Are children flexible speakers?
Effects of typicality and listener needs in children's event descriptions

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Abstract

Do children take into account their addressees' needs in spontaneous production? Developmental evidence for speaker adjustments is mixed. Some studies show that children are often under-informative when communicating with ignorant addressees but other studies demonstrate successes in children's ability to integrate another person's perspective. We asked whether children adapt their event descriptions depending on (a) the typicality of event components, and (b) the listener's visual access to the events. We found that children's ability to use information about the listener's visual perspective to make specific adjustments to event descriptions emerged only in highly interactive contexts, in which participants collaborated towards mutual goals.

Keywords: referential communication; event cognition; language production; instruments; perspective-taking; pragmatics

Introduction

According to a widely shared perspective, communication is a collaborative effort governed by rational expectations (Grice, 1957). On Grice's theory (1975), a collaborative speaker is reasonably expected to be as informative as required by the purpose of the communicative exchange (maxim of quantity), truthful (maxim of quality), relevant (maxim of relation), and perspicuous (maxim of manner). Within this framework, production is often considered as an addressee-oriented process in which speakers flexibly adjust their utterances to their listeners' informational needs in a given context (e.g., Clark & Marshall, 1981).

However, in a seminal study, Brown and Dell (1987) suggested that not all adjustments in production are oriented towards a specific addressee. They proposed that speakers make two types of adjustments in production. *Generic* adjustments are geared towards an unspecified comprehender. For instance, speakers are more likely to mention atypical (unusual) event components (as opposed to typical ones) because any comprehender would find atypical components harder to infer (e.g., 'Adolph stabbed the man *with an icepick*' is more felicitous compared to 'Adolph stabbed the man *with a knife*'). Additionally, speakers also make adjustments to *specific* addressees in a particular communicative context. For instance, speakers are more likely to offer a greater amount of information to an ignorant addressee, but less information to a knowledgeable addressee (to avoid redundancy).

In the present study, we are interested in whether children adjust their utterances to the needs of their addressees and– to the extent that they do–whether these adjustments are oriented towards a generic or specific interlocutor.

Children's referential communication

Previous research on children's ability to adjust to the informational needs of their addressees has focused on nominal reference. The usual paradigm used to elicit referential expressions from children involves the child asking a partner to move objects on a visual display. The crucial manipulation concerns the partner's knowledge state: The partner is either knowledgeable (has full visual access to the same objects as the child) or partially ignorant (she has limited visual access to the objects on display). This line of work has led to contrasting views concerning children's referential communication abilities.

On an *egocentric* view, young children's early egocentrism prevents them from adjusting their production to their addressees' informational needs. This view is supported by experimental evidence showing that children are often under-informative when communicating with ignorant addressees. For instance, 3-year-olds fail to adjust their utterances appropriately when addressing ignorant vs. knowledgeable interlocutors (Perner & Leekam, 1986) and 5-year-olds are often underinformative when describing one of two objects in a contrast set to an ignorant addressee (Davies & Katsos, 2010). Furthermore, 2-, 3- and 4-year old children produced ambiguous utterances before receiving any referential training (Matthews, Lieven, & Tomasello, 2007). Even older children (6- to 8-year-olds) have been shown to produce many ambiguous utterances in their referential communication (Deutsch & Pechmann, 1982; Girbau, 2001; Sonnenschein, 1982).

On an *audience-design* view, children are able to adjust their production to the needs of their addressees, as long as these needs are sufficiently transparent. Experimental evidence from certain types of tasks supports this view. Children seem to be sensitive to a partner's perspective when they are engaged in a task that has a clear communicative purpose (e.g., when children give their

partner instructions about how to manipulate objects on a visual display; see Bahtiyar & Küntay, 2009; Nadig & Sedivy, 2002). Children also become more informative when they are given specific feedback in the form of clarification questions (e.g., "[Do you need] the *girl eating an ice-cream* or the *girl swimming*?"; see Matthews, Lieven & Tomasello, 2007; Matthews et al., 2012). Additionally, children seem to be taking into account the knowledge state of their interlocutors when they are familiar with them: for instance, 2-year-old children are more likely to name a hidden toy when their mother has not witnessed the hiding (O'Neill, 1996).

The egocentric and audience-design views make specific predictions concerning the types of adjustments that children might make in production. Both accounts predict that children should make 'generic' adjustments, since these are guided by broad comprehension constraints and do not involve true perspective-taking. However, they make different predictions concerning children's ability to perform addressee-specific adjustments. According to the egocentric account, children might not make adjustments to specific addressees, because of limitations in the ability to take into account another person's perspective. According to the audience-design account, children might make listener-specific adjustments in contexts where listeners' informational needs are sufficiently transparent.

Current study

In this study, we compare the predictions of the egocentric and audience-design views by asking whether adults and preschoolers adapt their event descriptions depending on (a) the typicality of event components (generic adjustment), and (b) the listener's visual access (specific adjustment). Both factors have been argued to play a role in adults' early syntactic choices in production (Brown & Dell 1987; Lockridge & Brennan 2002). Unlike prior work that has focused on children's nominal reference, we elicit descriptions of events to explore children's adjustments. Describing events is much more complex than referring to single objects and requires more advanced syntactic structure. Specifically, we focus on instrument phrases in event descriptions, which are typically encoded in a non-obligatory adjunct (i.e., Ving *with a Y*).

Additionally, we explore the communicative circumstances under which children can make successful adaptations. Previous experimental evidence suggests that in certain types of tasks children are able to take into account the informational needs of their addressees, but more research is required to clarify exactly which factors contribute to children's success. In Experiment 1, we test whether the presence of an addressee with specific informational needs affects typical and atypical instrument mention. In Experiment 2, we test whether instrument mention is affected by presenting stimuli in contrastive pairs of typical/atypical events. In previous research, contrastive contexts have been shown to facilitate unique identification of referents (e.g., Brennan & Clark, 1996; Brown-Schmidt & Tanenhaus, 2006; Deutsch & Pechmann, 1982). In Experiment 3, we explore how instrument mention is affected by introducing a clear communicative goal to the task.

Experiment 1

In Experiment 1, participants watched short video clips depicting different events and described them to listeners who either saw or could not see the events. Half of the events contained typical and half atypical instruments (e.g., watering plants with a watering can/a hat used as a container). Both the egocentric and audience design accounts predict that participants should make generic adjustments in production by mentioning atypical instruments more frequently than typical instruments. In terms of addressee-specific adjustments, on the audience-design view, participants are expected to offer more information about instruments when their addressee has no visual access to events; on the egocentric view, instrument mention should not differ depending on the knowledge state of the addressee.

Methods

Participants Twenty-four 4- to 5-year-old children (range: 4;4-5;2, mean: 4;11) and twenty-four adults participated in the experiment. The children were recruited from daycares in the Newark (DE) area. Adults were undergraduate students at the University of Delaware and received course credit for their participation.

Materials Test items included 12 events depicting an agent performing an action. For each of the test events, we created two short video clips, one showing the agent performing an action using a typical instrument (e.g., watering plants with a can) and the other showing the agent performing the same action using an atypical instrument (e.g., watering plants with a hat). Typicality of instruments was pre-rated by a group of 14 adults and 16 children. Overall, adults mentioned the selected typical instruments in 73% of their responses and children in 63% of their responses. For atypical versions of the same events, we chose instruments that were either not mentioned at all or mentioned very infrequently (less than 6% of the time) by both children and adults. We chose these novel (i.e., highly atypical but still possible) instruments because we wanted to ensure that there would be a large difference between typical and atypical instruments in the test events, noticeable even by our younger participants. We also created a set of 6 filler clips showing various everyday actions that did not involve instruments (e.g., watching television, running). The same (male) agent performed all actions in the test and filler clips.

Procedure Participants were informed that they would be watching a set of short video clips and that, at the end of each video, they would have to describe what they saw.

They were also introduced to a 'friend' of the experimenter's (the confederate listener) who had not seen the videos and wanted to know what participants would see. Participants were randomly assigned to one of two conditions. In the *Visual Access* condition, the listener sat next to the participant and also watched the clips. In the *No Visual Access* condition, the listener sat behind an opaque barrier so that she was unable to see the videos (or the participants as they were describing them). No restrictions were placed on participants' productions**.**

Coding Participants' descriptions were tape-recorded and transcribed. Descriptions were coded for the explicit mention of instruments (either within the same clause or in a separate clause) before or after the main verb (e.g., "The guy is eating soup with a big spoon", "A man getting the knife and cutting something") or incorporated into the verb (e.g., "The man is hammering a fence"). We also coded for implicit mention of instruments, in cases where the instrument was not mentioned but simply inferred by the systematic choice of locution (e.g., "He is trying to open the door", for an event in which the agent was using a hanger to try and break into the room).

Results and Discussion

We conducted an ANOVA with Age (Children, Adults) and Visual Access (Visual Access, No Visual Access) as between-subjects factors and Typicality (Typical, Atypical) as a within-subjects factor. The analysis revealed a main effect of Age ($F(1, 43) = 89.56$, $p < .001$), a main effect of Visual Access ($F(1, 43) = 461.84$, $p < .001$), and a main effect of Typicality ($F(1, 43) = 224.31$, $p < .001$). These effects were qualified by an interaction between Age and Visual Access ($F(1, 43) = 9.60$, $p = .003$): adults were much more likely to add instrument information when the events were not visible to their interlocutor (M=.64) compared to situations where the interlocutor also had visual access to the events (M=.47; $p < .05$); in children, however, this difference was not significant (M=.20 vs. .23 respectively). The analysis also revealed an Age by Typicality interaction ($F(1, 43) = 29.04$, $p < .001$): adults were much more likely to mention instruments for Atypical compared to Typical versions of events (M=.87 vs. .22), while in children this difference was smaller (M=.36 vs. .06 respectively). No other interactions were found.

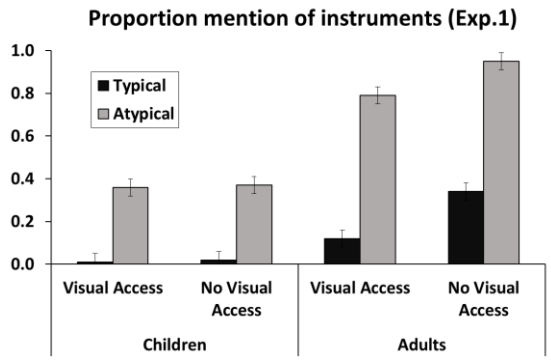

Figure 1: Proportion of mention of Typical and Atypical instruments by age group and type of Visual Access in Experiment 1

These results show that adults made both typicality-based adjustments and more specific adjustments to the informational needs of their addressee.[1] Children, however, performed only typicality-based adjustments by mentioning only the most unusual event component, a result in accordance with the egocentric view.

There are several explanations for the fact that children may have ignored the needs of their addressee. One possibility is that children had difficulty estimating the goals of the exchange: asking children to simply describe events for a passive listener may not have provided the necessary communicative goal that would highlight the listener's specific needs. To explore this possibility, we conducted a second experiment that clarified the goals of the exchange.

Experiment 2

In Experiment 2, we explored a new paradigm with the goal of making the addressee's needs more prominent for children: we asked whether instrument information can be identified and used by children to unambiguously single out and describe an event within a pair of closely matched alternatives. In such contrastive contexts, adults might be expected to produce instruments regardless of typicality or visual access (since the goal of the task is to disambiguate the right referent) but children might show both effects of typicality and visual access. We reasoned that such a contrastive context might highlight the need to clearly distinguish between two almost identical events for the sake of an uninformed addressee. In order to seek developmental changes in the ability to make use of perspective information, we compared two age groups of children. Recall that the egocentric account predicts that–despite the different manipulations–children should not show effects of visual access. The audience-design account, however, predicts that children should use instruments more

[1] It should be noted that adults' specific adaptations emerged despite our listener being a confederate and not a naïve participant (see Lockridge & Brennan, 2002 for discussion).

frequently when the addressee lacks visual access to the events.

Methods

Participants Sixty children and thirty adults participated. The children ranged between 4;0 and 6;0 and fell into two age groups: a younger group (n = 30) with a mean age of 4;7 and an older group (n = 30) with a mean age of 5;6. All children attended daycares in the Newark (DE) area. Adults were undergraduate students at the University of Delaware and received course credit for their participation.

Materials Materials consisted of pairs of events constructed out of clipart pictures. Each pair was displayed on a computer screen in Powerpoint format. There were 8 pairs of test events. Within each pair, the same event was depicted with a typical vs. an atypical instrument (e.g., a woman sweeping the floor with a broom vs. a tree branch). The position (left-right) of the typical and atypical versions were counterbalanced within the stimulus set. The test events were arranged in two presentation lists. In each list, one version of each event was placed within a red circle (half of the time, the circle was placed around a typical and the other half around an atypical event). For each event, the version that was circled was different between the two lists. Each presentation list also contained 8 pairs of control events.

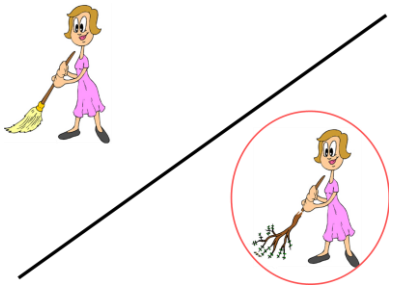

Figure 2: Example stimulus from Experiment 2 depicting a pair of typical and atypical events. The circle indicates the target event

Procedure Participants were assigned to either a *No Visual Access* or a *Visual Access condition*. In the No Visual Access condition, the experimenter introduced participants to her 'friend' (a confederate). Then the experimenter showed participants the display of events on a computer screen and told participants: "These are two twins. They are each doing something different. Look at both twins and tell [the confederate] what the twin inside the circle is doing. She has a picture of the twins too, but she doesn't know which one we are talking about." Participants saw that the confederate had a binder which contained color printouts of the pictures on their computer screen but lacked circles around the target pictures. The confederate was then seated across from participants so that she could not see the computer screen. Throughout the experiment, the confederate avoided eye contact with the participants but kept looking into her binder and followed the descriptions of the events turning the pages as appropriate. In the Visual Access condition, participants and confederate were seated next to each other so that they both had visual contact with the pictures described. The confederate looked at the screen as participants were describing the events and followed along by turning the pages in her binder.

Coding Participants' descriptions were tape-recorded and transcribed. For test items, responses were coded following the coding scheme of Experiment 1.

Results and Discussion

We conducted an ANOVA with the proportion of explicitly mentioned instruments as the dependent variable, Age (Younger, Older, Adult) and Visual Access (Visual Access, No Visual Access) as between-subjects factors and Typicality (Typical, Atypical) as a within-subjects factor. The analysis revealed a main effect of Age ($F(2, 84) = 103.60$, $p < .001$), with adults being more likely than either group of children to include instrument information overall (M_{ad}=.91 vs. M_y=.17 and M_o=.32; ps $< .001$), and older children being more likely to include more instrument information than younger children (p =.026). There was also a main effect of Typicality ($F(1, 84) = 55.07$, $p < .001$), qualified by an interaction between Age and Typicality ($F(2, 84) = 6.76$, $p = .002$): matched-pairs comparisons revealed that both older and younger children were much more likely to mention instruments for Atypical compared to Typical versions of events (younger: $t(29) = -6.71$, $p < .001$, M_A=.27 vs. M_T=.08; older: $t(29) = -5.64$, $p < .001$, M_A=.43 vs. M_T=.19), while in adults this difference was not significant ($p > .05$, M_A = .93 vs. M_T = .88). There were no other main or interaction effects.

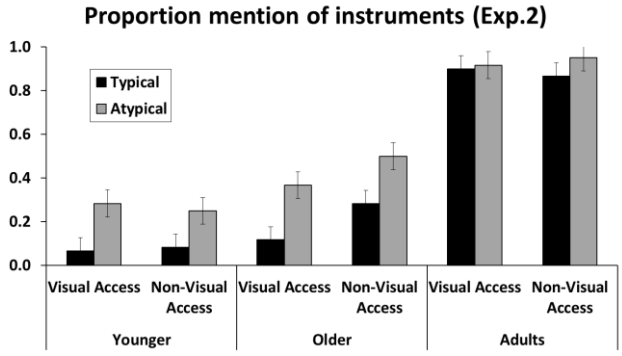

Figure 3: Proportion of mention of Typical and Atypical instruments by age group in Experiment 2

Thus, in these contrastive contexts, adults did not perform any type of adjustment (generic or specific). The reason is that instrument mention in adults was very high, regardless

of typicality or visual access, since the goal was to uniquely identify the correct referent. However, children made only generic (typicality-based) adjustments and did not adapt to specific addressees. This result provides support to the egocentric view of children's adjustments.

Experiment 3

Experiment 3 was a version of Experiment 2 with two main modifications: first, the addressee was no longer a confederate who acted as a passive listener but was introduced as a 'naïve' listener who was actively involved in the task; second, the task had a specific communicative purpose (guessing game). We reasoned that in a highly interactive paradigm, in which participants interacted with a 'real' addressee, children's ability to take into account the needs of their interlocutor might be more likely to arise.

Methods

Participants Thirty-two children and thirty adults participated[2]. The children ranged between 4;0 and 6;0 and fell into two age groups: a younger group (n = 19) with a mean age of 4;4 and an older group (n = 13) with a mean age of 5;2. All children attended daycares in the Newark (DE) area. Adults were undergraduate students at the University of Delaware and received course credit for their participation.

Materials and Procedure Materials were identical to Experiment 2. The procedure included the following modifications. The adult listener (the experimenter's confederate) was presented to the participants as a 'naïve' addressee. The experimenter told the participant and the confederate that they would play a guessing game together, in which the participant had to help the addressee guess the right event. At the beginning of each trial, the addressee said: "I can see two pictures. Which one is it? Tell me about it!" At the end of each trial, the addressee said: "I hope I got it right!" and placed a sticker next to the picture that best matched the participant's description. Feedback was provided in one practice trial at the beginning of the task. During the main test phase, the participants could not see where the addressee put the sticker so that their production was not affected. As in Experiment 2, participants were assigned in either a *Visual Access* or a *No Visual Access* condition.

Results and Discussion

We conducted an ANOVA with Age (Younger, Older, Adult) and Visual Access (Visual Access, No Visual Access) as between-subjects factors and Typicality (Typical, Atypical) as a within-subjects factor. The analysis yielded a significant effect of Age ($F(2, 56) = 37.319$, $p < .001$), with older children mentioning instruments more frequently than younger children, but less frequently than adults. Crucially there was a main effect of Visual Access ($F(1,56) = 5.029$, $p = .020$), indicating that participants of all age groups used more instrument information when the addressee did not have visual access to the events.

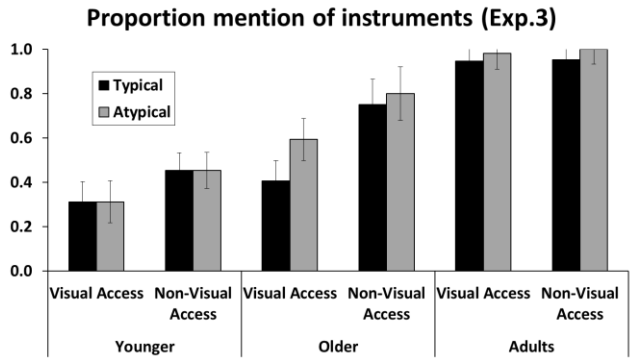

Figure 4: Proportion of mention of Typical and Atypical instruments by age group in Experiment 3

Therefore, in this more interactive paradigm, children showed sensitivity to their addressee's informational needs by mentioning instruments more frequently when the addressee could not see the events, in accordance with the audience-design view. In the context of contrastive presentation of the stimuli, children–just like adults–did not perform generic adjustments, since both types of instruments (typical, atypical) were important for disambiguating the correct referent.

General Discussion

The present study investigated referential communication patterns in children and adults, focusing on event reference. We showed that adult speakers, similarly to Brown and Dell (1987) and Lockridge and Brennan (2002), performed both 'generic' adjustments (adding information about atypical, i.e., generally unpredictable, instruments) and more specific adjustments to addressees' needs (mentioning instruments more often when addressees could not see the events). Children, however, often made only generic (typicality-based) adjustments. Their ability to use information about the listener's visual perspective to make specific adjustments to their event descriptions emerged only in contexts where the addressees' needs were made particularly transparent.

What were the precise factors that made addressees' needs accessible to children in Experiment 3? An important difference between Experiments 1-2 and Experiment 3 was the role of the addressee. In Experiment 3, the addressee was a "real" interlocutor, who had more genuine informational needs that children could easily identify. In fact, in studies that show early successes in children's tendency to make addressee-specific adjustments, the addressees are either the children's parents (O' Neill & Topolovec, 2001; O'Neill, 1996) or confederates of the experimenter with an active role in the task (Bahtiyar &

[2] The results presented here are preliminary.

Küntay, 2009; Nadig & Sedivy, 2002). By contrast, in studies where the addressee is either a static picture on a computer screen or imaginary (Davies & Katsos 2010; Girbau 2001), children fail to make adaptations. Even adults seem to be more likely to make addressee-specific adjustments when the addressee is naïve as opposed to a confederate (see Brown & Dell, 1987; Lockridge & Brennan, 2002).

A second important difference between Experiment 3 and the previous experiments is the communicative purpose of the task. In Experiment 3, the speaker and the addressee had to engage in a collaborative process (guessing game) to achieve a mutually pursued goal (finding the 'right' picture). This conclusion is supported by previous findings that demonstrate children's sensitivity to other people's perspective in tasks that require collaboration between interlocutors (e.g., Deutsch & Pechmann, 1982; Matthews, Lieven, & Tomasello, 2010; O' Neill & Topolovec, 2001; O'Neill, 1996).

Overall, our findings suggest that children do not seem to be egocentric communicators. However, they need extra communicative cues to facilitate their assumptions about what type of information is relevant for the purpose of the exchange and how much information their addressee needs.

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