development is essentially a cultural process. It is not a question of material goods but of human resources". I believe that among human resources defining human cultures, language and communication ability play a central role, supporting many aspects of daily functioning and learning. Indeed, when language development is slowed down, the impact on further knowledge acquisition and social interaction could be detrimental.

In this address, I start by pointing out that the development of language and communication abilities is a protracted and malleable process for children. Then I turn to some examples from my research about the development of a core communicative skill – learning to refer to objects in the context of verbal communication. At the end, I will outline what I think is essential knowledge that child language researchers need to seek after to provide guidance for efforts to foster language development.

Why is language learning protracted? Although it is true that many milestones can be universally achieved within the first three years of life, some aspects of language development can be quite long lasting, even extending late into adulthood years. 9-year-olds surely tell better narratives than 5-year-olds, and there is even further development into adulthood. Our linguistic repertoire keeps expanding throughout life span. Even as adults, we keep adding new words, concepts, and expressions to what we already know. It is true, though, later development builds upon foundations achieved in the first few years.

And why is language learning malleable? When environmental resources to support learning of language fall short for certain individuals, their language proficiency can be detrimentally affected. Although language is commonly hailed as a universal human-specific capacity, knowledge and use of language is not uniformly distributed across individuals, and could be a source of enhancing social inequality.

A developmental outlook in language sciences is essentially concerned with inequality, or more specifically differences across age groups. As developmental psycholinguists, we basically study systematic changes, or rather systematic sophistication of language skills across developmental time. As a case in point, differences between 1-year-olds, 5-year-

olds, 8-year-olds and adults are quite vivid when one looks at meaning representations by different age groups of a common word such as *chair*. We, as adults, all sort of know what chairs are. If I ask you now "how comfortable is your chair?" I can presume that the specific meaning of the word *chair* is accessible to you and you all know chairs are things used for sitting on.

How about younger individuals? What do they know about the word *chair*? Few 1-year-olds will understand or say the word *chair* to refer to things that people sit on. Mothers of a representative sample of Turkish 12-month-olds report (Aksu-Koç, Küntay, Acarlar, Maviş, Sofu, Topbaş & Turan, 2011) that less than one third (27%) of their children understand the word *chair*. And none actually produce the word *chair* yet. At 24 months, 40% of mothers report that their child says the word *chair*. In terms of production of this basic word, the percentage of children who produces it goes from 0 to 40% in the course of 12 months, from age 1 to 2. If we move further in age, 5-year-olds will understand and produce complex sentences such as "I want the chair that does not have a broken leg", where they can modify the noun *chair* with a second embedded clause. Obviously, there is a large developmental incline in language development between age 1 and 5. How about an 8-year-old, is there still development regarding the knowledge of the word *chair*? The following example of my own 8-year-old daughter's question to her 11-year-old sister suggests that there is. In excerpt 1, Rana asks Nida as they are playing some board game:

(1) *Annem Prince Claus'un sandalyesine mi oturacak?*
    Is my mom going to be sitting on Prince Claus' chair?

Rana at the age of 8 still needs to learn about the metaphorical extension of the common word chair.

But Woody Allen already knows about this metaphorical meaning. To illustrate sophistication of word meanings in adults, I would like bring in a famous quote from a 1977 movie of Woody Allen, the ever-wonderful Annie Hall. This is an example of creation of humour, relying on linguistic mastery of multiple meanings of a word. In excerpt 2, Woody Allen's character Alvy Singer is with his ex-wife Robin in a crowded cocktail party. Robin is pointing for Alvy some academic characters in the crowd.

(2) Robin: There's Henry Drucker. He has a chair in history at Princeton. Oh, and the short man is Hershel Kaminsky. He has a chair in philosophy at Cornell.

    Alvy Singer: Yeah? Two more chairs, they got a dining room set.

This anectodal example of developing knowledge of the word *chair* suggests there is a long path from emergence of communication to mastery of language. 1-year-olds could excitedly point to their high chairs when they want help with climbing on those and some seem to understand when their mother says "get in your chair, it is snack time". But life knowledge about other types of chairs would trickle in slowly and only with expanding culturally relevant life experience, making it possible for Woody Allen to write that unforgettable quote about faculty chairs and dining room chairs.

Such a protracted development in communicative skills and linguistic knowledge is not a simple development of one type of knowledge. Proficiency in language requires a complex interplay of three types of knowledge (Berman, 2004):

(1) *Mastery of linguistic devices* involves knowledge about the full range of expressive options, that is, vocabulary and grammar available in one's target language(s). In all languages, one needs to learn many words such as *chair*, and many sentences such as *sit on that chair.*

(2) *Socio-cognitive ability* allows one use these expressive options for different communicative goals and discourse functions. When there is more than one chair in an environment and one with a broken leg, and you want to identify the one with the broken leg, you can't just say "I want the chair", you have to say something like "I want the chair that has a broken leg" or some such sentence. Selecting the appropriate linguistic form for a specific situation involves socio-cognitive ability.

(3) *Cultural knowledge* involves knowledge about favored expressive options in a given speech community. Metaphorical meanings of chair as seats of office are probably not available to everyone. You might count on a joke that maps furniture items to symbolic faculty seats of office to pass in academic subcultures, but not in other settings.

In short, linguistic knowledge comes blended with other types of knowledge, calling for an approach in language sciences called **pragmatics**. Research paradigms in **pragmatics** draw attention to an integration of linguistic knowledge with other types of knowledge such as communicative goals and cultural knowledge. Although knowledge about linguistic devices or grammar can potentially be described as abstract, this knowledge needs to be effectively linked to action and context in actual settings. A question such as *where is the chair?* could be understood in multiple ways, but the context will usually favour a certain interpretation over others.

I have found it interesting and innovative to take a comparative pragmatic development approach to study children's language acquisition learning different languages. To me, **pragmatic development** involves learning to use linguistic devices and non-linguistic action in a well-integrated way in relation to an ongoing interaction and contextual

constraints (Küntay, Nakamura, Şen, in press). It is not enough for children just to learn linguistic devices and rules; they also need to learn to follow a set of communicative conventions. These communicative conventions are learned through early conversational interactions and are an essential element of social functioning. Since communicative conventions differ across linguistic communities, pragmatic development is better approached within a comparative, crosscultural, and crosslinguistic framework.

At this point I would like to shift to some of my research using the approach of comparative pragmatic development, in relation to an area called **referential communication**. Referential communication is conveying reasonably clearly to our addressee who and what we intend to talk about. In any language, we can use a whole range of devices such as pointing gestures, pronouns such as *he* or *this*, nouns or proper names to refer to things and people. But we need to be cautious of the fact that we are identifying referents for the benefit of a specific audience who shares a certain type of knowledge and background with us. I should not refer to my husband only by his name out of the blue, when I know my addressee cannot guess who the person I am talking about is. Thus, the appropriate choice of the referential form relies on knowledge about available linguistic devices in one's language in addition to an understanding of the specifics of the **discourse–pragmatic context**, especially the communicative needs and the current knowledge state of the audience about the referent. As a first example of research on referential communication, I will talk about Turkish preschool children's use of the demonstrative pronoun system in comparison to that of adult Turkish speakers (Küntay & Özyürek, 2006).

Demonstrative pronouns are linguistic elements such as *this, that, here,* and *there* that refer to objects physically available during conversations. The meanings of demonstrative pronouns are not inherent as in content words like *chair*, but they are rather contextually specified. One can say "you want this?" with *this* referring to a chair or many other things – the context will help determine what is referred to by *this*. Before many content words make their way into early language, forms such as *this, that, here*, and *there* are usually already attested. In our representative Turkish data, 8% of 12 month olds and 65% of 24 month olds are reported by their mothers to be using *bu*, the Turkish version of the pronoun 'this'. These rates of usage are higher than for *chair* (0% of 12 month olds and 40% of 24 month olds) and most other content words. Thus, demonstrative pronouns appear relatively early in language productions of children.

But the developmental story is more complicated when we examine what makes children choose *this* over *that* or *that* over *this*. What are the dimensions that govern children's usage of certain demonstrative pronouns over others? Research with English learners showed

that children slowly learn to indicate the spatial location or the distance of the referent from a speaker to select *this* or *that* (Clark & Sengul, 1978; Tanz, 1976); *this* for closer objects to the speaker and *that* for farther away objects to the speaker.

More recently, non-Indo-European demonstrative pronoun systems that encode non-spatial meaning dimensions came to the attention of researchers (Diessel, 2006; Levinson, 2004). What do these systems look like and what kind of developmental challenges do they pose to their learners?

To address this question, we looked at Turkish learners, who encounter a three-way demonstrative pronoun system in their language (see Table 1). As demonstrative pronouns, Turkish includes *bu* and *o*, which correspond to 'this' and 'that' in English, *bu* for closer referents to the speaker and *o* for those that are near the addressee. However there is a third pronoun in Turkish, *şu*, that is used to direct an addressee's attention to a new referent, independently of the distance of this referent from the speaker or the addressee. *Şu* could be used to refer to very near referents, such as spots on the speaker's body, or very far objects, such as a boat hardly visible far in the horizon.

Table 1: *Turkish has a three-way distinction in its demonstrative pronoun system: BU, O, ŞU. The relevant dimensions determining the use of the pronoun are distance of the referent from the speaker and addressee attention being on or off the referent.*

|	Referent is Near speaker	Referent is Far from speaker
Addressee's Attention is On Referent	*bu*	*o*
Addressee's Attention is Off Referent	*şu*	*şu*

In order to study the acquisition of this three-way demonstrative system in Turkish, we conducted a study with preschool children at ages 4 and 6, and adults. We gave pairs of friends in each age group blocks of different sizes and colors so that they can work together and use these blocks to build a construction as shown in a picture. We video-recorded the sessions for 12 minutes each. As this collaborative task called for reference to blocks and the parts of the model in the picture, it successfully and unobtrusively elicited many demonstrative forms from both children and adults.

From the videos, we coded each sentence with a demonstrative pronoun in terms of (a) which among the 3 demonstrative pronouns were used, (b) relative distance of the referent

from the speaker (whether the referent was close to the speaker, close to the addressee, or in between, or away from both), (c) whether the addressee's look was on or off the referent just before the demonstrative pronoun was used.

We first examined the distribution of each type of demonstrative pronoun and found differences between children and adults (Figure 1). Children used more *bu* than *şu* instances while the adults used more *şu* than *bu* instances. The usage of *o* did not differ across age groups.

Figure 1. *Percentage of usage of demonstrative pronouns by children and adults*
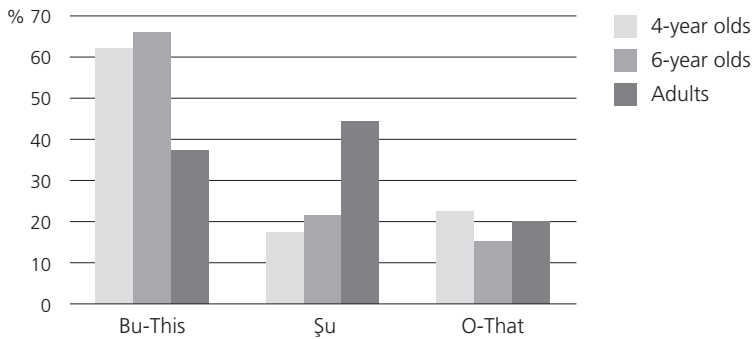
Then we explored whether the distance of the referent from the speaker and the status of the addressee's attention are taken into account by preschoolers and adults in their use of demonstrative pronouns. As seen in Figure 2a, children and adults tend to use *bu* for near referents, taking distance into account. And whether the addressee's attention is focused on the referent or not does not matter. Figure 2b indicates that all age groups choose to use *o* for referents far from themselves. That is, children and adults appear to take distance into account in their contrastive use of *bu* and *o*, reserving *bu* for close and *o* for farther away referents. Moving on to Figure 2c, showing the proportion of usage of *şu*, we find a difference between adults and children. For adults' use of *şu*, we see that distance does not matter; however, *şu* is more often used when the addressee's attention is off the referent. Thus, adults are using *şu* to call for addressee's attention on an object that is previously unattended to. Both child groups, on the other hand, were not talking into account this dimension of the status of addressee attention. By children, *şu* is used with a similar function to *bu*, mostly for near referents.

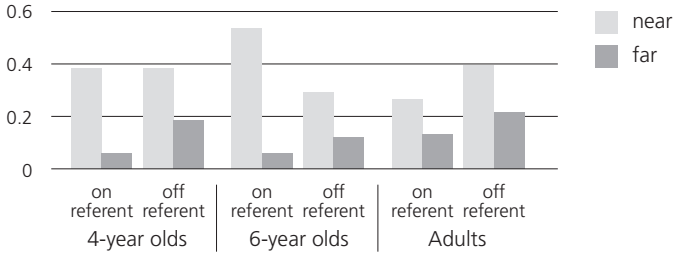Figure 2a: *The proportion of usage of Bu- This*

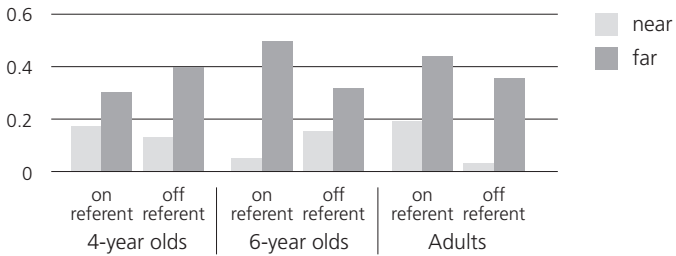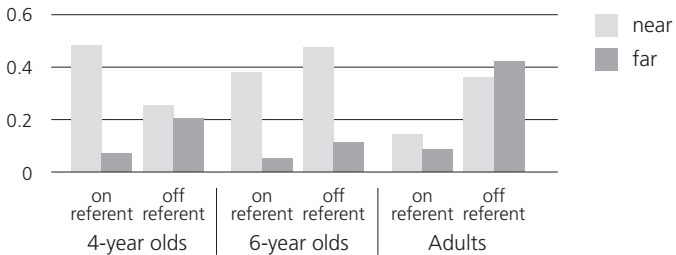Figure 2b: *The proportion of usage of O- That*

Figure 2c: *The proportion of usage of şu*

In summary, differently from adults, 4- and 6-year–old Turkish speakers were not yet at adult levels in using the contrast between *şu* and the other two demonstratives to encode their partner's attentional status. They were not employing *şu* for referents that are not yet attended by their audience. This shows that demonstratives are not always basic and easy to

acquire in all languages (Diessel, 2006). Turkish 6-year-olds do not appear to perform at the level of adults when faced with the task of designing the most appropriate demonstrative form to fit with the recipient's attentional status during fast-flowing conversations.
As a follow up, we also wanted to know how Turkish mothers use demonstrative pronouns in talking to their 3-year-old children. Mothers also seem to be overusing *bu* in comparison to adults talking to other adults (See Figure 3).

Figure 3. *Proportions of use of demonstrative pronouns by mothers to children and adults to adults*
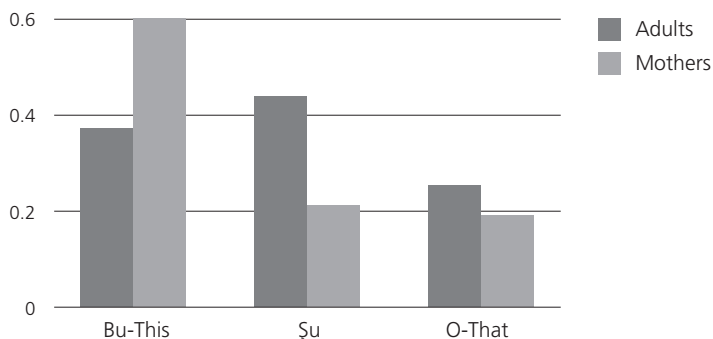
This study shows that when attentional status needs to be monitored in usage of demonstrative pronouns in a linguistic system such as Turkish, fine-tuning towards the adult-like referential communication system could be somewhat protracted. Examination of child-directed speech suggests that how mothers expose their children to demonstrative pronouns might be different from how they talk to other adults.

In a recent experimental study (Sarilar, Matthews & Küntay, in press), we directly explored the influence of input or child-directed speech on development of referential communication. We wanted to find out whether exposure to certain types of child-directed input boosts usage of more effective referential communication skills. The aim was to train 3- and 4-year-olds to become referentially more effective in requesting pictures from adults. When young children ask for the help of an adult to reach a specific object that is not easily reachable (say, on the topmost shelf of a high bookcase), they could point at the picture, jump up and down expressing their desire, or say "this" or "that" (*bu* or *şu* or *o*). But these ways of communicating might be ineffective if there are other similar objects near the desired one. Conveniently, languages allow one to use specialized constructions

to exactly describe what one wants. In our study, we tried to train young children to use a particularly challenging construction in Turkish, the relative clause construction.

In a sentence such *I want the chair that does not have a broken leg,* the embedded clause *that does not have a broken leg* is a relative clause, which helps to describe a specific chair. Relative clauses are complex linguistic constructions that permit speakers to uniquely identify referents for their addressees even in the most challenging situations with many similar objects to the target referent. They modify nouns such as *chair* with information presumed important for identification, and help to distinguish a certain chair from other chairs with contrasting properties.

When we examine naturalistic talk of children in languages such as German and English, we find that relative clauses are not frequent (Diessel & Tomasello, 2000). Crucially they are especially rare in Turkish child productions and even in Turkish child-directed speech. A reason for this late mastery is proposed to be the linguistic complexity of the relative clause construction in Turkish (Slobin, 1986).

In designing our study, we thought there might be other reasons than linguistic complexity that might make the acquisition of relative clauses particularly arduous in Turkish. Late mastery of relative clauses could well be associated with lack of insight into the addressee's need for information, lack of exposure to relative clauses in child-directed speech, and infrequency of communicative situations where precise characterization of referents is essential.

In this study we provided support to children with these factors by setting up actual situations where children have to come up with precise referential expressions in a motivating sticker request task, adapted from Matthews, Lieven and Tomasello (2007). The children were given picture books with the same front covers as the books that the main experimenter had. However, when compared to the experimenter's version, each page in the children's books was missing a story character engaged in a certain activity (for e.g., a man eating a carrot). The goal of the child was to make his or her pages look the same as the main experimenter's by obtaining the right sticker from a second experimenter who stood in front of a board with 14 stickers pinned on it. The main experimenter encouraged the children to move towards the second experimenter and to request the missing stickers by describing their content to the second experimenter. One of the 14 stickers was the target sticker missing from the child's page; the others were distractors. For example, if the missing part on the child's page was a man eating a carrot, on the board there was also a man washing a dog. Thus, the most effective way to request the sticker is by using a relative

clause that combines the specific character with its specific action such as *the man that is eating the carrot*.

There was a pretest, a training, and a posttest phase in the procedure. In the pretest phase, we asked the children to request stickers to complete 6 pages of one book. This was to determine how children naturally ask for stickers before they receive any training. This was followed by a training session, where the child sat next to the main experimenter, completed 12 pages in 2 books by choosing the missing sticker among distracters. Once the child made her selection, the main experimenter provided descriptions of the selected sticker. These descriptions were done differently in three different experimental conditions. In the relative clause feedback condition, a relative clause that uniquely describes the selected sticker was used (e.g., *pasta yiyen kızı seçtin* 'you selected the girl eating cake'). In the demonstrative-noun phrase feedback condition, the distal demonstrative used for objects near the addressee, o, was combined with the appropriate noun for the character in the sticker (e.g., *o kızı seçtin* 'you selected that girl'). In the positive feedback condition, just a general approval endorsed the selection of the child (e.g., *güzel seçtin* 'you did a nice selection'). After the training was completed, in the posttest we again measured children's strategies of requesting stickers using a new set of pictures.

As seen in Figure 4, we found that both 3-year-olds and 4-year-olds increased their usage of relative clauses from the pretest to the posttest when they were exposed to relative clauses during their training. Such an increase in the employment of relative clauses was not observed in the demonstrative noun phrase and the positive feedback conditions. It should be noted that the books and therefore the pictured activities to be described during the posttest were different from the scenes used during the training and the pretest. In other words, different nouns and verbs had to be used for new characters and activities in the posttest. Thus, the relative clauses produced by the children were not verbatim imitations of the words used by the main experimenter in the training phase; they reflected, rather, a creative or productive use of the relative clause construction.

The effect of the training of this relatively complex and relatively infrequent construction is impressive given how rare it is for young children to use relative clauses in their spontaneous conversations in Turkish. We were able to show that Turkish children can increase production of relative clauses if given repeated exposure to the construction in input and a task that motivates them to learn.

Although training studies of children's vocabulary knowledge exist, research about facilitation of learning of grammatical constructions (Vasilyeva, Huttenlocher & Waterfall,

Figure 4: *Percentage of usage of relative clauses in the pretest and the posttest in the three different conditions*
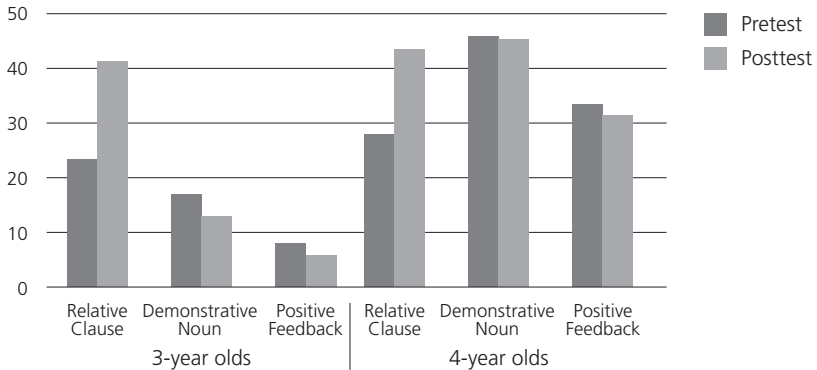
2006) and pragmatic knowledge during early years is sparse. We show here it is possible to integrate training of a certain complex construction type into children's daily lives in an ecologically feasible way through relevant interactive dialogues. We hope this work has implications for preschool programs targeting to boost children's grammatical and pragmatic proficiency.

This brings me towards the most forward-looking part of my talk. We already said that language development is crucial for human intelligence and effective social participation. We also said that language development runs a protracted course of development, which can potentially be impacted by specific experiences. So as researchers, in what directions should we channel future efforts to find out at what point in development and through which experiences we can best support children's communicative and linguistic proficiency?

Children everywhere and with various characteristics benefit from support, but there are certain conditions such as having low socioeconomic resources or immigrant status that are known to put children at risk for language development. We have fairly firm findings about disparities in children's language development being related to family socioeconomic status (e.g. Hart & Risley, 1995; Hoff, 2003; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Pan, Rowe, Singer & Snow; 2005) and family immigration status (e.g. Hernandez, Macartney & Blanchard, 2009). Recent research has found that disadvantaged socioeconomic status impacts language more than other neurocognitive

domains such as visual cognition and memory (Hackman & Farah, 2009; Noble, McCandliss, & Farah, 2007). One obviously promising future research path is to try to determine the immediately causal factors that lead to delays or protective buffers in children's development of language and communicative competence under conditions of family disadvantage.

A major challenge about understanding the association between socioeconomic disadvantage and language delay is to find out how early and through which mechanisms this relation arises. In future work, we need to untangle what is meant by socioeconomic status. High SES refers to a bundle of characteristics that include but is not limited to material wealth, occupation, access to education, high-quality neighborhoods, parental sensitivity, and social networks in addition to reduced levels of life stress (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 2000; Conger & Donellan, 2007; McLoyd, 1988). Which combination among the many interrelated factors associated with SES affect the course of language development of the child? Is this combination different in different settings?

In research we conducted with a nationally representative sample of Turkish 3-year-olds (Baydar, Küntay, Yağmurlu, Aydemir, Cankaya, Goksen, & Cemalcılar, submitted), we found that children of families with low economic status and high maternal depression showed lower levels of receptive vocabulary. This finding confirmed earlier research conducted in Western countries; the conditions of maternal depression and low economic status are generally found to produce highly compromised vocabulary outcomes. However, there were interesting, potentially culture-specific buffers in Turkey. When mothers of the highest risk group of 3-year-olds reported support coming from extended family members and neighbours in relation to child care, the children's vocabulary was significantly higher than when this support was lacking. The contribution of extended family and community to young children's vocabulary under adverse conditions allows an expansion of our current thinking about influences on language development. It is not only dyadic, primary caregiver-child interaction quality that plays a role in providing input for children's vocabulary growth. For children with multiple caregivers, interactions with multiple partners and observing third-party interactions might be crucially safeguarding against loss of opportunities for word learning resulting from maternal distress and family socioeconomic disadvantage.
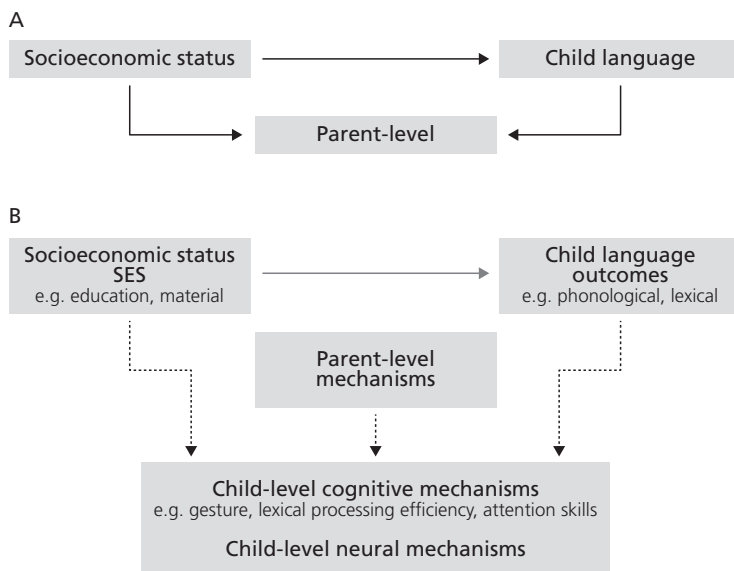
With the addition of more research in non-Western contexts, I believe the environmental determinants of optimal language and communicative development will be better understood. However, there is another important challenge. We are still far from

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having determined whether these environmental effects also lead to changes in the l neurocognitive mechanisms and communicative tools employed by the child to approach the language learning task. If these child-internal mechanisms are compromised in risky environments, how early do they alter? Thus, a second path of future research is to discover the changes child-internal mechanisms of language learning might accrue as a result of unfavorable experiences.

There is some very recent exemplary research showing that child-level learning mechanisms change as a result of the environmental conditions children are exposed to. For example, Fernald, Marchman and Weisleder (2013) found SES-related differences in children's lexical processing efficiency during real-time sentence comprehension at 18 months of age. When the children hear a sentence such as "where is the car?" while looking at a side-by-side presentation of a picture of a car and another object, those who turn towards the correct picture faster were considered to have more efficient lexical processing. Importantly, higher quantity and quality of maternal speech predict children's lexical processing efficiency, which, in turn, predict vocabulary production 6 months later (Hurtado, Marchman, and Fernald, 2008). Kuhl and colleagues (Liu, Kuhl & Tsao, 2003) also reported that clarity of maternal speech is a significant predictor of children's ability to differentiate phonetic contrasts in their native language at age 6-12 months, an ability that predicts later language outcomes up to two years later (Tsao, Liu, & Kuhl, 2004).

In a recent review paper (Demir & Küntay, submitted), we discuss two models of SES effects on language development. Previous literature on the effects of SES on children's language development often does not decompose SES and child language outcomes into their components, and primarily focuses on parent-level mechanisms mediating the effects of SES on language outcomes. This type of research is represented in panel A of Figure 5. In the light of recently accumulating evidence, we propose an alternative model depicted in panel B, which puts forward three suggestions. First, we need to decompose components of SES, such as education, material resources and parental support as specific paths of influences. Second, child language outcomes mostly just focus on vocabulary, but we should consider other aspects of language such as grammar and discourse. Most importantly, in addition to parent level mechanisms, the changes accrued in the child-level cognitive mechanisms and neural mechanisms should be taken into consideration to determine how exactly child language outcomes are compromised.

Figure 5. *Two models of SES effects on child language development.*
The first model (Panel A) does not decompose SES and child language outcomes into their components. In addition, it primarily focuses on parent-level mechanisms. We propose to decompose components of SES, child language outcomes, and mediating factors (Panel B). This model emphasizes child-level cognitive and neural mechanisms that underlie the effects of SES on early language development.

A

Socioeconomic status → Child language

Parent-level

B

Socioeconomic status
SES
e.g. education, material

→ Child language
outcomes
e.g. phonological, lexical

Parent-level
mechanisms

Child-level cognitive mechanisms
e.g. gesture, lexical processing efficiency, attention skills

Child-level neural mechanisms

As a language researcher, I agree with Prince Claus that it is essential to promote human resources to achieve development. By identifying the specific ways to support children's language and communication development in different monolingual and multilingual settings, we might be able to curb the widening of achievement gaps between more and less advantaged children. I hope to contribute to this endeavour in the coming years in collaboration with researchers at Utrecht University and other places in The Netherlands.

Acknowledgements

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