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Communicative intentions of child-directed speech in three  
different learning environments: Observations from the  
Netherlands, and rural and urban Mozambique

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## *Communicative intentions of child-directed speech*

### Abstract

This article compares the communicative intentions observed in the speech addressed to children of 1;1 and 1;6 years old from three cultural communities: the Netherlands, rural Mozambique, and urban Mozambique. These communities represent two prototypical learning environments and a third hybrid: Western, urban, middle-class families; non-Western, rural, subsistence-farming families; and non-Western, urban learning environment. The results show that the Dutch CDS contains relatively more utterances with a cognitive intention than the Mozambican CDS. In Mozambique CDS contains more imperatives, particularly in the rural environment. The CDS from urban Mozambique contains more socioemotional intentions. The findings suggest that these differences can be explained in terms of the different responsibilities and levels of autonomy expected from children of the three learning environments.

## Introduction

The social contexts in which children grow up determine to a large extent how they acquire language (Hoff, 2006; 2010). Socialization practices are often reported in terms of the amounts of speech directly addressed to children (i.e., child-directed speech, CDS; Hart & Risley, 1995; Lieven, 1994; Shneidman, Arroyo, Levine, & Goldin-Meadow, 2012; Weisleder & Fernald, 2013), but also reported in a variety of quality features of CDS (Broen, 1972; Boyce, Gillam, Innocenti, Cook, & Ortiz, 2013; Cameron-Faulkner, Lieven, & Tomasello, 2003; Hart & Risley, 1995; Luo, Snow, & Chang, 2011; Newport, Gleitman, & Gleitman, 1977). Moreover, it is known that caregivers from different socio-economic statuses address their children in different ways - although sentences might be similar, the frequencies with which they occur in CDS differ (Hart & Risley, 1995; Hoff, 2006).

Still, most studies on language acquisition are from WEIRD (Western, Educated, Industrialized, Rich and Democratic) communities, meaning our theories may *only* apply to these WEIRD cultures (Henrich, Heine, & Norenzayan, 2010). Caregivers from various non-Western cultures often talk less frequently to their children (Lieven, 1994; Schieffelin & Ochs, 1986; Shneidman et al., 2012), and use different speech acts in various quantities (Harkness, 1977; Heath, 1983; Kirk, 1976; LeVine et al., 1994; Luo et al., 2011; Rabain-Jamin, 2001). Moreover, caregivers from different cultures or socio-economic backgrounds stimulate their offspring through different activities to foster development in particular domains, depending on what they consider important to teach their children (Bornstein & Putnick, 2012; Keller, 2012; LeVine et al., 1994). For instance, to foster cognitive skills, caregivers tend to engage children in book reading, story telling, counting, and object labeling (Bornstein & Putnick, 2012). However, to foster motor skills caregivers stimulate

## *Communicative intentions of child-directed speech*

their child to perform some physical activity, such as walking or retrieving objects (Keller, 2012). To foster socioemotional skills, caregivers engage children in interpersonal interactions, such as singing, playing with other children, and taking children outdoors (Bornstein & Putnick, 2012).

Such different activities with specific developmental targets constitute different conversational settings that often contain specific types of communicative intentions (or functions) contained in CDS (Hoff, 2006; 2010). For instance, CDS during book reading activities contain more object labeling and questions, and fewer directives or social regulatory speech as compared to, for instance, toy play (Choi, 2000) or mealtime settings (Hoff, 2010). Such differences relate to the child's language development (Hoff, 2006). The amount of directives (or imperatives) in CDS, for example, has a negative relation with children's grammar and vocabulary development (Newport et al., 1977).

Social contexts in which children acquire language may be characterized in terms of *learning environments* defined by the socio-demographics of and the cultural values held in the community (Greenfield, 2009). Keller (2012) conceptualizes three different prototypical learning environments and argues that typical caregiving practices in these environments are based on parental (or communal) expectations of how children will succeed in the lifestyle of their community (cf., Greenfield, 2009). Formal education is a central expectation for individual children in prototypical *Western, middle-class urban communities*, and consequently caregiving aims to foster the development of *individual psychological autonomy*. Prototypical *subsistence-based farming communities* expect that children help with various household chores and farming activities from early on, and therefore foster the development of *communal action autonomy*. Whereas *non-Western urban, middle class communities*

## *Communicative intentions of child-directed speech*

(which Keller characterizes as a hybrid of the other two) expect their children to perform at school, while at the same time learn about their communal responsibilities to care for other family members. This expectation then translates to the fostering of *communal psychological autonomy*. These different caregiving objectives would translate into different social activities, and thus lead to different conversational settings, each with specific communicative intentions.

It is important to know how caregivers from different cultures communicate with their children, because the format of the interaction that takes place determines to a large extent what the child learns during early development (Hoff, 2010). Hart and Risley (1995) report that 86-96% of the words observed in a child's vocabulary are also observed in the vocabulary of their parents. Similarly, Vogt and Lieven (2010) found that 61-94% of the constructions produced by children are accounted for in a dense corpus of CDS that captures only 7-10% a child's waking life during their second year of life. However, it is not only the amount of CDS that differs across cultures, but also the pragmatics of the social contexts in which children are socialized (Küntay, Nakamura, & Ateş Şen, 2014). This is important, because the underlying pragmatics of CDS determines both its content and its intention.

So, differences in the communicative intentions of CDS would result in different types of utterances addressed to children (both in terms of vocabulary and syntax), which would consequently relate to the rate, content and style of language that is acquired. An important question that we address in this paper is then: To what extent do the communicative intentions of CDS vary between Keller's (2012) three - more or less - prototypical learning environments, and can these differences be explained based on the characteristics of their lifestyles and expectations regarding children's responsibilities?

*Culture and Social Context*

In Western communities, the child is often the center of attention and is, as a consequence, often directly addressed in a multitude of modalities, such as speech, gestures and physical activities (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979). In non-Western communities, young children are often not yet treated as competent language learners. For instance, adults from a variety of cultures do not talk to children until they start producing multiword utterances (Heath, 1983; Lieven, 1994; Pye, 1986). In many of these cultures, however, children are often cared for by siblings, who do speak directly to them (Gaskins, 2006; Zukow-Goldring, 2002). Yet, the amount of interaction with children may vary substantially between non-industrialized cultures (Fouts & Lamb, 2009; Kirk, 1976). To assess the differences in these learning environments, it is instructive to look at differences between the two mutually exclusive prototypical contexts.

Greenfield (2009) argues that the socio-demographics of an environment determine to a large extent the cultural values adopted in that environment. Western urban societies tend to have complex, differentiated economic roles with rich market-based economies (Keller, 2007). Moreover, in the Western urban society formal education is organized at school, and maternal education is usually high (Keller, 2007; LeVine et al. 1991). As a result, these societies tend to have higher levels of socio-economic status (Greenfield, 2009; Keller, 2012). Western society is more individualized, and culture-specific theories on child-development emphasize independence (Keller, 2007). These socio-demographic factors and cultural values have a consequence on the child's learning environment (Greenfield, 2009; Keller, 2012). Western caregivers expect that their children should develop the ability to

## *Communicative intentions of child-directed speech*

verbally express and negotiate mental states. Keller (2012) calls this *individual psychological autonomy*, which caregivers foster so children can perform well in school and, consequently, their society. Caregivers therefore adapted their socialization practices to focus on "face-to-face contact, object-stimulation, and extensive conversations ... to the infant" (Keller, 2012: 15).

Rural communities, on the other hand, tend to be small-scale and have relatively simple structures with little division of labor, and subsistence farming is the prime economic activity (Greenfield, 2009). People in rural communities tend to have lower SES: they are often poorer than in urban societies, and there is less maternal education (Keller, 2007; LeVine et al., 1991). Education is often facilitated at home, though the number of children receiving formal education is increasing in most rural communities world wide. Rural communities are relatively self-contained and people tend to have lifelong social relations, usually with interdependent kin. This leads to a form of collectivism in the rural community culture, in which there is a strong emphasis on the development of a child's interdependence (Keller, 2007). These socio-cultural factors pose expectations that children grow up understanding their responsibilities towards the community, which usually includes a variety of household chores from early on (Gaskins, 2006; Harkness, 1977; Keller, 2012). Rural caregivers therefore stimulate the development of *communal action autonomy* (Keller, 2012), which refers to the stimulation of children's social responsibilities, which are achieved through extensive body contact (Gottlieb, 2004) and social stimulation (Cowley Moodley, & Fiori-Cowley, 2004), but involve less face-to-face contact and object stimulation (Keller, 2007). Moreover, caregivers try to accelerate children's physical development to achieve their motor independence at an early age (Gottlieb, 2004).

Keller (2012) describes the non-Western, middle class, urban community as a



### *Communicative intentions of child-directed speech*

hybrid of the other two prototypical learning environments (Keller, 2012). This environment tends to be formed by people who have migrated from the traditional rural settlements into the city. They have taken their cultural traditions from the rural subsistence-based lifestyle and adapted these to fit the requirements of the market-based lifestyle of the urban society. They tend to have obtained somewhat high levels of formal education based on Western schooling systems. While they often still live in extended families, parents and grandparents are no longer considered as the main repository of knowledge. As a result of more formal education and increased importance of language use, socialization practices involve more verbal exchanges with children. Interactions with children involve less body contact and more face-to-face contact and object play, however not to the same degree as in Western communities (Keller, 2012). So, rather than individual psychological autonomy, Keller (2012) argues that infants and children from non-Western, urban, middle-class families tend to participate in activities that support *communal psychological autonomy*.

### *Communicative intentions of child-directed speech*

In order to study communicative intentions of CDS, researchers tend to investigate the frequency of declaratives, imperatives, various types of questions, assertions, directives, etcetera. The amounts of declaratives and questions addressed to children in Western cultures typically exceeded the use of imperatives (Broen, 1972; Cameron-Faulkner et al., 2003; Hart & Risley, 1995; Newport et al., 1977). However, Hart and Risley (1995) have shown that there is wide spread variation in the use of intentions among caregivers from different SES. People from lower SES tend to use fewer declaratives and more imperatives, compared to people from higher SES.

### *Communicative intentions of child-directed speech*

Cross-culturally, there are also substantial differences in the amounts of declaratives, imperatives and questions addressed to children. In various studies from rural Africa and rural Guatemala, around 50% of CDS utterances were imperatives, while much fewer utterances were declaratives or questions (Harkness, 1977; LeVine et al., 1994; Pye, 1986; Rabain-Jamin, 2001). Estonian mothers even used around 65% imperatives during puzzle solving and mealtime activities (Tulviste & Raudsepp, 1997). Similar findings were reported in Heath's (1983) qualitative study that compared the language learning environments of Tracton (African American working class) and Roadville (white American working class), both small interdependent communities.

Kirk (1976) compared maternal behavior between three Ga subcultures from Ghana by analyzing mother-child interactions. The subcultures included a rural community, an urban community and a Westernized suburban community. Compared to the other subcultures, rural mothers more often used imperatives. Suburban mothers more often used utterances containing more semantic information than just a verb root (e.g., 'Push it behind it' instead of 'Push it!'). The frequencies of these (and other) utterances from urban mothers were between the two other cultures (Kirk, 1976).

Two other studies are of interest, which used a different type of analysis. First, Bornstein et al. (1992) compared the amount of affect and information contained in CDS across four cultures (Argentina, France, Japan and the United States) at two different ages (5 and 13 months). They showed that mothers from each culture used more affect-salient speech than information-salient speech at 5 months, but that this was reversed at 13 months, except for Japan where affect remained more prominent. This contrasting finding from the Japanese culture is in line with the "Japanese

## *Communicative intentions of child-directed speech*

mother's goal to empathize with her infant's needs..., rather than to show authority as mother" (Bornstein et al., 1992: 600). In a sense, this fits - to some extent - a more socially oriented form of caretaking, while the finding that the Western cultures favor information-salient speech is in line with the fostering of individual psychological autonomy.

Second, Bornstein and Putnick (2012) used data obtained from questionnaires of more than 127,000 families in 28 developing countries, concerning cognitive and socioemotional caregiving practices. *Cognitive caregiving* consisted of interactions that stimulate children to learn language, and understand the environment through descriptions and demonstrations. *Socioemotional caregiving* consists of interactions that stimulate children in developing interpersonal interaction skills. Bornstein and Putnick (2012) found that mothers from developing countries with a lower Human Development Index (an indicator of how advanced the country is) engage in less cognitive activities, while the amount of socioemotional caregiving activities remains comparable across these countries.

### *Our study*

In the remainder of this article we will assess to what extent CDS contains cognitive (information-salient), imperative and socioemotional intentions. We focus on child-directed speech and do not include speech that may be overheard by children, because although children may learn from overheard speech, they appear to benefit more from CDS (Shneidman et al., 2012). Since we will compare the use of communicative intentions in CDS in terms of percentages for each intention, we will also assess differences in the absolute amounts of utterances addressed to children. This is important, since the amount of speech addressed to children relates to their

### *Communicative intentions of child-directed speech*

vocabulary development (Hart & Risley, 1995). We do not analyze other features of CDS, such as MLU or the number word types, because of the linguistic differences between the languages spoken in each community: Dutch, Changana and Portuguese. Changana is a Bantu language that has a complex morphology, so that what in Dutch or Portuguese must be expressed in a few words, Changana may use only one.

We distinguish between cognitive, imperative and socioemotional intentions, rather than the more common distinctions of declaratives, assertives, imperatives, questions and affectives. We do this because these three intentional categories correspond almost directly to Keller's conceptual descriptions of the three learning environments in terms of the fostering of psychological autonomy (cognitive stimulation), action autonomy (imperative stimulation) and communal responsibilities (socioemotional stimulation). The common categories could, more or less, be used to achieve any of these three objectives. We believe that fostering psychological autonomy is primarily realized through cognitive stimulation as manifested through, e.g., object labeling, counting and eliciting object labels (e.g., through questions). Action autonomy is mainly fostered through imperatives that contain requests for the child to perform a physical activity (questions), such as small household chores, but also by commenting on physical activities (e.g., assertions). Communal responsibilities require children to learn their role within the social unit (i.e., the extended family), and these can be achieved through what can be called socioemotional stimulation, such as extensive body contact (e.g., breastfeeding, Gottlieb, 2004; Keller, 2012), social play (Bornstein & Putnick, 2012), joint singing (Bornstein & Putnick, 2012; Cowley et al., 2004), and learning about interpersonal relations (Keller, 2012), such as kinship, roles and politeness (these could include declaratives, assertives and affectives).

## *Communicative intentions of child-directed speech*

Bearing these definitions of CDS and communicative intentions in mind, we assess how these differ between Dutch, rural Mozambican and urban Mozambican caregivers. These three communities represent the three learning environments discussed by Keller (2012). Based on the preceding review, we expect to see that in the Netherlands, CDS will contain relatively more cognitive intentions, and that in the rural Mozambican community, CDS will contain relatively more imperatives and, especially compared to the Netherlands, more socioemotional intentions. For the urban Mozambican community, we expect that the relative amounts of cognitive and imperative intentions are in-between the rural and the Dutch community, and that the socioemotional intentions are comparable to the rural community. However, as will become clear, urban Mozambican mothers in our sample have received much less formal education than one might expect of a middle class community, so the hybrid community that we investigate does not have the exact properties as Keller's hybrid. We therefore expect that the relative amounts of cognitive and imperative intentions are closer to the rural community than to the Netherlands.

## Methods

### *Cultural communities*

Research focused on three –more or less- prototypical learning environments:

1. Our Dutch sample was collected from native Dutch families, living in or around Tilburg in the province of Noord-Brabant, and constitutes a typical Western, middle class, post-modern urban community. All households consisted of small, nuclear families where caregiving is primarily carried out by both parents. Most children attend daycare for one to three days per week.
2. The rural Mozambican community consisted of three neighboring villages

## *Communicative intentions of child-directed speech*

near the town of Chokwe, approximately 250 kilometers from Mozambique's capital, Maputo. Most rural families have adopted a subsistence-based farming lifestyle and live in extended families within a relatively large compound consisting of a few mud houses. Subsistence farming is usually carried out in *machambas*, small fields owned by families often located just outside the villages. Adult men usually work in South Africa or Maputo, and tend to be away from home for several months in a row, occasionally bringing back some of their earnings. Caregiving is normally distributed among the extended family members with relatively large responsibilities for sibling caregivers.

3. The urban Mozambican sample was recruited from two central, neighboring suburbs in Maputo. In these communities, extended families live in small compounds, typically consisting of a brick house and a small yard. Men in these communities represent the lower working class, and women are usually domestic workers, who often sell goods at the local market. Caregiving is mostly distributed among the adult members of the extended families, with occasional support from siblings.

## *Participants*

We recruited in total 40 families with infants around the age of 1;1 at the start of our longitudinal study. Twelve families were from the Dutch community, 14 from rural Mozambique and 14 from urban Mozambique. All families in the Netherlands are native speakers of Dutch and highly educated. The rural participants are monolingual Changana speakers (Changana is a Southern-Bantu language, spoken in Southern Mozambique and parts of South Africa), and the mothers tend to have received either no or little formal education. The urban families are mostly bilingual speakers of

*Communicative intentions of child-directed speech*

Portuguese and Changana (or Ronga - a mutually intelligible dialect of Changana), and the mothers have received significantly more education than in the rural community, but significantly less than in the Dutch community. Table 1 summarizes the main demographics of our sample.

Table 1. Demographics of our participant sample.

Demographics	Netherlands (N=12)	rural Mozambique (N=14)	urban Mozambique (N=14)
Female/male	6/6	7/7	5/9
Avg age first visit (SD in days)	1;1.8 (18)	1;1.8 (26)	1;1.6 (28)
Avg age second visit (SD in days)	1;5.10 (19)	1;5.28 (25)	1;5.12 (30)
Avg family size	3.3 (0.8)	8.2 (5.8)	7.4 (4.4)
Avg. birth order	1.5 (0.8)	3.2 (2.4)	2.5 (1.5)
<i>Maternal education</i>			
No education	0	6	1 <sup>a</sup>
Primary education	0	8	11
Secondary education	0	0	1
Higher education	12	0	0

Note: <sup>a</sup> Maternal education data from one urban Mozambican participant is missing.

## *Communicative intentions of child-directed speech*

The general ideas and procedures of the study were explained to the participants in their native languages (in Mozambique, local research assistants were hired and trained to communicate with them). Participants were advised that their participation was voluntary, that they would not receive any direct benefits (although we distributed small presents for the infants, as well as photographic stills or DVDs of the footage at the end of the project), and that they could retract from our study at any time for any reason. All families provided voluntary informed consent.

### *Procedure*

For this study, families were visited around the infants' ages of 1;1 and 1;5-1;6, during which we recorded naturalistic interactions of infants in their daily, social environment. (For convenience, we will refer to the second age range as the 1;6 age group.) In Mozambique, each visit was preceded by an accommodation session in which the children and their families were familiarized with the presence of a foreign person observing them with a video camera. The accommodation session occurred approximately a week prior to the data collection session. In the Netherlands, an accommodation session was considered unnecessary, as the infants would have been exposed to white persons and video equipment before.

On each visit, the infants were video-taped for a duration between 45 and 75 minutes, to ensure we recorded approximately 30 minutes of audible material. Prior to the recording, adults present in the household were instructed to continue their daily activities as prior to our arrival and not to position their infant for the benefit of the camera. The only restriction was that the mothers and their infant would not leave the premises. These instructions were given to elicit naturalistic, non-fabricated behavior. Where suitable, filming was carried out using a tripod from approximately 5 to 15



## *Communicative intentions of child-directed speech*

meters away from the infant. However, in the Netherlands and in some urban households, space was too confined, and filming had to be done by hand, 1 to 5 meters away.

For all videos, extensive segments totaling 30 minutes were identified for analysis. The identification procedure was necessary to exclude episodes during which the infant was off-camera, asleep, disturbed or interacting with the researchers. Also, prolonged periods of breastfeeding (more than 3 minutes) were excluded to reduce a bias towards this type of interaction. All speech directly addressed to the infants during these 30 minutes was transcribed by a research assistant, who was a native speaker of the language, in ELAN (Wittenburg, Brugman, Russel, Klassmann, & Sloetjes, 2006). For the Dutch videos, the research assistants were trained Master students (including the third author). In Mozambique, these were the already mentioned local research assistants, who were literate in both Portuguese and Changana, and who were directly supervised by either the second or third author while transcribing the videos.

The Changana speech was written more or less phonetically following the standard Changana/Ronga orthography (Bachetti, 2006). Utterances were taken as the basic units of transcription. Vocalizations, such as laughter, cries, attention getters and non-linguistic exclamations, were marked separately and were excluded from the present analysis. Singing was included in the analysis, but was annotated separately, usually without writing down the lyrics. The reason for not transcribing the lyrics was that it often turned out to be very hard for the Mozambican research assistants to hear the exact words sung. In addition, all unintelligible speech was identified as unknown speech and excluded from the analysis. The Mozambican transcriptions were translated first into Portuguese and subsequently into English. The resulting

## *Communicative intentions of child-directed speech*

transcriptions are not designed for a full linguistic analysis, but contain sufficient information for determining the communicative intent of the CDS.

Communicative intent was annotated in three categories:

- *Cognitive intentions* are defined as those utterances that either contain salient information or elicit such information. These are utterances that contain or elicit object-labels, counting, abstract concepts (including abstract verbs as "thinking"), animal sounds, object attributes, spatial relations or relations among objects. Hence, they are utterances that typically contain a concrete noun, an adjective and/or a preposition. They are often declaratives (e.g., "Look, a doggy" or "That is a train"), but could also be encoded as a question (e.g., "What does the cow say?" or "What is that?") or even as a behavior directive (e.g., "Can you give me the water?" or "Can you say X?"), provided they include or elicit an object-label.
- *Imperatives* are defined as utterances that involved a clear instruction that generally required a physical activity from the addressee or a verbal comment on a physical activity performed by the infant. Examples include "Go get the car", "Stand up", "Use your legs first", "Do it like this", but also comments like "Cut, cut, cut" while cutting a piece of paper, or "Step, step, step" while learning to walk. Most often utterances that contain verbs describing a physical action were coded as imperatives. These exclude verbs that describe an abstract event or internal process, such as "thinking" (cognitive intention), but also verbs that relate to socioemotional events, such as "laughing", "crying", "singing" or "waving bye-bye".
- *Socioemotional intentions* are defined as utterances that carry a semantic component of an interpersonal communication, interaction and relation, as well as those that express and support affect and emotion (cf. Bornstein & Putnick, 2012).

## *Communicative intentions of child-directed speech*

These utterances relate to people, rituals, habits, affective actions and feelings. These typically include a person's name, kinship or friendship relation or role (e.g., "grandmother", "friend", "babysitter"), a socioemotional state (e.g., "angry"), affective nouns or adjectives (e.g., "cute"), but also utterances describing social situations (e.g., "dinner" or "party") and social actions (e.g., "singing", "dancing"). For example, utterances like "Bless you", "Give mummy a hug", "Let's sing a song", "Look, there is grandma", or "Bring this to your sister", but also acts of singing are included.

The three categories are not mutually exclusive. For instance, the utterance "Can you give me the water?" both contains a clear object naming event and a request, so it is coded both as a cognitive and an imperative. Utterances can contain all three categories, as in "Sweetheart, give mummy that book", which is an imperative ('give mummy that book') that contains an object label ('that book') and has socioemotional content ('sweetheart' and 'mummy'). When the communicative intention of an utterance could not be decided, it was coded as unknown. Five percent of the data from 1;1 was annotated by a second rater to establish inter-rater agreement. Calculating Cohen's kappa yielded 0.898 (93.8% agreement). The online supplement to this article contains a more detailed description of our coding scheme.

## Results

### *Number of child-directed utterances*

Before showing the results concerning the communicative intentions of CDS in the three communities, we present the mean number of child-directed utterances during

the 30-minute recordings in the three learning environments. Figure 1 shows that the amount of CDS utterances in the Netherlands exceeds that observed in Mozambique considerably, and that the amount of CDS from rural Mozambique is drastically less than that observed in the two other learning environments.

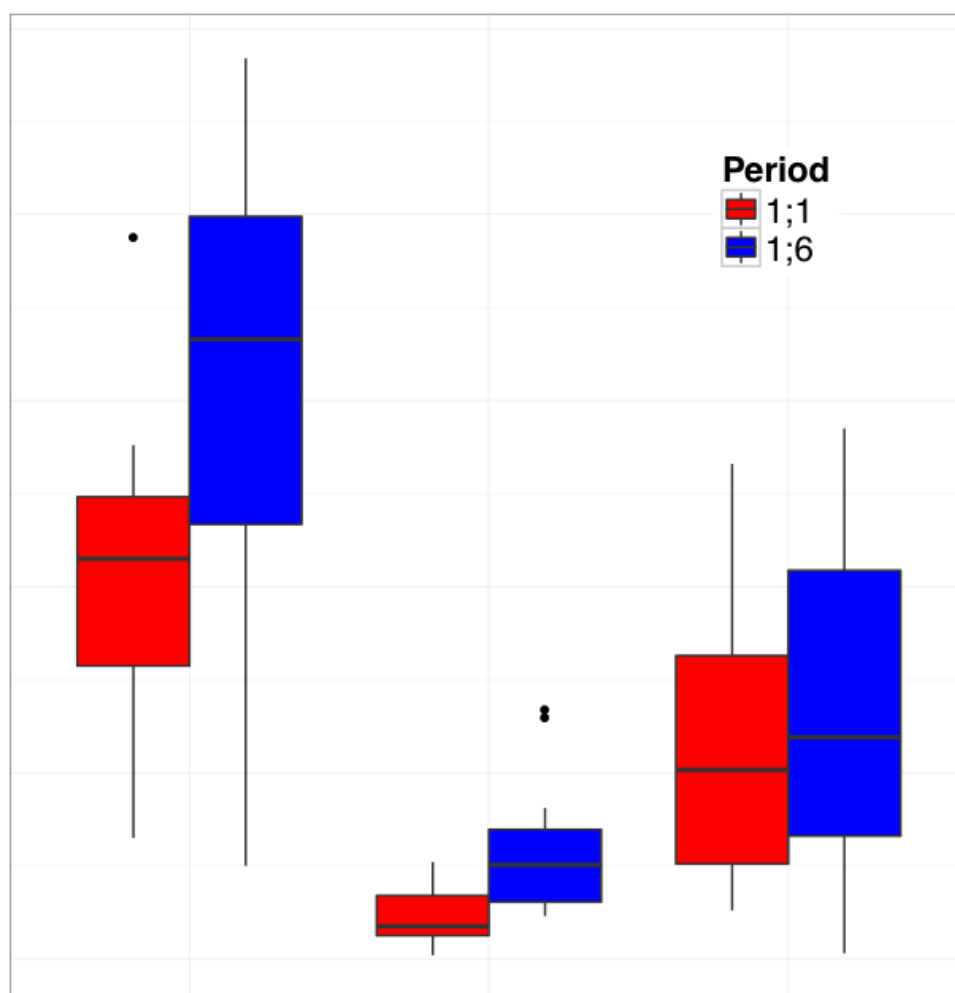


Figure 1. Box plots showing the number of utterances addressed to the children at 1;1 and 1;6 in the Netherlands (NL), rural Mozambique and urban Mozambique.

A 3 (location) x 2 (age group) mixed ANOVA was carried out to establish the effects of location and age group on the amount of child-directed utterances. This analysis

### *Communicative intentions of child-directed speech*

shows there were significant main effects of location,  $F(2,37)=26.32, p<.001, \eta^2=.553$ , and of age group,  $F(1,37)=29.22, p<.001, \eta^2=.09$ . Also, an interaction effect of location and age group was present,  $F(2,37)=6.26, p<.001$ . Post-hoc Bonferroni tests revealed that at 1;1 the number of utterances in the Netherlands ( $M=206.75$ ) was higher than those observed in rural Mozambique ( $M=22.43$ ),  $p<.001$  and in urban Mozambique ( $M=116.71$ ),  $p<.001$ . The number of utterances in urban Mozambique was also significantly higher than in rural Mozambique,  $p<.001$ .

At 1;6, the number of utterances in the Netherlands ( $M=302.92$ ) also significantly exceeded those in rural Mozambique ( $M=57.79$ ),  $p<.001$  and in urban Mozambique ( $M=134.93$ ),  $p=.001$ . Again at 1;6, the number of utterances in urban Mozambique was significantly higher than in rural Mozambique,  $p=.010$ . Over time, the number of CDS utterances has significantly increased between 1;1 and 1;6 in the Netherlands,  $p=.006$ , and in rural Mozambique,  $p=.009$ , but not in urban Mozambique,  $p=.693$ .

### *Communicative intention within learning environments.*

Figure 2 shows the frequencies and proportions of communicative intentions in all three communities at both ages. Looking within each learning environment, we see that the *Dutch* sample at 1;1, the mean frequency of cognitive intentions ( $M=80$ ;  $SD=55$ ) was similar to the frequency of imperatives ( $M=73$ ;  $SD=31$ ) and higher than the frequency of socioemotional intentions ( $M=52$ ;  $SD=21$ ). For the 1;6 age group, the frequency of cognitive intentions ( $M=140$ ;  $SD=65$ ) substantially increased and was now substantially higher than the amount of imperatives ( $M=107$ ;  $SD=52$ ). In turn, both frequencies were considerably higher than the proportion of socioemotional intentions ( $M=55$ ;  $SD=33$ ).

### *Communicative intentions of child-directed speech*

For the *rural Mozambican* community in the 1;1 age group, the mean frequency of cognitive intentions ( $M=2$ ;  $SD=2$ ) was substantially lower than the frequency of imperatives ( $M=14$ ;  $SD=11$ ), which in turn was twice the amount of socioemotional speech ( $M=7$ ;  $SD=5$ ). For the 1;6 age group, a similar trend was observed, but the frequencies have increased. The mean frequency of cognitive intentions ( $M=6$ ;  $SD=2$ ) was lower than imperatives ( $M=38$ ;  $SD=22$ ) and than socioemotional intentions ( $M=13$ ;  $SD=12$ ).

In the *urban Mozambican* context, the frequency of cognitive intentions at 1;1 ( $M=14$ ;  $SD=12$ ) was drastically lower than the imperatives ( $M=60$ ;  $SD=42$ ) and socioemotional intentions ( $M=44$ ;  $SD=29$ ). For the 1;6 age group, the amount cognitive intentions ( $M=22$ ;  $SD=18$ ) increased, but still occurred less often than imperatives ( $M=75$ ;  $SD=52$ ) and socioemotional intentions ( $M=38$ ;  $SD=28$ ).

### *Communicative intention of CDS between learning environments*

Figure 2 further shows that at both ages, the distribution of CDS with different communicative intentions varies substantially between the three learning environments. Looking at the proportions of communicative intentions, the graphs show that cognitive intentions occur much more often in the Netherlands than in Mozambique, imperatives occur relatively more often in Mozambique, and socioemotional speech take has relatively similar proportions of CDS in all three communities, but is proportionally highest in urban Mozambique. For each communicative intention, a mixed effects 3 (location) x 2 (age group) ANOVA was carried out to assess which significant main effects there were on the proportion of CDS.

*Communicative intentions of child-directed speech*

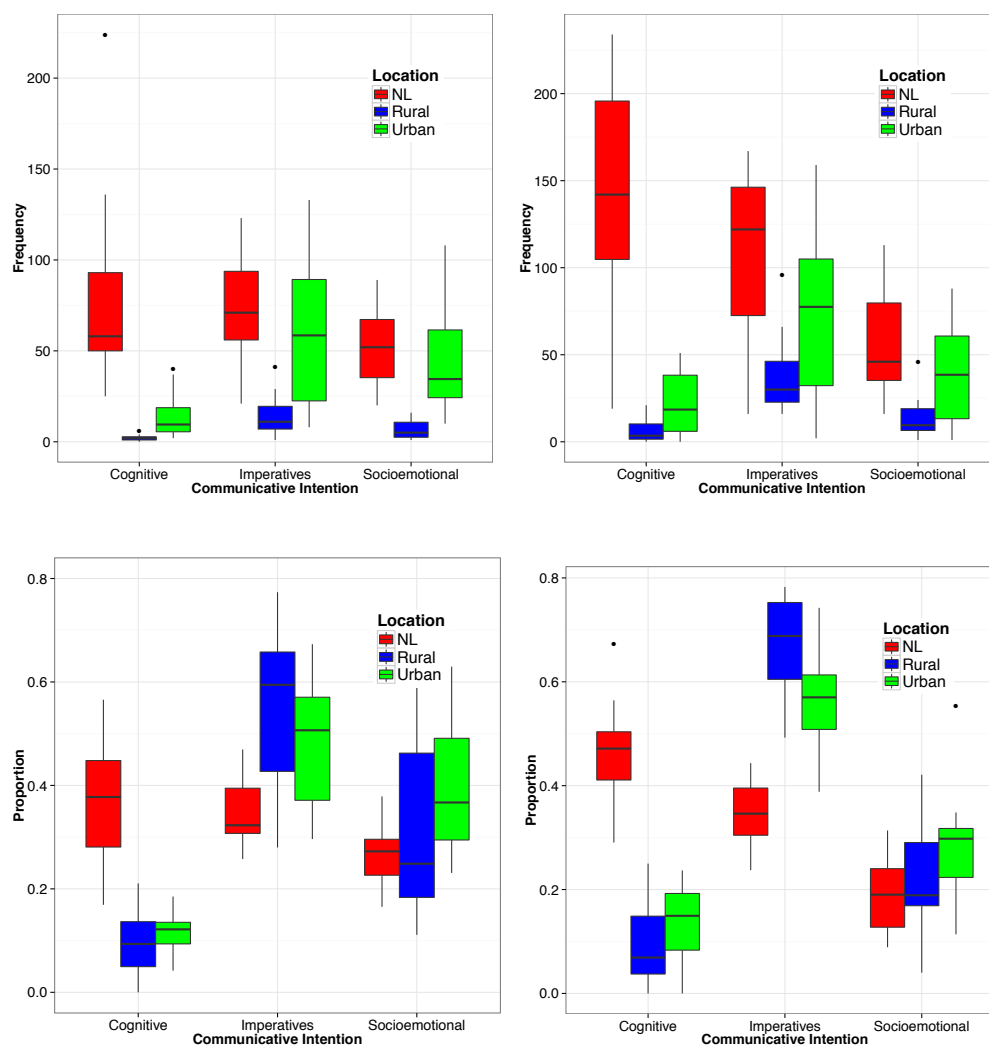


Figure 2. The distribution of communicative intentions of utterances addressed to children at 1;1 (left) and at 1;6 (right) in the Netherlands, rural Mozambique and urban Mozambique. The top graphs show the occurrence frequencies and the bottom graphs show the proportions of communicative intentions within each community.

*Cognitive intentions.* This ANOVA for cognitive intentions revealed significant main effects of location,  $F(2,37)=125.23, p<.001, \eta^2=.758$ , and of age group,  $F(1,37)=4.25, p=.046, \eta^2=.058$ . There was no interaction effect,  $p=.132$ . Pairwise Bonferroni tests revealed that for the 1;1 age group, the proportion of cognitive intentions in the Netherlands,  $M=.36, SD=.12$ , was significantly higher than in rural Mozambique,

### *Communicative intentions of child-directed speech*

$M=.09$ ,  $SD=.06$ ,  $p<.001$ , and urban Mozambique,  $M=.11$ ,  $SD=.03$ ,  $p<.001$ . For the 1;6 age group, pairwise Bonferroni tests revealed that the proportion of cognitive intentions in the Netherlands,  $M=.46$ ,  $SD=.11$ , was significantly higher than in rural Mozambique,  $M=.09$ ,  $SD=.07$ ,  $p<.001$ , and urban Mozambique,  $M=.14$ ,  $SD=.01$ ,  $p<.001$ . For both age groups, there were no significant differences between rural and urban Mozambique. While there was a significant main effect of age group, the post-hoc Bonferroni tests did not yield any significant differences for each location.

*Imperative intentions.* For imperatives, we also found main effects for location,  $F(2,37)=29.17$ ,  $p<.001$ ,  $\eta^2=.491$ , and for age group,  $F(1,37)=4.35$ ,  $p=.044$ ,  $\eta^2=.044$ , and no interaction,  $p=.238$ . Bonferroni tests revealed that the proportion of imperatives at 1;1 in the Netherlands,  $M=.35$ ,  $SD=.07$ , was significantly lower than in rural Mozambique,  $M=.59$ ,  $SD=.20$ ,  $p<.001$ , but did not differ significantly compared to urban Mozambique,  $M=.11$ ,  $SD=.03$ ,  $p=.064$ . Rural and urban Mozambique did not reveal a significant difference,  $p=.215$ . For the 1;6 age group, the Bonferroni tests revealed that the proportion of imperative intentions in the Netherlands,  $M=.34$ ,  $SD=.07$ , was significantly lower than in rural Mozambique,  $M=.67$ ,  $SD=.10$ ,  $p<.001$ , and urban Mozambique,  $M=.57$ ,  $SD=.10$ ,  $p<.001$ . Additionally, the proportion of imperatives observed in rural Mozambique was significantly higher than in urban Mozambique,  $p=.020$ . Testing for the effect of age, the proportion of imperatives used in urban Mozambique increased almost significantly between age 1;1 and 1;6,  $p=.05$ . No significant differences were observed in the Netherlands and rural Mozambique.

*Socioemotional intentions.* For socioemotional intentions, we again found main effects for location,  $F(2,37)=7.80$ ,  $p=.001$ ,  $\eta^2=.166$ , and for age group,  $F(1,37)=12.52$ ,



### *Communicative intentions of child-directed speech*

$p=.001$ ,  $\eta^2=.151$ , and no interaction,  $p=.856$ . Bonferroni tests revealed that when infants were 1;1, the proportion of socioemotional intentions in the Netherlands,  $M=.26$ ,  $SD=.076$  did not differ significantly from rural Mozambique,  $M=.31$ ,  $SD=.12$ ,  $p=.904$ , but was significantly lower than in urban Mozambique,  $M=.40$ ,  $SD=.12$ ,  $p=.035$ . Rural and urban Mozambique did not reveal a significant difference,  $p=.310$ . For the 1;6 age group, the post-hoc tests revealed that the proportion of socioemotional intentions in the Netherlands,  $M=.19$ ,  $SD=.07$ , did not differ from rural Mozambique,  $M=.22$ ,  $SD=.10$ ,  $p=1.00$ , but was again lower than in urban Mozambique,  $M=.29$ ,  $SD=.10$ ,  $p=.025$ . The proportion of socioemotional CDS in rural Mozambique did not differ significantly from urban Mozambique,  $p=.188$ . Concerning the age effect, the Bonferroni tests revealed that proportions of socioemotional intentions decreased significantly over time in the Netherlands,  $p=.024$ , and in urban Mozambique,  $p=.007$ .

### Discussion

In this article, we investigate to what extent caregivers from three different learning environments, in the Netherlands, rural Mozambique and urban Mozambique, vary in their use of different communicative intentions in their CDS. The results are mostly in line with our expectations: 1) The proportion of cognitive intentions are drastically higher in the Netherlands than in Mozambique. 2) The proportion of imperatives is highest in rural Mozambique, followed by urban Mozambique and then the Netherlands. 3) The proportion of socioemotional intentions in CDS is highest in urban Mozambique, but only differs significantly from the Netherlands. In rural Mozambique, the proportion of socioemotional intentions is in between urban Mozambique and the Netherlands, but these differences are not significant.

## *Communicative intentions of child-directed speech*

These findings demonstrate that irrespective of the amount of speech addressed to children, the composition of utterances' intentions vary across these three learning environments, and follow the expected differences in lifestyles and responsibilities of children of these different cultural communities (cf. Greenfield, 2009; Keller, 2012). The fostering of individual psychological autonomy in Western, middle-class urban environments is not only evident in the significantly greater amount of utterances addressed to children, but also in the proportion of cognitive intentions in utterances. Book reading activities, object naming, as well as expressing relations between objects and asking children questions about things, amount to what we call utterances with *cognitive intentions*. These were -by far- more prominent in the Netherlands, compared to both Mozambican communities. This finding is consistent with the larger numbers of declaratives and questions in the CDS found among Western, middle class, communities (Broen, 1972; Cameron-Faulkner et al., 2003; Hart & Risley, 1995; Newport et al., 1977), and the idea that the Western communities follow a child-centered approach to caregiving (Schieffelin & Ochs, 1986). Absolutely speaking, the frequency of cognitive intentions in the Netherlands becomes even more prominent in the CDS when the children are in the midst of their vocabulary spurt, at 1;6, indicating that Dutch caregivers adapt to their children's development by providing them more utterances that allow them to learn more vocabulary.

The (relative) lack of cognitive intentions in Mozambique is striking. In the rural community this can be explained to some extent by the caregivers' lack of interest in fostering psychological autonomy as compared to communal action autonomy (cf. Keller, 2012), as a result of which we expected to find less cognitive intentions. However, this would not apply to urban Mozambique, where caregivers

### *Communicative intentions of child-directed speech*

are supposedly fostering communal psychological autonomy. Yet, the relative amount of cognitive intentions in urban Mozambique is the same as in rural Mozambique. It thus seems that urban Mozambican caregivers address their children in more traditional ways, which do not include many cognitive intentions, while the fostering of psychological autonomy in urban Mozambique is achieved by talking to children more frequently overall.

Two other factors may play a role: First, the number of toys and other artefacts of interest are relatively low in Mozambique, compared to the Netherlands, especially in rural Mozambique. Hence, there are fewer objects to label. Second, the Bantu languages spoken in Mozambique allow for noun ellipsis, provided the context is clear and they are morphologically marked in the verb and adjectives (Bachetti, 2006). As a result, fewer object labels occur in CDS (Choi & Gopnik, 1995), thus reducing the amount of cognitive intentions. Fact is that object labelling is infrequent, and a different analysis of the same data indicates that when referential communication is required, this is often achieved through the use of gestures (Vogt & Mastin, 2013). Although these causes are likely to have some effect, the lack of differences within Mozambique complicates this explanation: First, families in urban Mozambique tend to have substantially more toys and artefacts. Second, Portuguese was the primary language spoken in the urban community. It thus appears that cultural differences in caregiving practices between the Netherlands and Mozambique are more likely to explain the lack of cognitive intentions in Mozambique.

The relatively large proportion of imperatives in rural Mozambique suggest that, as expected, caregivers focus more attention to the development of action autonomy in the non-Western rural community (Greenfield, 2009; Keller, 2012). This is in line with the high amounts of imperatives observed in various other studies from

### *Communicative intentions of child-directed speech*

non-Western, rural communities (Harkness, 1977; LeVine et al., 1994; Pye, 1986; Rabain-Jamin, 2001), as well as from studies among families of low SES (Hart & Risley, 1995). The proportion of imperatives in urban Mozambique was higher than in the Netherlands, yet lower than in rural Mozambique, which would be in line with the hybrid status of the non-Western urban community (Keller, 2012). Although not shown in the data, we observed that in urban Mozambique and even more so in the Netherlands, many imperatives occurred during play settings, whereas in rural Mozambique, these occurred relatively more frequently as instructions for children to assist in the household.

Given the desire to foster communal responsibilities in non-Western communities (Keller, 2012), we expected to find that socioemotional intentions would occur relatively more frequently in the CDS of both rural and urban Mozambique compared to the Netherlands. This expectation was only met in urban Mozambique, but not in rural Mozambique. Rural Mozambique neither differed significantly from the Netherlands nor from urban Mozambique. It is possible that the need to foster communal responsibilities in rural Mozambique is not evident in the socioemotional intentions of speech, but instead is expressed in different ways. For instance, through imperatives that ask children to act responsibly within the community, or that they may be observed in non-verbal communication, such as increased body contact (Gottlieb, 2004; Keller, 2012). Alternatively, communication in Mozambique often occurs in multiparty interactions in which interpersonal relations and socioemotional bonding may be expressed implicitly. Since the three communities do not differ much in the proportion of CDS that contains a socioemotional intention (cf. Bornstein & Putnick, 2012), it may also be possible that the fostering of interpersonal relations and socioemotional bonding is universally shared among these environments. Moreover, it

may be that urban Mozambicans implement their desire to foster psychological autonomy by marking socioemotional intentions explicitly in their CDS, thus explaining the higher proportions there.

These findings should be interpreted in relation to the absolute frequencies by which utterances are addressed to the children. The Dutch CDS contains almost twice as many utterances compared to urban Mozambique for both age groups. In turn, CDS observed in urban Mozambique has more than five times as many utterances than the CDS from rural Mozambique at 1;1, and more than twice as many utterances when children were 1;6. These findings are in line with earlier socialization studies investigating the amount of CDS cross-culturally (e.g., Lieven, 1994; Shneidman et al., 2012), and across SES (Hart & Risley, 1995; Weisleder & Fernald, 2013). Also, the total amounts of imperative and socioemotional utterances addressed to Dutch children outnumber those addressed to Mozambican children. Similarly, the total amounts of cognitive and imperative utterances addressed to urban Mozambican children, outnumber those observed in rural Mozambique.

There are also clear differences in the types of conversational settings observed in the three learning environments. In the Netherlands, we typically observed children being engaged in very talkative book reading, object play and mealtime settings. In rural Mozambique, it was frequently the case that children were being left alone, playing with peers and siblings - often without objects, were being breastfed or fed otherwise, or were being taught small household chores. In urban Mozambique, the amount of social play was higher than in rural Mozambique, and also frequently involved adult caregivers and there were less breastfeeding moments. It is likely that these different settings explain some of the variation in communicative

intentions. Although we could have controlled for this, for instance by imposing simulated play in all communities, that would also bias the results, because mothers in, especially rural, Mozambique are not used to playing with their children in such a manner. We therefore believe that the present results are a fair representation of everyday life in the three learning environments.

To conclude, our study shows considerable cross-cultural differences in the amount of communicative intentions of CDS. These differences can be explained, to a large extent, based on the conceptualizations of the three learning environments outlined by Keller (2012) and Greenfield (2009). The implications of this study are a strong reminder that our theories concerning children's early language acquisition should not only focus on WEIRD societies, but should also take into account the socialization practices from non-Western communities (Henrich et al., 2010). These socialization practices are to a large degree determined by the socio-demographics and resulting expectations of children's responsibilities in any given cultural environment, so differences between urban and rural communities, and SES are critical.

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