

Exploring "Associative Talk": When German Mothers Instruct their Two year olds about Spatial Tasks

Katharina J. Rohlfing

*Emergentist Semantics
Bielefeld University, CITEC
Universitätsstr. 21–23
Bielefeld, Germany*

KJR@UNI-BIELEFELD.DE

Editor: Matthew W. Crocker

Abstract

In this study, maternal semantic input was analyzed during a task, in which German mothers instructed their two-year-old children to put two objects together in a particular way. In the setting, the spatial relation (ON and UNDER) and the canonicity of these relations (canonical such as 'an iron on an ironing board' and noncanonical like 'a cup under a table') were varied and related to children's spatial cognitive skills. Two kinds of discourse strategies are proposed that characterize mothers' semantic input in this task: bring-in and follow-in. For the analysis, an automatic procedure was developed, in which the amount of words spent on a strategy was related to the overall word amount. The data suggest that the canonicity of the task can change the discourse: Bring-in strategies dominated the discourse in the UNDER tasks with canonical spatial relations while in the more difficult non-canonical tasks, mothers used follow-ins significantly more often than in the canonical tasks. Together, the results of this study shed light on the process of an on-line adaptation of the mother to her child and give us insight into how a situated understanding in a task-oriented discourse emerges.

Keywords: mother-child discourse, semantic input, understanding of prepositions

1 Introduction

Mothers talk about events to their children. This has been studied extensively in two different areas of research: language acquisition and memory development. One intriguing topic in language acquisition is how mothers structure their discourse, and how children's emerging communication skills are associated with maternal conversational style (for example, Hart & Risley, 1982; Tomasello & Todd, 1983). In this area, the research goal is to find out how mothers scaffold the language-learning process. Studies in memory development, in turn, examine how parental conversations about events influence the ways in which children store these events. Here, the goal is to identify conversational styles that foster developmental changes in memory skills (for example, Haden, Ornstein, Rudek, & Cameron, 2009). The aim of the present article is to combine both strings of research when analyzing a task-oriented dialogue. In a task, a mother uses instructions because she wants her child to achieve a goal. However, the way she shapes her instructions takes two aspects into account: the child's attention and the child's knowledge about the objects, their spatial relations and events involved. Therefore, the following sections review the conversational strategies from the area of language acquisition for organizing a child's attention and the strategies from the area of memory development on children's acquired knowledge about events.

Children's lexicon acquisition and mothers' linguistic and communicative style

Several studies have proposed that mothers' speech and their communicative styles influence children's word learning (for example, Hart & Risley, 1982; Tomasello & Todd, 1983), and it has been shown convincingly that the amount of talking and the richness of lexical variation in caregiver input influences children's lexical and grammar development (for example, Hart & Risley, 1982; Hoff & Naigles, 2002; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; Masur, Flynn, & Eichorst, 2005; Tamis-LeMonda, Bronstein, & Baumwell, 2001). Some crosslinguistic variations in maternal speech and its relation to children's lexical acquisition have also been reported. For example, Choi (2000) has shown that the distribution of nouns and verbs in caregivers' talk differs between English- and Korean-speaking mothers, and that these distributions relate to children's vocabulary composition in early years.

Not only the amount and quality of the caregiver's input but also how the caregiver responds to and incorporates the child's attention is a key element in talking to children (Estigarribia & Clark, 2007; Tomasello & Todd, 1983). Della Corte, Benedict, and Klein (1983) as well as Tomasello and Todd (1983) have investigated maternal conversation style in terms of social-interaction variables. Tomasello and Todd (1983) measured mother's style of attention regulation when addressing their 12- to 13-month-old children, and analyzed how this style correlated with referential-expressive differences in the children's early lexical acquisition. They found that the maternal style—directing attention toward an event the child is not focusing on—was associated with more personal-social words and fewer nominals in the child's lexical development. This style was judged not to be optimal for establishing joint attention (see also Tomasello & Farrar, 1986), because "now it is the child who must discern where the adult's attention is focused" (Tomasello & Todd, 1983: 200). In addition, an experimental study by Tomasello and Farrar (1986) has shown that 17-month-old children learned words better when they were presented within a joint episode; that is, when the child's attention was already focused on the labeled object (see also Mundy & Gomes, 1998).

A further study by Akhtar, Dunham, and Dunham (1991) examined mothers' utterances in terms of prescriptive commands directed toward the child or descriptive statements describing events that either followed or directed the child's focus of attention. For example, a "follow-prescriptive" occurred when a mother and her child were engaged in building a tower and the mother said "give me the block!" referring to the one the child was holding and looking at (Akhtar et al., 1991). Whereas maternal speech was examined when the children were 13 months old, the children's lexical development was measured at the age of 22 months. Interestingly, only the follow-prescriptives correlated significantly with the child's productive vocabulary at the age of 22 months. Hence, the study suggests that giving commands rather than descriptions to 13-month-old children in the context of joint focus may be beneficial in the early stages of a child's vocabulary development (Akhtar et al., 1991).

In sum, the studies presented above have shown that establishing joint attention is a key element in communicative exchanges, and that the way in which mothers align their speech with their child's focus of attention accounts for individual differences in learning. However, Lieven (1994) observed that in some cultures, mothers tend to organize their children's attention rather than merely responding to it. Thus, joint attention should not be limited to a behavioral strategy. Instead, following Estigarribia and Clark (2007), who studied 40 dyads of adults talking to children at the mean age of 18 to 36 months, establishing joint attention is an interactive process in which it seems to be important for children to understand "why the adult is trying to get their attention" (Estigarribia & Clark, 2007: 811).

As reported here, research in language acquisition has concentrated on joint attention in the form of conversational strategies for organizing a child's attention. However, as I shall show below, research on memory development points to other means of achieving a rather top-down organization of attention.

Children's memory development and mothers' conversational style

The options available to a mother when talking about events have been examined in studies investigating the effects of maternal input on children's memory for events. Memory is a crucial cognitive component for early development: It allows children to recall and talk about past experiences (Ornstein & Haden, 2001). Several studies have proposed that language plays an essential role in the development of memory (Bauer & Wewerka, 1995; Boland, Haden, & Ornstein, 2003; Haden et al., 2009; Reese, Haden, & Fivush, 1993; see, for nonverbal recall, McGuigan & Salmon, 2006). Hayne and Herbert (2004) modeled some new actions with objects for 18-month-old children who were not yet fluent speakers. During the demonstration, one group of children received a narration about the event goals and individual target actions. This verbal description gave the full names of the objects and full verbs, for example: "We can use these things to make a *rattle*. Push the *ball* into the *cup* . . ." (Hayne & Herbert, 2004: 131). Another group received an "empty narration" containing deictic terms like "Let's have a look at *this*. Then we have *this* bit . . ." This style of verbal behavior maintained the infant's attention, but contained no additional information about either the target actions or the event goals. After a 4-week delay, the infants' memory of the previously demonstrated actions with the objects was tested. Results showed that infants who had been given full narrations exhibited superior retention of the events compared to infants given empty narrations (Hayne & Herbert, 2004).

In a study with older children (30–46 months), Reese et al. (1993) analyzed how mothers construct events so they can be better memorized. They identified two conversational styles: low-elaborative and high-elaborative. A high-elaborative style (also called "high-eliciting" style in Haden et al., 2009: 121) is characterized in terms of (a) eliciting discussions of past events; (b) frequently asking wh-questions; (c) elaborating between what is happening in the here and now and what a child might already know about the event (for example, adding information or associating it with previously experienced events to guide children's memory); (d) encouraging children to talk about aspects of the events that seem to interest them (see also Akhtar et al., 1991; Tomasello & Farrar, 1986; Tomasello & Todd, 1983); (e) repetitions; and (f) providing positive evaluations of children's responses (Boland et al., 2003; Haden, Ornstein, Eckerman, & Didow, 2001). A low-elaborative style in contrast, is characterized by mothers talking to their children about practical matters and focusing on the who and what (Bauer & Wewerka, 1995). Boland and colleagues (2003) tested the positive effects of the high-elaborative style on toddlers' ability to remember events. They first trained some mothers to use elaborative conversational styles; other untrained mothers served as controls. Trained mothers learned some conversational techniques in order to provide input that focuses on children's attention and, thus, presumably increases their understanding of events. The mothers were then asked to apply these techniques in joint play events with their children, such as fishing or camping. The children were interviewed about the events both one day after the session and after a 3-week interval. They were asked to tell, for example, what they had experienced on the camping trip with their mother and to answer other questions concerning the details of the event. Recall of instances in which a component of the event was named were coded, and the percentage of recall was compared across children with trained versus untrained mothers. Results suggested that conversational interaction focusing children's attention on salient aspects of an event enhances their understanding of the event. Such interaction helps to establish a richly detailed and organized representation of the experience (Bauer & Wewerka, 1995). Hence, mother-child interaction is linked in important ways to what is encoded and subsequently remembered (Haden et al., 2009).

Associative Talk: Background knowledge about events

A closer look at the above shown elaborated style reveals that a bundle of potential factors is involved in the positive effect on memory. The next step is to tease the factors apart and

investigate them separately. The effect of some of the factors is reported in the literature: for example, the positive effects of asking wh-questions (for example, Bauer & Wewerka, 1995; Walsh & Blewitt, 2006), of follow-prescriptives of a child's actual behavior (Akhtar et al., 1991; Dunham & Dunham, 1992; Rosenthal Rollins, 2003; Tomasello & Farrar, 1986; Tomasello & Todd, 1983), and of positive evaluations (Della Corte et al., 1983). However, we know little about the content of these types of input, in particular, about the range of options mothers have for elaborating or associating their input with the knowledge the child might already possess about the event. For example, it has been shown that toddlers know early about putting things into a container and on a surface, but they get to know later in the development how to put things behind or under (Casasola, 2008). Mothers have to consider the cognitive development of their children when talking as an attempt to solve a task. Therefore, the approach presented here aims at exploring what Ornstein, Haden, and Hedrick (2004: 382) referred to in their review as "associative talk."

How does association work? The temporal concurrence or consecutiveness of units seems to be crucial for the development of relationships between them. According to Strube (1984), two processes can induce a search of memory: one based on common features or feature patterns; the other, on a specific context. Features or feature patterns are linked when they occur in close temporal proximity. They can be seen as paradigmatic relationships. The strategy based on a specific context requires a joint perception and action context and retrieves syntagmatic relationships (de Saussure, 1931). Research on children's event memory has not yet specified these association processes. Instead, it is proposed that an event is jointly constructed and structured in a conversation between mother and child (Haden et al., 2001).

In order to explore the "associative talk", this article focuses on the discursive options that mothers have when trying to scaffold their child's understanding of a given task and to introduce the relevant features of a jointly structured event into the situation. Unlike the studies in memory development, however, the aim of the study is not to test what the participant remembers about an event. Instead, the goal is to explore the associative talk occurring within a task. This task is a mother requesting her child to produce a particular spatial configuration between two objects. For example, she asks her child to put a cup on a table. Such a task might be linked to an event (for example, having a tea party) as long as the child has such an event representation in her or his memory and can apply this knowledge to perform the task. The analysis of associative talk applies to the semantic content of the discourse – that according to Masur, Flynn, and Eichorst (2005: 88) is influential in lexical development because it maintains or motivates their children's attention to events. However, up to now, it has not been a focus of research.

Some research on semantic content has been carried out in cognitive linguistics. For example, Sinha and Jensen de López (2000) have suggested that the linguistic way of structuring events is based on cultural knowledge about objects (artifacts). Sinha (1983: 269) refers to the child's knowledge that can be useful for a task as "background knowledge." Its involvement in the construction of meaningful events has been stressed from a developmental perspective by Sinha (1983) and from a general perspective on concept formation by Barsalou (2002). It can be defined as knowledge that enables a child to make inferences that facilitate the comprehension and establishment of a coherent representation in memory.

Freeman, Lloyd, and Sinha (1980) have shown that the background knowledge about the canonical orientation of an object and the canonical relationships between objects impacts on children's performance in a task. For example, children understand an instruction such as "put a block on a cup" poorly when an inverted (that is, noncanonical) orientation of a cup is being requested. Canonicity (Sinha, 1983), that is, the background knowledge about the functional relationship, influences not only the relationship between two objects but also the way one object is handled. A cup, for example, must be held in an appropriate way (that is, the opening facing upward) to fulfill its function. Canonicity is established according to "canonical rules" (Sinha,

1983: 276) that reflect the social interests and values of a particular society and mediate its cultural practices.

In the following study, canonicity was used as an independent variable having an influence on the task difficulty. From previous research, it is known that children at the age of 20 to 26 months have to put a greater effort into a noncanonical goal (Clark, 1973; Rohlfing, 2005). Even though it has been shown that children are sensitive to the semantic principles of spatial categories of their target language from at least 18 months of age (Choi et al., 1999), other findings indicate that two-year-olds' proficiency in understanding spatial terms is highly situation- and task-dependent (for example, Clark, 1973; Freeman, Lloyd & Sinha, 1980; Sinha & Jensen de López, 2000; Rohlfing, 2005), and therefore still under strong influence of nonlinguistic factors such as object's function and geometry. These findings on the sensitivity to language-specific spatial semantics on the one hand and the sensitivity to nonlinguistic factors concerning the materiality of objects on the other hand put forward the idea of a continuous and complex interaction among cognition, perception and language in spatial tasks (Bowerman & Choi, 2001; Casasola, 2008). The canonicity in the tasks below will therefore likely affect this interaction.

The present study hypothesizes that maternal input will differ as a function of the canonicity of the requested relation. Mothers are expected to make more use of children's background knowledge and, thus, relate more often to shared past events when requesting a canonical relationship as opposed to requesting a noncanonical relationship. This is examined by extending analyses of the conversational style (for example, Haden et al., 2001) involved in "associative talk" and proposing a more detailed characterization.

2 Method

Participants

Nineteen German-speaking mother-child pairs participated in this study. The 10 girls and 9 boys were aged 22–24 months ($M = 22.6$ months, $SD = 21$ days). At this particular age, children are able to engage in dyadic task-oriented interactions on the one hand, on the other hand, previous research have shown that 22 to 24 month-olds are biased towards some canonical spatial configurations (or some geometric features) and have difficulties in understanding verbal requests for noncanonical goals (for example, Clark, 1973; Rohlfing, 2005), which gives an opportunity to investigate the impact of task difficulty on the dialogue.

Participants were selected from a subject pool of interested parents answering an advertisement in the local newspaper of a North German city. All children were being raised in a monolingual German-speaking environment. Mothers were not paid for their participation, but their children were given a book as a present.

Stimuli

The stimuli were objects whose relations varied in two ways: in terms of canonicity (canonical vs. noncanonical relation) and the kind of relation (ON vs. UNDER). For each task, two relations were prepared with and without an animated trajectory. All stimuli are presented in Figure 1.

A *canonical relation* refers to the most common function between two particular objects. For an iron and the ironing board, the canonical relation is the iron going ON the ironing board. The objects used for a canonical relation in this study are depicted in the top row of Figure 1. In contrast to the canonical relation, a *noncanonical relation* was defined as a relation that is possible and plausible with the objects involved but does not relate to their customary function (for example, a cup *under* a table). When choosing objects for a canonical or noncanonical relation, it is important to be aware of the fact that canonicity also involves appropriate

orientations of the objects for a relation. The orientation of an object, in turn, can be culture-specific (Sinha & Jensen de López, 2000) and depends on the child's personal experience (Rohlfing, Rehm, & Goeke, 2003). This study considers four noncanonical relations: *a spoon on a cup*, *a rabbit on a hutch*, as well as *a cup under a table* and *a horse under a bridge* (previous studies had shown that children at the age studied are very likely to put a horse on or across the bridge particularly when a staircase leads to the top of the bridge). The noncanonical relations are depicted in the bottom row of Figure 1.

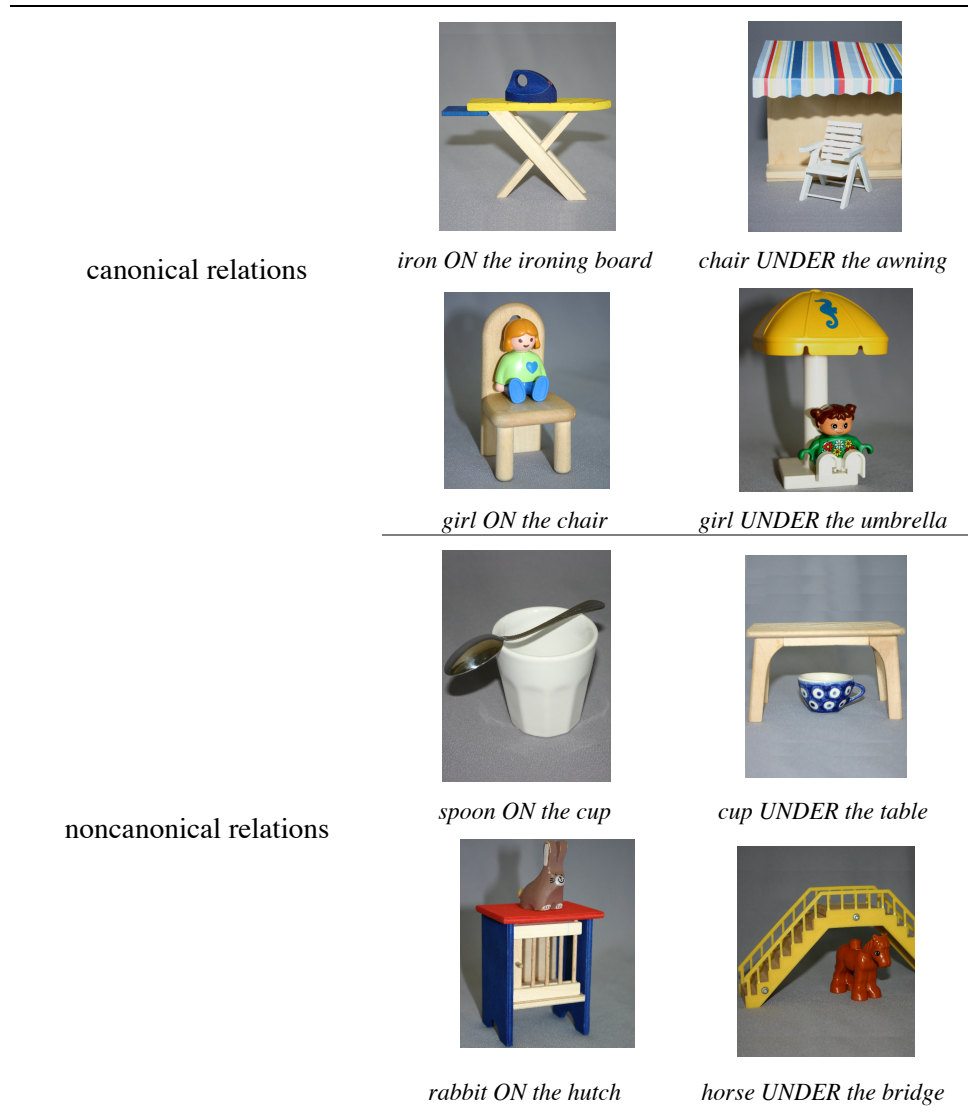


Figure 1: Photos shown to the mothers and labels for the different tasks.

The relations ON and UNDER were chosen because of the different level of knowledge children demonstrate in understanding them: Whereas the preposition ON is reported to be understood very early, the understanding of UNDER is relatively poor at the age of 20 to 24 months (for example, Clark, 1973; Rohlfing, 2005).

Procedure and language survey

Sessions lasted about half an hour. At the beginning, the experimenter engaged the child in free play at a small table while the mother filled out a language survey containing items on the child's understanding and production of 49 spatial terms. More specifically, in this survey, the mother was asked whether the child understands spatial terms for actions (for example, *open*, *put*, *hide*), relations between objects (for example, *in*, *on*, *under*, *to*), nouns (for example, *front*, *inside*, *top*), and other deictic terms (for example, *here*, *where*). These words were chosen because of their semantic relevance for this experiment. Kickert (2008) has shown that the German version of this language survey correlates strongly with the scores on ELFRA-2 (Grimm & Doil, 2000), the German adaptation of the MacArthur-Bates Communicative Development Inventories, CDI. For example, the productive vocabulary in the language survey presented here correlated very significantly with the productive vocabulary in ELFRA-2 ($r = .88, p < .001$).

After a few minutes, all toys and books were removed from the table. The mother sat at the table next to the child, but at a 90° angle. The experimenter presented pairs of objects one by one to the child. The experimenter told the child that she was going to show some new toys and that they would all play a game together. Next, the mother was shown a photo depicting a relation (see Figure 1). She then proceeded to instruct her child. The data was transcribed from this time on. The mother was told that the relation on the photo was the target relation, and she was instructed to feel free to use verbal and nonverbal means to get her child to understand and perform the task. However, we asked mothers not to actually perform the relationship on the objects directly, for example, not to put a spoon on a cup. If a child still did not understand the task after several instructions, the experimenter moved on to the next pair of objects.

Data coding

Data were transcribed using an XML-format program called MARTHA. This program was specially developed for this study, and its customized structure made the transcription process simple but appropriate for this analysis. Mothers' verbal behavior was transcribed and coded in an XML format on four levels: lexicon, sentence reference, discourse, and nonverbal behavior. The present paper reports on the discourse coding. The discourse was quantified by counting all words uttered by the mother in every transcript. This word total then represented 100 % of the discourse. Next, the number of words used for a particular discourse strategy (see the category system below) was related to the overall word count. This revealed the percentage involvement of a particular strategy within the overall discourse.

This new procedure is more objective, especially in comparison to previous practices such as (a) taking the raw frequencies into account, because with this new method, it is possible to take the interpersonal variability into account, that is, the fact that the dialogues between mothers and their children were of different length (some mothers talked more than others) as no time constraint was given in the task; thus, the proportions seem to give a better picture of the involvement of the different strategies in the discourse than the raw frequencies; (b) first counting sentences—and having to make difficult decisions on whether one-word utterances like "good!" or syntactically incomplete utterances like "this way!" are sentences in child-directed speech—and then calculating the number of discourse strategies per sentence (Rohlfing & Choi, 2004) or (c) counting discourse strategies as a specific sentence type alongside other types such as explicit instructions (Choi & Rohlfing, 2010).

Child's behavior was coded in terms of the task performance: A child was successful if she or he put the objects together in a requested manner; a child was not successful if answered with another relation than requested. For example, in the case that a mother requested a noncanonical relationship between a horse and the bridge (Put it UNDER!), and the child performed a canonical relationship, this task performance was coded as not successful.

Category system for the discourse

The category system was based on a schema developed in Rohlfing and Choi (2004). It was assumed that a task-directed instruction has the format *Put X ON/UNDER Y!* and explicitly directs the child to put two things together (Choi & Rohlfing, 2010). When the instruction diverged from this format, the mothers' verbal behavior was analyzed for its discourse strategy. As the left-hand column in Table 1 shows, utterances were assigned either to *bring-in* or to *follow-in* strategies. Each type of discourse then has subtypes. Their descriptions are given in Table 1. The right-hand column gives examples of these strategies with the crucial parts for the category assignment highlighted in bold.

	strategy	description	prominent example
BRING-IN	Story about the trajector object	A further description of an event related to the trajector object containing the object's function	<i>A tea-cup!</i>
	Story about the landmark object	A further description of a landmark object is provided containing the object's function	<i>This is a beach umbrella!</i>
	Story about the situation	The whole event is named, which suggests the involvement of both objects in a target relation	<i>Let's have a tea party!</i>
	Comparison	The task is compared to a similar situation that the child has already experienced or knows	<i>Like at home, you put the cup with water always on the table</i>
	Paraphrase	The objects' names, the relation or the action are paraphrased to evoke associations with the target relation	<i>Put the horse under the bridge, put him in the hole!</i>
FOLLOW-IN	Describing	Comments on what the child is actually doing	<i>Yeah, you are going over the bridge!</i>
	Inhibiting	Negative comments on what the child is actually doing; sometimes precedes Contrast	<i>Now, don't stir! There is nothing inside.</i>
	Indirection	The child's actual behavior is lead to a point, from which a task-directed instruction is given; it may concern the orientation or the role of an involved object or the child's attention	<i>Turn the bridge over!</i> <i>Show Mummy the spoon!</i>
	Contrast	The target relation is contrasted with what the child is currently doing [in this example, the first sentence is coded Labeling while the second is coded as Contrast to the first one]	<i>That's on the bridge. Put the horse under the bridge!</i>
	Noun uptake	Mother expands on child's suggestion; if the child labels an object, the mother picks up this noun and uses it for the task instruction	<i>Child: steps!</i> <i>Mother: Can you put the horsey under the steps?</i>

Table 1: Coding system for the discourse.

Five types of the *bring-in* strategy were identified. They comprise what Ornstein et al. (2004) term "associative talk" or what Haden et al. (2009: 121) refer to as "statement elaborations" and explain as "declarative comments that provided new information about the event, but did not call for the child to respond (for example, 'We saw lots of dinosaurs at the museum.')." In all of the bring-in strategies, the mother introduced a particular event frame to the dialog (for example, "tea party") that was familiar to the child. For example, when a mother asked "Will you have some

tea?" for the task of putting a cup on the table, the utterance was coded as a bring-in discourse strategy, because the mother was evoking a particular event. Evoking the event may help the child to understand the requested spatial relation. A bring-in can be achieved by talking about past events directly in terms of telling a *story* about the *trajector* ("StoryTR" strategy), the *landmark* ("StoryLM"), or the *situation* ("StorySIT"). These stories provide an elaboration of the function of the objects, thus allocating an object in context. A fourth type of bring-in strategy is *comparison* in which the mother compares the current situation with a specific, personally experienced event. Finally, the fifth type of bring-in is *paraphrase* in which the mother paraphrases a preceding utterance that may be difficult for the child to understand by introducing another notion that is more familiar. For example, in the task in which the horse had to be put under the bridge, the preposition UNDER was replaced by the preposition IN ("in the middle" or "in the hole"). In the example given in Table 1, a mother replaced the preposition UNDER with the preposition IN and said "in the hole," evoking the hollow space under the bridge as a containment, so that the child could perceive the target location and follow the task better.

The follow-in strategies were defined on the sole basis of maternal discourse (and not through nonlinguistic aspects such as the child's eye gaze as in Tomasello & Farrar, 1986) as utterances that refer to children's situated attention on the physical and spatial properties of the objects themselves. Strategies identified as *describing*, *indirection*, *contrast*, and *noun uptake* use language as a tool to directly instruct the desired event on the basis of the action or the object the child is attending to. For example, when a mother said "you are going over the bridge," she was describing what the child was doing and therefore this utterance was assigned as a follow-in (describing). The strategy *inhibiting* characterized cases in which a mother gave negative comments on what the child was actually doing such as "Now, don't move!"

Transcript	analyzed as
01 C: [manipulates]	
02 M: Guck mal, das soll ein Sonnendach sein. <i>Look, this should be a sunroof</i>	
03 M: Da damit die Sonne da nicht hinkommt. <i>So the sun does not come here</i>	Bring-in: Story about the situation
04 M: Und der Sonnenstuhl kann jetzt u:nter dem Dach stehen. <i>And the sun chair can now stand under the roof</i>	Bring-in: Story about the trajector
05 C: [manipulates]	
06 M: Den Stuhl- <i>the chair...</i>	
07 M: Ja:? So liegt der Stuhl ja. <i>Yes? Now lays the chair.</i>	Follow-in: Describing
08 C: [manipulates]	
09 M: Kannst du den auch hinstellen? Wie bei uns auf der Terasse. <i>Can you also put it upright? Like at our home at the awning?</i>	Follow-in: Indirection Bring-in: Comparison
10 M: Ja genau. <i>Yes, exactly.</i>	

Table 2: Example of transcript analysis: Words spent on strategies are marked in bold

However, some overlaps of strategy categories were possible within this system. In one case, a mother said with reference to the horse: "Und jetzt läuft's ja oben drüber. Kann das auch unten durchkrabbeln? [Now, it goes on top. Can it crawl under as well?]" In the latter utterance, one word was coded as a bring-in strategy, because the mother paraphrased the relation "under the bridge" by the action of crawling. However, this utterance also implied a follow-in strategy, because the mother contrasted the requested relation with the child's actual doing. The XML-based analysis tool took account of the involvement of both strategies in the overall discourse.

Because of the overlap, the two strategies are considered as two dependent variables and are subjected to two separate statistical tests. As stated in the data coding section, the total number of words the mother used in a task was calculated first. Then the number of words used for a particular strategy was calculated as percentage of a particular strategy involved in the whole discourse. The transcript in Table 2 provides an example.

3 Results

Children's task performance

Children performed an average of six tasks correctly (from a minimum of four and a maximum of eight, $SD = 1.6$). An inspection of the percentage of children performing the requested relation (see Table 3) revealed that the tasks varied in level of difficulty. Table 3 reports both the percentage of successes and the median number of instructions needed for the child to succeed. It indicates that canonical relationships were easier to perform (with canonical ON easier than UNDER) than noncanonical ones. In addition, a higher percentage of both bring-in and follow-in strategies combined was found in noncanonical settings: On average, 18.7 % of the mothers' discourse took the form of strategies in noncanonical tasks compared to 14.9 % in canonical tasks.

RELATION			Percentage of successful performance	Median of instructions needed
ON	canonical	iron / ironing board	89	7
		girl / chair	100	3
	noncanonical	cup / spoon	42	17
		rabbit / hutch	79	13
UNDER	canonical	chair / awning	74	13
		girl / umbrella	89	8
	noncanonical	pot / table	68	12
		horse / bridge	68	15

Table 3: Children's task performance and the number of instructions.

Task performance, children's age, and children's spatial lexicon

Since the children in the sample had an age span of 3 months (from 22 to 24 months), it was possible that their performance was dependent on their age. However, no evidence was found for this assumption (children's age did not correlate significantly with children's performance: $r = -.00$, $df = 19$, ns). Alpha was set at .05 for all statistical tests. The next step was to examine possible correlations with the children's abilities in the spatial lexicon (as reported by mothers in the language survey). Children's task performance correlated significantly with reported productive spatial lexicon ($r = .52$, $df = 19$, $p < .03$) but not with the reported receptive spatial lexicon ($r = .28$), suggesting that a more advanced reported productive spatial lexicon helped children to solve the task successfully. The reported production of spatial terms related particularly to performance on noncanonical tasks ($r = .48$, $df = 19$, $p < .04$). Thus, children's productive language capabilities seemed to be involved in their task performance, which, in turn, influenced the length and quality of the discourse that the mother provided to the child. This indirect influence was examined with an analysis of covariance (s. below) taking the reported productive lexicon as covariate.

Discourse strategies and canonicity

Overall, the total number of words provided by the mothers to their children across all eight tasks was 10039. The average number of words from a mother to her child per task was 528 ($SD = 199$), with 19.2 % of this discourse being provided in the form of bring-in strategies and 14.4 % in the form of follow-in strategies. The greater presence of bring-ins was statistically significant, $t(18) = 2.37$, $p < .03$. This indicated the relevance of bring-in strategies as an important component of the discourse.

Since bring-in and follow-in strategies can overlap (s. section on data coding and category system), two separate 2×2 ANCOVAs were performed on the percentage of words constituting bring-in and follow-in discourse strategies with spatial relation (ON and UNDER) and canonicity of the relation (canonical and noncanonical) as within subject factors and the reported productive spatial lexicon of the children as covariate.

As shown in Figure 2, the frequency of bring-in strategies was higher in the canonical settings than in the noncanonical settings, but only for the UNDER tasks. The statistical analysis failed to attain any significance. One explanation seems evident when looking at the data in Table 3: In the canonical ON tasks, children displayed ceiling effects in their performance and mothers did not need to instruct a lot. This is in line with previous research (Clark, 1973; Rohlfing, 2001). Since in this task, little discourse was needed anyway, the comparison with the noncanonical task seems to be futile. A paired t test performed only on the UNDER tasks, revealed a statistical difference, $t(18) = 1.82$, $p = .03$ (one-tailed), according to which more bring-ins were produced in canonical tasks than in noncanonical tasks verifying the one-directional hypothesis raised for the analysis: Mothers were expected to make more use of children's background knowledge and, thus, bring-in more often shared past events when requesting a canonical relationship as opposed to requesting a noncanonical relationship.

As shown in Figure 2, the frequency of follow-in strategies was significantly higher in the noncanonical settings than in the canonical settings for both relations, which was confirmed by the statistical analysis revealing a main effect for canonicity $F(1,17) = 9.18$, $p < 0.01$, $\text{Eta}^2 = 0.35$. This main effect was further investigated by means of post hoc pairwise Bonferroni-corrected (.05/2) t tests indicating a difference in canonicity between canonical vs. noncanonical ON tasks $t(18) = -3.47$, $df = 18$, $p = 0.003$ and canonical vs. noncanonical UNDER tasks $t(18) = -3.11$, $df = 18$, $p = 0.006$. In addition, the ANCOVA analysis revealed also a main effect for relation $F(1,17) = 3.17$, $p < 0.01$, $\text{Eta}^2 = 0.16$. Accordingly, mothers made use of more follow-ins when instructing for UNDER relations rather than for ON. Together, these results match the

analysis of the task difficulty (s. results on children's task performance) suggesting that the more difficult the task was, the more use of follow-ins the mothers made.

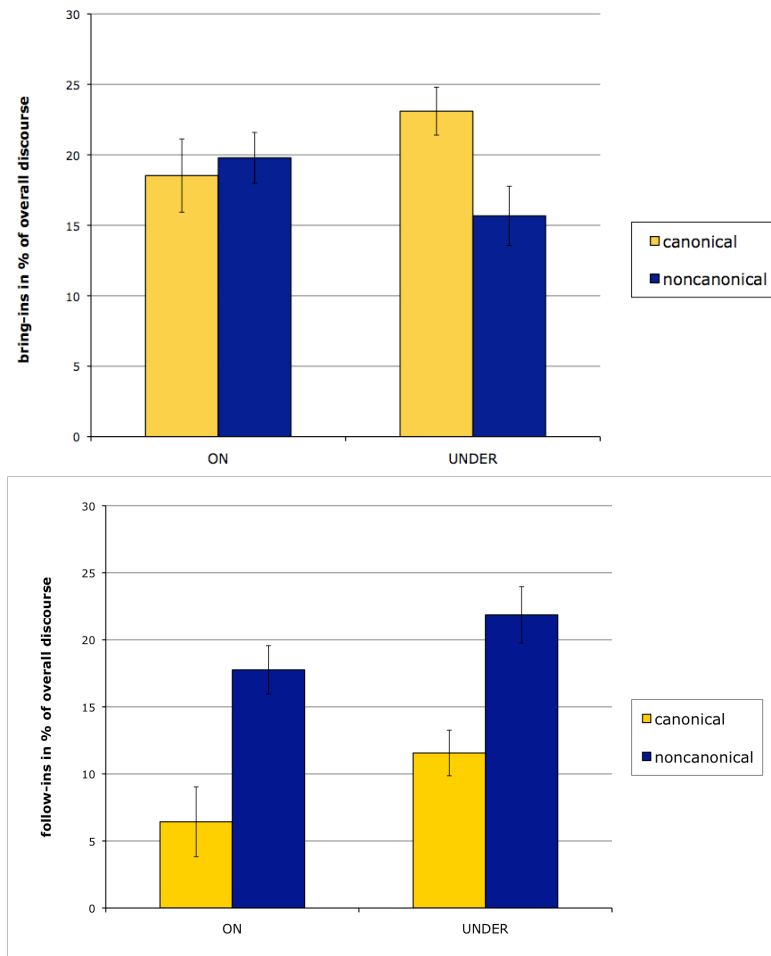


Figure 2: Percentage of (above:) bring-ins and (below:) follow-ins involved in the discourse with regard to canonicity of the ON and UNDER spatial relation. While Follow-ins are used more often in noncanonical tasks of both spatial relations, the dominance of the bring-ins in canonical relations can be seen only for the more difficult UNDER spatial relation.

In sum, the data provides support for the hypothesis that the type of maternal discourse could change as a function of the canonicity of a spatial relationship: Generally, in canonical and noncanonical conditions, mothers drew on their children's background knowledge such as familiar events related to the spatial task. When more discourse is needed (which is the case in the more difficult UNDER tasks), mothers more often brought in shared past events when requesting a canonical relationship as opposed to requesting a noncanonical relationship. When instructing for a noncanonical relation, in turn, mothers followed-in more and thus focused more directly on the spatial task itself.

Recall that the ANCOVAs were conducted to examine whether the strategies mothers used in their discourse varied as a function of the children's language production. However, the outcome did not support the hypothesis that children with a less advanced spatial lexicon received a different type of discourse input than those with a more advanced one. That is, the use of bring-in or follow-in strategies did not relate to the children's level of spatial lexicon. This suggests that

strategies were task-dependent and selected on-line as a function of the canonicity (familiarity) of spatial relationships.

The question remains whether the choice of a particular strategy led to successful performance by the child. However, no statistically relevant relation between mothers' use of particular discourse strategies and children's performance was found. There was only a marginally negative correlation between children's performance and follow-in discourse strategies in noncanonical settings, indicating that children who were not successful in the noncanonical tasks were followed-in more by their mothers. This lack of a significant relation suggests that even though the organization of discourse seems task-dependent, particular strategies do not necessarily help children to solve the task.

Subcategories of discourse strategies

The subcategories of each type of discourse strategy (see Table 1) were also analyzed, starting with the frequency of each subtype in canonical versus noncanonical settings (see Table 4). The huge individual differences become apparent when looking at the standard deviations.

STRATEGY		discourse				
		canonical		noncanonical		<i>comparison</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
		<i>t(18)</i>				
BRING-IN	Story TR	7.9	10.7	15.2	10.3	-2.0*
	Story LM	1.3	3.2	1.5	2.4	-0.2
	Story SIT	12.8	14.4	6.7	8.1	1.3
	Comparison	12.3	10.4	6.5	6.8	2.1*
	Paraphrase	3.3	15.6	18.2	13.1	-6.0***
FOLLOW-IN	Describing	3.9	5.6	29.2	21.3	-5.2***
	Inhibiting	2.1	4.5	4.0	4.7	-1.4
	Indirection	16.1	16.4	18.6	19.8	-0.4
	Contrast	2.6	4.9	22.1	15.9	-5.1***
	Noun	0.4	0.9	2.6	4.86	-1.9
	Uptake					

Table 4: The percentage involvement of each of the particular strategies type in the overall discourse; the right column reports the results of the comparison between canonical and noncanonical tasks: the *t*-values and their statistical significance (* $p < 0.5$, ** $p < 0.1$, *** $p < .001$).

Table 4 shows the distribution of the subtypes of the bring-in strategy in canonical and noncanonical settings. Altogether, significantly more comparisons were used in canonical settings, $t(18) = 2.05$, $p = .05$, with mothers relating these settings to known past events or known situations. Fewer such comparisons were possible in noncanonical settings in which the task seemed to deviate from known situations. According to further paired *t* tests, mothers invented more stories about the trajector object in noncanonical settings, $t(18) = 2.05$, $p = .05$, by saying, for example, that the rabbit wanted to see the sun or to escape. In addition, significantly more

paraphrasing was used in the noncanonical settings, $t(18) = -6.02$, $p < .001$. For example, in the task of putting the rabbit on the hutch, the hutch was often paraphrased as *Dach* [roof] to evoke the function of an ON. The subtype Paraphrase included attempts to use another noun not only for the reference objects such as the hutch or the bridge, but also for the spatial relations such as UNDER. This relation was paraphrased by verbs such as "to hide" as in *und jetzt möchte sich das Pferdchen unter der Leiter verstecken* [and now the horsey would like to hide under the ladder] or "to crawl" as in *kann das auch unten durchkrabbeln?* [Can the horse crawl under as well]. As these examples show, it was especially the animate trajector objects that were often personalized by providing modal verb forms like "want" or "can" with the effect of strengthening the story character.

Further findings on the subtype Paraphrase revealed that the preposition UNDER was also paraphrased by using other prepositions such as THROUGH (*durch die Treppe durch* [through the stairs]), or the preposition ON was paraphrased by CROSSWAYS (*quer*). The frequent use of Paraphrase for noncanonical relationships suggests that mothers were aware that their children had difficulties in understanding the UNDER relation (see Fernyhough, 1996) and tried to use other similar terms with which the children might be more familiar. Here, the association seemed to be achieved by the feature or feature pattern resemblance. Hence, more paradigmatic relationships were required.

Table 4 shows also the subtypes of the follow-in strategy in canonical versus noncanonical settings. Two differences between the two types of conditions emerged and attained statistical significance (paired t tests): These were Describing, $t(18) = -5.2$, $p < .001$, and Contrast, $t(18) = -5.14$, $p < .001$. Other differences did not attain a statistical significance. Since in noncanonical settings, children spent a lot of time performing the canonical relation (for example, putting the rabbit in the hutch or putting the horse over the bridge), mothers seemed to guide their children to the pursued task by first describing what they were doing and then contrasting that with what they should have been focusing on. This provided linguistic contrasts, as can be seen in the following examples:

A mother to her 22 months old son in the Bridge task:

So geht das Pferd die Treppe runter und jetzt möchte das Pferd unter der Treppe hergehen.

[The horse walks down the stairs and now it wants to go under the stairs]

A mother to her 23 months old daughter in the Hutch task:

Jetzt haste den in den Stall getan, ne? Stell' den Hasen doch mal aufs Dach!

[Now you put it in the hutch, right? Put the rabbit on the roof!]

A mother to her 23 months old daughter in the Table task:

Eine Tasse. Die kommt auf den Tisch eigentlich, ne? Kannst du die denn auch mal u:nter den Tisch stellen?

[A cup. Usually, it goes on a table, right? Can you put it also under the table?]

A mother to her 22 months old daughter in the Cup task:

Nein, nicht hinein! Auf die Tasse drauf legen.

[No, not inside! Put it on top of the cup!]

A mother to her 22 months old son in the Hutch task:

Nicht in den Stall hinein, sondern o:ben drauf!

[Not inside the hutch, but on top of it!]

4 Discussion

This study has been guided by the question of how mothers—being sensitive to their 2-year-old children's cognitive biases towards some spatial configurations between objects discernable in poor understanding of some requests for spatial relations—provide their young interlocutors with alternative perspectives on the shared situation. I propose that in their discursive behavior, mothers have at least two options at their disposal: On the one hand, they can *bring-in* past events; on the other hand, they can *follow-in* from what the child is actually doing. Up to now, much research has been devoted to investigating follow-in strategies and in this study, their semantics has been analyzed by focusing what is being said to the child within this joint focus. Regarding the fact that more follow-ins were used in the noncanonical tasks, an important question is whether in this case, follow-ins reflect a strategy at all. An alternative explanation is that mothers just spend a lot of time telling their children not to put the objects in a more obvious or preferred relation. However, mothers do a lot more than just preventing their children from the canonical relation. To specify the different forms of follow-ins in terms of their semantics is an extension to previous research (for example, Carpenter, Nagell & Tomasello, 1998) that considers this behavior on an attention level only.

More importantly however, this exploration study shows that bring-in strategies constitute an even greater part of the overall discourse with children and need to be studied further.

Which strategy will be used depends on the given situation: In canonical settings, children's background knowledge about events is brought-in and predominantly restricts the discourse. In contrast, children tend to be followed-in in the noncanonical tasks. In these noncanonical tasks, mothers exert lot of effort to redirect their children's attention away from the spatial relation (or the object's feature) to which the children seem biased.

Why might different types of discourse strategies be more beneficial for one task or another? According to the present data, past experiences can be brought-in by evoking a familiar "story" about a particular object or situation. A given situation like a tea party or breakfast can also be associated with past experiences in which the same type of object has been handled in a particular way, and by analogy, children can perform the task. Thus, in a canonical situation, it seems sufficient for the mothers to introduce stories/situations, and the children do not need explicit spatial expressions to perform the task.

The specification of the bring-in strategies is a clear development of what Ornstein et al. (2004) have called "associative talk," because the identified subcategories point to different association methods, that is, ways of specifying what is being associated with what and by which stylistic options in a specific task. Using these strategies, mothers guide their children to relate the present event to past experiences and event knowledge; in this way, bring-in strategies are well-situated in canonical tasks. They enhance the child's comprehension of the task and align the mother and the child's memory.

Follow-in strategies work differently. They primarily address children's present attention and manipulative behavior rather than their background knowledge. The finding that mothers make an effort to redirect their children's attention is in line with research on coordinated joint attention (Carpenter, Nagell, & Tomasello, 1998; Dunham & Dunham, 1992; Hollich, Hirsh-Pasek, & Golinkoff, 2000), in which the positive effect of follow-in linguistic input during a child's action is already well-documented. Vocabulary acquisition is facilitated when, during interactions, caregivers describe aspects of the infant's current focus of attention (Dunham & Dunham, 1992: 414; Rosenthal Rollins, 2003). The research presented here adds to these results: Even though there is a stronger presence of this type of discursive behavior in situations in which children develop comprehension problems, follow-in strategies pursue the same goal as the bring-in strategies; both are used to establish a shared view of the situation by providing verbal

information (see Fernyhough, 1996). However, the follow-in strategies focus linguistically on the spatial actions themselves.

The potential smoothness of the transition from bring-in to follow-in strategies in the discourse can be seen in the strategy named Contrast (see Examples 1–4 above). When following this strategy, mothers first follow-in and label an actual event, for example, "that's over the bridge!" And then immediately suggested an alternative event, for example, "Can you put the horsey under?" The alternative event for the latter example can then be paraphrased in better known words (for example, "Hide the horsey!," that can evoke the appropriate knowledge (about what one does when hiding) and lead to the correct response. This interaction between the two types of discourse strategy is characteristic for establishing a shared view on the situation (known also as grounding process) in this particular task: The competent speaker interweaves background event knowledge while describing the child's actual action.

Concerning the question which strategies lead to a successful task solution, the data presented here provide little evidence that the children's performance relates to their mothers' conversational style. There are no direct correlations between discourse strategies and children's success in solving the tasks. There is also no relation between children's reported lexical competence and mothers' use of strategies. Together, these results suggest that strategies are chosen on-line as problem-solving alternatives and are not necessarily related to the level of language acquisition skills. However, the next step in pursuing these correlations more directly will be to conduct a study in which mothers are trained to use specific strategies.

With regard to different discursive styles, Choi and Rohlfing (2010) have recently looked at cross-cultural differences and compared the discourse style of North-American mothers to that of Korean mothers. They have reported that Korean mothers make more effort in general to evoke background knowledge in conversations with their children; Korean mothers refer more to their children's knowledge about objects and past events than North American mothers do. Interestingly, this difference does not relate to children's vocabulary. One aspect that might contribute to more background knowledge being provided by Korean mothers is the fact that spatial relations are expressed by means of verbs. Verbs, more than nouns, promote expressions of events. These crosslinguistic differences may reflect cultural differences in mother-child interaction in general and the use of associative talk in particular. This is also a topic for future research.

Acknowledgments

The research reported in this paper was made possible by a Dilthey Fellowship (Research Initiative Focus on the Humanities) from the Volkswagen Foundation. I would like to thank Lars Schillingmann for creating a new analysis tool for discourse. I am grateful to Soonja Choi and Karla McGregor for support and to three anonymous reviewers for their comment on an earlier version of this paper. Many thanks also to members of the Dialoglab for their help with the study and to all the mothers and their children who participated in it.

References

- Akhtar, N. Dunham, F., & Dunham, P. (1991). Directive interactions and early vocabulary development: the role of joint attentional focus. *Journal of Child Language* 18: 41–49.
- Barsalou, L. W. (2002). Being there conceptually: Simulating categories in preparation for situated action. *Representation, Memory and Development. Essays in honor of Jean Mandler*, eds. N. L. Stein, P. J. Bauer, M. Rabinowitz, 1–15. Mahwah, New Jersey/London: Lawrence Erlbaum Associates, Publishers.
- Bauer, P. J., & Wewerka, S. S. (1995). One- to two-year-olds' recall of events: The more expressed, the more impressed. *Journal of Experimental Child Psychology* 59: 475–496.

- Boland, A. M., Haden, C. A., & Ornstein, P. A. (2003). Boosting children's memory by training mothers in the use of an elaborative conversational style as an event unfolds. *Journal of Cognition and Development* 4: 39–65.
- Bowerman, M., & Choi, S. (2001). Shaping meanings for language: universal and language-specific in the acquisition of spatial semantic categories. *Language acquisition and conceptual development*, eds. M. Bowerman & S. C. Levinson, 475–511. Cambridge: Cambridge University Press.
- Casasola, M. (2008). The development of infants' spatial categories. *Current Directions in Psychological Science* 17: 21–25.
- Carpenter, M., Nagell, K., & Tomasello, M. (1998). *Social cognition, joint attention, and communicative competence from 9 to 15 months of age*. Monographs of the Society for Research in Child Development, 63 (4, Serial No. 255).
- Choi, S. (2000). Caregiver input in English and Korean: Use of nouns and verbs in book-reading and toy-play contexts. *Journal of Child Language* 27: 69–96.
- Choi, S., McDonough, L., Bowerman, M. & Mandler, J. M. (1999). Early sensitivity to language-specific spatial categories in English and Korean. *Cognitive Development* 14: 242–268.
- Choi, S., & Rohlfing, K. J. (2010). Discourse and lexical patterns in mothers' speech during spatial tasks: What role do spatial words play? *Japanese / Korean Linguistics*, Volume 17, eds. S. Iwasaki, H. Hoji, P. M. Clancy & S.-O. Sohn, 117–133. Stanford: CSLI Publications.
- Clark, E. V. (1973). Non-linguistic strategies and the acquisition of word meanings. *Cognition* 3: 161–82.
- Della Corte, M., Benedict, H., & Klein, D. (1983). The relationship of pragmatic dimensions of mothers' speech to the referential-expressive distinction. *Journal of Child Language* 10: 35–43.
- de Saussure, F. (1931). *Grundfragen der Allgemeinen Sprachwissenschaft*. Berlin: Walter de Gruyter.
- Dunham, P., & Dunham, F. (1992). Lexical development during middle infancy: A mutually driven infant-caregiver process. *Developmental Psychology* 18: 414–420.
- Estigarribia, B., & Clark, E. V. (2007). Getting and maintaining attention in talk to young children. *Journal of Child Language* 34: 799–814.
- Fernyhough, C. (1996). The dialogic mind: A dialogic approach to the higher mental functions. *New Ideas in Psychology* 14: 47–62.
- Freeman, N. H., Lloyd, S., & Sinha, C. G. (1980). Infant search tasks reveal early concepts of containment and canonical usage of objects. *Cognition* 8: 243–263.
- Grimm, H., & Doil, H. (2000). *Elternfragebogen für die Früherkennung von Risikokindern (ELFRA-2)*. Göttingen: Hogrefe.
- Haden, C. A., Ornstein, P. A., Eckerman, C. O., & Didow, S. M. (2001). Mother-child conversational interactions as events unfold: Linkages to subsequent remembering. *Child Development* 72: 1016–1031.
- Haden, C. A., Ornstein, P. A., Rudek, D. J., & Cameron, D. (2009). Reminiscing in the early years: Patterns of maternal elaborativeness and children's remembering. *International Journal of Behavioral Development* 33: 118–130.
- Hart, B. M., & Risley, T. R. (1982). *How to use incidental teaching for elaborating language*. Lawrence, KS: H & H Enterprises.
- Hayne, H., & Herbert, J. (2004). Verbal cues facilitate memory retrieval during infancy. *Journal of Experimental Child Psychology* 89: 127–139.
- Hollich, G., Hirsh-Pasek, K., & Golinkoff, R. (2000). *Breaking the language barrier: An emergentist coalition model of word learning*. Monographs of the Society for Research in Child Development, 65 (3, Serial No. 262).
- Hoff, E., & Naigles, L. (2002). How children use input to acquire a lexicon. *Child Development* 73: 418–433.
- Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. (2002). Language input and child syntax. *Cognitive Psychology* 45: 337–374.

- Kickert, K. (2008). *UNTERstützen des Präpositionserwerbs bei 2-jährigen Kindern – eine Interventionsstudie* [Supporting the acquisition of prepositions in 2-year-old children: An intervention study]. Unpublished diploma thesis, Department of Psychology, Bielefeld University, Germany.
- Lieven, E. V. (1994). Crosslinguistic and crosscultural aspects of language addressed to children. *Input and interaction*, eds. C. Gallaway, & B. J. Brichards, 56–73. Cambridge: CUP.
- Masur, E. F., Flynn, V., & Eichorst, D. L. (2005). Maternal responsive and directive behaviours and utterances as predictors of children's lexical development. *Journal of Child Language* 32: 63–91.
- McGuigan, F., & Salmon, K. (2006). The influence of talking on showing and telling: Adult-child talk and children's verbal and nonverbal event recall. *Applied Cognitive Psychology* 20: 365–381.
- Mundy, P., & Gomes, A. (1998). Individual differences in joint attention skill development in the second year. *Infant Behavior and Development* 21: 469–482.
- Ornstein, P. A., & Haden, C. A. (2001). Memory development or the development of memory. *Current Directions in Psychological Science* 10: 202–205.
- Ornstein, P. A., Haden, C. A., & Hedrick, A. M. (2004). Learning to remember: social-communicative 3 exchanges and the development 4 of children's memory skills. *Developmental Review* 24: 374–395.
- Reese, E., Haden, C. A., & Fivush, R. (1993). Mother-child conversations about the past: Relationships of style and memory over time. *Cognitive Development* 8: 403–430.
- Rohlfing, K. J. (2001). No preposition required. The role of prepositions for the understanding of spatial relations in language acquisition, *Applied cognitive linguistics I: theory and language acquisition*, eds. M. Pütz, S. Niemeier & R. Dirven, 230–247. Berlin: Mouton de Gruyter.
- Rohlfing, K. J. (2005). Learning prepositions. *Perspectives on Language Learning and Education* 12: 13–17.
- Rohlfing, K. J., Rehm, M., & Goecke, K.U. (2003). Situatedness: The interplay between context(s) and situation. *Journal of Cognition and Culture* 3: 132–157.
- Rohlfing, K. J., & Choi, S. (2004). *Getting you to understand. How mothers instruct their children to put two things together*. Paper presented at the IADA (International Association for Dialogue Analysis) Conference, Chicago, 30. March – 3. April.
- Rosenthal Rollins, P. (2003). Caregivers' contingent comment to 9-month-old infants: Relationships with later language. *Applied Psycholinguistics* 24: 221–234.
- Saussure, F. de (1931). *Grundfragen der Allgemeinen Sprachwissenschaft* [Course in general linguistics] (H. Lommel, Trans.). Berlin: Walter de Gruyter.
- Sinha, C. (1983). Background knowledge, presupposition and canonicity. *Concept development and the development of word meaning*, eds. T. Seiler & W. Wannenmacher, 269–296. Berlin: Springer.
- Sinha, C., & Jensen de López, K. (2000). Language, culture and the embodiment of spatial cognition. *Cognitive Linguistics* 11: 17–41.
- Strube, G. (1984). *Assoziation. Der Prozeß des Erinnerns und die Struktur des Gedächtnisses*. Berlin, Heidelberg, New York, Tokyo: Springer-Verlag.
- Tamis-LeMonda, C. S., Bornstein, M. H., & Baumwell, L. (2001). Maternal responsiveness and children's achievement of language milestones. *Child Development* 72: 748–767.
- Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. *Child Development* 57: 1454–1463.
- Tomasello, M., & Todd, J. (1983). Joint attention and lexical acquisition style. *First Language* 4: 197–212.
- Walsh, B. A., & Blewitt, P. (2006). The effect of questioning style during storybook reading on novel vocabulary acquisition of preschoolers. *Early Childhood Education Journal* 33: 273–278.