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Abstract

The prototypical word learning situation in western, middle-class cultures is dyadic: an adult addresses a child directly, ideally in a manner sensitive to their current focus of attention. But young children also seem to learn many of their words in polyadic situations through overhearing. Extending the previous work of Akhtar and colleagues, in the current two studies we gave 18-month-old infants opportunities to acquire novel words through overhearing in situations that were a bit more complex: they did not socially interact with the adult who used the new word before the word learning situation began, and the way the adult used the new word was less transparent in that it was neither a naming nor a directive speech act. In both studies, infants learned words equally well (and above chance) whether they were directly addressed or had to eavesdrop on two adults. Almost from the beginning, young children employ diverse learning strategies for acquiring new words.

Keywords

joint attention, overhearing, word learning

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To acquire a conventional linguistic expression, children must learn how others in their linguistic community use it. In Western, middle-class cultures the prototypical word learning situation is a dyadic one in which an adult uses some new piece of language either to follow into or to direct a child's attention within the context of some joint attentional frame (Bruner, 1983; Tomasello, 1988). A number of studies have shown that infants acquire new language more readily (i) if they engage in larger amounts of joint visual attention with their parents, and (ii) if they have parents who are sensitive to their focus of attention as new pieces of language are introduced (Tomasello & Todd, 1983; Tomasello & Farrar, 1986; Tomasello, Mannle, & Kruger, 1986; Carpenter, Nagell, & Tomasello, 1998). Interestingly, though, the link between joint attention and early language seems to decrease (Carpenter et al, 1998) or disappear (Morales et al., 2000) over the course of the second year of life. And we also know from reports of other small-scale traditional cultures that infants are exposed more to polyadic situations in which they acquire words not by participating directly in a joint attentional frame but primarily through eavesdropping others' conversations (Correa-Chávez & Rogoff, 2009; de León, 1998; Lieven, 1994; Rabain-Jamin, 2001; Rogoff, 2003).

In a series of experiments Akhtar and colleagues provided evidence that indeed infants and young children can acquire new words through overhearing. For example, Akhtar, Jipson, and Callanan (2001) had an adult label a novel object. She did this either for the infant addressing her or him, or for another adult instead. They found that 25- and 30-month-olds learned the new word successfully and equally well, whether they were addressed directly or just eavesdropped on the adults' conversation. In addition, Akhtar (2005) found that 24-month-olds learned new words through overhearing even when they were playing with another toy at the time. And in another study, Floor and Akhtar (2006) found that even 18-month-old infants could do this as well. Thus, overhearing seems to be a powerful mechanism for language acquisition already in infancy.

These experiments leave open at least two questions, however. The first is the possibility that the experimental situation was actually more dyadic-like than intended. That is, in the basic procedure of all these studies, prior to the main experimental manipulation a familiarization task was administered in which the experimenter and the child played a finding game with four buckets. Each bucket contained one familiar object, and the experimenter consecutively retrieved each one, named it for the child, and handed it over to her or him before proceeding to the next bucket. After this familiarization task, the main procedure started in which the experimenter played the finding game with the same buckets, this time using novel objects instead of familiar ones. In the addressed condition, the experimenter retrieved the objects consecutively, naming the target object for the child. In the overhearing condition, the experimenter never addressed the child but an assistant instead. The issue is that even though children were never directly addressed during the test phase in the overhearing condition, they watched the experimenter playing the same game that the two of them had previously played together with another adult, and this may have given the children the feeling of participating, at least to some degree.

The second issue is that in most of the studies of Akhtar and colleagues in the overhearing condition the adult explicitly named an object for another adult. Naming is an unusual speech act in that it is, in a sense, meta-linguistic; we might say that the speaker is not using a piece of language but mentioning it. It is thus possible that this naming

situation makes it easier for outsiders to discern the communicative intentions of the speaker, who is not using the word to direct attention at all. Akthar (2005, Study 2) had 24-month-old children play a game with an adult in which the adult used the object label in a directive speech act ('Can you put the *toma* in here?') and found that they learn the word equally in addressed and overhearing conditions (see also Martínez-Sussmann, Akthar, Diesendruck, & Markson, 2011). To our knowledge there is no such study with children below two years and, in addition, one could also argue that directives are a particularly easy situation to tune into through overhearing because they typically are not embedded in joint attentional frames to the same degree as more descriptive or informative utterances.

In the current studies, we addressed these issues. In Study 1 we aimed to replicate the study of Floor and Akhtar (2006), but we eliminated any previous dyadic interactions between the experimenter and the infant in the context of the experimental game. In Study 2 we presented infants with a more complicated situation of overhearing in which one adult simply made a comment to another adult about the game they were planning (e.g., 'Here the *toma* goes in'). This situation is arguably more complex than either naming an object or directing someone to do something with an object in that it requires the infant to understand something of the joint attentional situation between the other two people to discern the referential intentions involved.

Study 1

In Study 1 we tested word learning in an explicit naming context in two different situations: directly addressed or overhearing. As in the study by Floor and Akhtar (2006) the experimenter E1 played a finding game, either with the infant (*addressed* condition) or with a second experimenter E2 (*overhearing* condition). Infants in the overhearing condition were never addressed in any way by E1 during the procedure (we made a number of methodological changes to make this sure, see below). We predicted that infants would learn the novel label equally well in both conditions.

Method

Participants. Thirty-six 18-month-old infants (18 girls, 18 boys; $M = 18.0$; $SD = 0.26$) participated in the study. Additional infants were tested but excluded because they became fussy during the procedure ($n = 10$), because of parental interference ($n = 1$), or because of experimenter error or equipment failure ($n = 5$). Infants were recruited from a medium-sized German city from a database of children whose parents had volunteered to participate in child development studies. They were all monolingual native German speakers and came from heterogeneous socioeconomic backgrounds. In each condition the number of first-borns ($n = 15$) and daycare infants ($n = 11$) was equally distributed.

Materials and design. Materials for the familiarization task (see below) were a ball, a teddy bear, and a toy car, all of approximately the same size and easily distinguishable from each other. For the main test we used three different novel sets, one for each trial. Each set consisted of three objects which could be manipulated in a particular way.



Figure 1. Materials used in Study 1 with a) the containers and b) the novel objects, and the materials used in Study 2 with c) the music box and the line and clothespins upon which the objects were pinned and d) the novel objects.

All objects were easily distinguishable by color, shape, and function and were about the same size. Prior to the test, a preference test was conducted for each novel set. It revealed no significant preferences for any object. See Figure 1 for an overview of all novel sets. We used three novel labels for the target objects (*baffe*, *nöhle*, *fiebe*); all of them were used with feminine gender.

For the finding game we used three buckets (11 x 17 x 14 cm) with screw caps (*diameter* = 11 cm) mounted in a row on a wooden plank (16 x 70 cm). To maintain infants' interest, buckets were covered with differently colored cardboard boxes in each trial (blue in trial 1, orange in trial 2, green in trial 3). Between trials infants played with an unrelated distractor game with E2 while E1 set up the room for the next trial (a blue box, 19 x 22 x 40 cm, with a transparent chute to slide down cubes into the box, thereby making a jingle sound).

A between-subjects design was used. Infants were randomly assigned to either the *addressed* condition or the *overhearing* condition. All infants were administered a familiarization task followed by three test trials. The order of the novel sets across trials, the object serving as the target object within each novel set in a given trial, the position of the target object in each trial (right, middle, left), and the label of the target object (*nöhle*, *baffe*, *fiebe*) were fully counterbalanced. Buckets were always opened from left to right (from E1's perspective).

Procedure

Object-Introduction. Prior to the study the infant played with both experimenters with unrelated toys in a playroom until she or he felt comfortable. That phase also served as the object introduction phase: E2 placed all three objects of one novel set on a tray in randomized order, held the tray straight in front of the infant and let her or him choose one object. After the infant had made a choice, she or he was allowed to play with the other two objects as well to make sure that infants in both conditions were equally familiarized with all objects. The novel sets were presented in randomized order, and the procedure was repeated in exactly the same way for the remaining two novel sets until the infant was familiarized with all objects later used in the test. Note that E1 never participated during that phase and was facing away from both the infant and the objects at any time to make sure she did not establish joint attention with the infant about the objects during the object introduction phase.

Familiarization task. To acclimatize the infant with the new room and to make sure infants generally understood the task, a familiarization task followed. Adapting the procedure of Moll & Tomasello (2007), E1 played with three familiar objects, a teddy bear, a toy car, and a ball (always in this order), one after the other for about 30 seconds each. Afterwards, E1 placed all three objects on a tray in randomized order and asked the infant to hand her each of them (e.g., ‘Can you give me the car?’).

Training. At this point, the main experimental procedure started. The parent sat on a cushion with an additional cushion available for the infant in front of the parent, facing E1 about 1.5 m away. E2 was positioned at an angle of 90° to E1 and the parent, 0.5 m away from E1. Throughout the study, the infant was allowed to move freely with no restriction and no instructions at all. In the *addressed condition*, E1 and the infant played the finding game together. At the beginning of each trial E1 said, ‘Ich zeig dir mal was neues, [infant’s name].’ (I’m going to show you something new, [infant’s name].) She extracted each object from the three buckets (going from left to right), one at a time, sharing excitement about it with the infant and showing her or him how to manipulate it for approximately five seconds before she put it back in and proceeded with the next bucket. Before extracting the two (unlabeled) distractor objects, E1 said: ‘Ich zeige dir, was hier drin ist. Willst du sehen, was hier drin ist? Ich zeige dir das mal.’ (I’m going to show you what’s in here. Do you want to see what’s in here? I’ll show you this one.) Before extracting the target object E1 said: ‘Ich zeige dir die [label]. Willst du die [label] sehen? Ich zeige dir die [label].’ (I’m going to show you the [label]. Do you want to see the [label]? I’ll show you the [label].) This way, E1 shared all three objects with the infant. Afterwards, she said, ‘Jetzt machen wir das nochmal, [infant’s name].’ (Let’s do this again, [infant’s name].), and repeated this whole procedure two more times, each time addressing the infant and sharing excitement with her or him while E2 just passively watched from the side. E1 thus labeled the target object for a total of nine times. In the *overhearing condition*, the procedure was exactly the same with the only difference that in this condition E1 turned to and addressed only E2 and never the infant. Thus, in the overhearing condition, the infant was merely onlooking; neither E1 nor E2 ever addressed the infant nor responded to her or him in any way.

Test. Now the test followed. E1 said that it was time to clean up the game now. She retrieved the objects from the buckets, put them in front of the buckets together with the lids and then put the buckets away (meanwhile E2 interacted with the infant briefly and asked her or him to sit down on her or his cushion so that infants always approached the objects from the same centered position at test). Then E1 said: 'Und jetzt räumen wir das auf, [infant's name!]' (Let's clean this up now, [infant's name]!) While putting the screw caps into a basket, she said: 'Die Deckel sind schon drin. Und jetzt fehlt noch die [label]. Tu mal die [label] hier rein, [infant's name].' (The lids are already in here. Now we just need the [label]. Can you put the [label] in here, [infant's name]?) Note that E1 never looked at the objects but only at the infant while saying this. E1 repeated her request if needed until the infant chose one object and put it into the basket, resulting in a maximal response period of 60 seconds. Infants who were too shy to approach the objects on their own were accompanied by their parent to the objects. Parents were instructed to just encourage the infant to approach the objects but not to influence their choice.

Coding and reliability. Infants' responses were coded from videotape. In order to see whether infants had learned the label, for each trial we coded whether infants chose the target object in response to E1's request (i.e., infants put the object into the basket, infants pointed toward the object, or produced the particular label while looking at the object). Trials were excluded from the analyses if infants made no choice ($n = 5$ in addressed, $n = 4$ in overhearing condition), or if they chose two objects simultaneously ($n = 2$ in overhearing condition).

In addition, we coded whether infants attended to the task to check that infants in both conditions had the chance to notice the mapping of the target object and the new label as an important precondition to learn the new word. Every time E1 extracted the target object from the bucket (3 times in each trial), we coded '0' if the infant did not attend at all (e.g., the infant was engaged with her or his parent, or distracted from the task otherwise), and '2' if the infant attended to the target object at least 90% of the time. Cases in which infants attended to the task sometimes but not for at least 90% were coded as '1'. This resulted in a maximum score of '6' and a minimum score of '0' for each trial.

To assess interrater reliability, a random sample of 25% of the sessions was independently coded by a research assistant who was unaware of the condition. She coded which object infants chose at test (left, middle, or right object; as she was unaware of which object the target was). Afterwards, she looked at the tapes again and coded infants' attention during the training trials. As a measure of agreement, Cohen's kappa was calculated for the categorical rating (infants' object choice) and Cohen's weighted kappa (Fleiss & Cohen, 1973) was calculated for the rating using an ordinal scale. This resulted in the following kappas: $\kappa = .82$ for object choice and $\kappa = .80$ for attention.

Results

Preliminary analyses revealed no effects of gender, trial order, or target object. Analyses were thus collapsed over these factors. For each individual, the mean number of trials in which she or he chose the target object was computed. An *independent-samples t-test* revealed no difference between the overhearing condition ($n = 17$, $M = .51$, $SD = .33$)

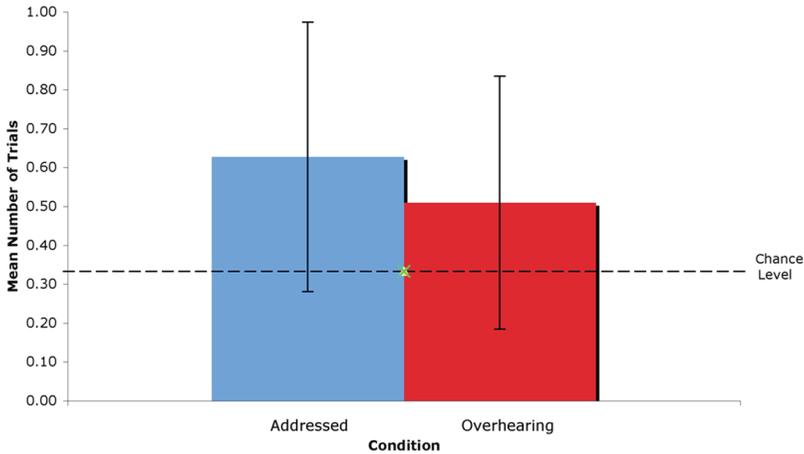


Figure 2. Mean number of trials and standard deviations in which infants chose the target object in each condition in Study 1.

and the addressed condition ($n = 17$, $M = .63$, $SD = .35$), ($t = .94$, $p = .35$, $d = .34$, see Figure 2).¹ We also compared their performance against chance (.33). A *one-sample t-test* revealed that, as a group, infants in both conditions chose the target object above chance in both conditions (overhearing: $t(17) = 2.27$; $p = .03$, $d = .86$; addressed $t(17) = 3.54$; $p < .01$, $d = .55$).

Discussion

The current study examined infants' word learning in one of two ways: the adult either named an object for the infant directly addressing her or him, or she named it for another adult, with the infant merely listening in on their conversation. We found that 18-month-olds learn words successfully and equally well both in addressed and in overhearing situations.

These results are in line with those of previous studies showing that young children can learn words through overhearing others' conversations (Akhtar et al., 2001; Akhtar, 2005; Floor & Akhtar, 2006). In particular, they are in line with the study by Floor and Akhtar (2006) who found that 18 month-olds can do this. While it was not clear in their study whether joint attention might have played a role, at least to some degree, in the overhearing condition as well, in our study we have removed any potential joint attention interaction, and found that infants can learn words through overhearing equally well. Our results thus support the claim that infants and young children do not necessarily need to be in a dyadic joint attentional frame to learn new labels for objects.

The word learning situation in Study 1 may have been special in that the referential context was particularly well-defined. Other studies have shown that children learn novel labels even in the absence of a speaker and the absence of a referential context (e.g., Scofield, Williams, & Behrend, 2007; Scofield & Williams, 2009). But in this study

as well as in Study 1 the word learning context is very specific and thus reduces inference demands. However, word learning situations in everyday life are often more complex and require infants to extract relevant information and make more complex inferences. Thus, in Study 2 we aimed to study word learning in a more naturalistic situation and ask whether infants can learn words equally well both when addressed directly and when overhearing others' conversation. We presented infants with a more complex situation in which the main focus was on a music game and the labeling occurred not as the main goal but more casually within this game.

Study 2

In Study 2, we used a more complex and more natural game involving more than explicitly showing and naming objects as the primary goal of the game. We developed a game in which music making was the goal and the novel objects were just used as tools to make sounds when slid down a chute into the 'music box'. E1 labeled the novel objects but instead of explicitly doing so ('I'll show you the X'), labeled them indirectly 'Here the X goes in ...'. As in Study 1, E1 played the game either with the infant (*addressed* condition) or with E2 (*overhearing* condition). Infants in the overhearing condition were never addressed in any way by E1 during the procedure.

Method

Participants. Thirty-six 18-month-olds participated in the study (18 girls, 18 boys; $M = 17.8$; $SD = 1.0$). Additional infants were tested but excluded from the final sample because they became fussy during the procedure ($n = 2$), because of parental interference ($n = 1$), and infants having less than two trials (5). In each condition the number of first-borns ($n = 11$) and daycare infants ($n = 10$) was equally distributed.

Materials and design. For the familiarization task we used the same ball, teddy, and car as in Study 1. For the experimental procedure we designed three new sets of novel objects. Each of these novels was distinguishable by color and by shape. They were about the same size (6 x 6 x 6 cm) but they could not be manipulated. For each novel object there were three identical exemplars. The objects of the novel-sets were preference-checked and infants showed no significant preferences among these objects. See Figure 1 for an overview of the novel sets. The same novel labels were used as in Study 1 (*baffe*, *nohle*, *fiebe*).

We used a 'music-box' (50 x 100 x 25 cm) with three tubes (height = 53 cm) that made a jingle sound each time an object was slid down a tube. Each tube made a distinct special sound (left: metallic sound, middle: stone sound, right: shell sound). To account for the more complex procedure, each tube had a cardboard sleeve matching the color of the novel object that goes into the tube, and the opening on top of the tube was shaped such that only one particular novel fit into it (see Figure 1). All novel objects for one trial were pinned up on a line with clothespins. Between trials infants played with an unrelated distractor toy (a little wooden man that climbed down a ladder).

Using a between-subjects design, infants were randomly assigned to either the *addressed* condition or the *overhearing* condition which determined whether E1 addressed the infant or E2, as in Study 1. A pilot study revealed that with this more complex procedure three trials would be too demanding. In the current study we thus administered only two trials. In each test trial one of the three objects served as the target object on the basis of a counterbalanced schedule. The position of the target object in each trial (right, middle, left) and the label of the target object (nohle, baffe, fiebe) were counterbalanced.

Procedure. The Object-Introduction and Familiarization task were administered in exactly the same way as in Study 1.

Training. The setup was similar to that in Study 1. E1 and the infant shared a game in which they had a music box and they needed different objects to slide them down a chute into the box to make a sound. As in Study 1, in the *addressed* condition, E1 shared the game with the infant. At the beginning of each trial, E1 said, 'Ich zeige dir mal unsere Musikmaschine, [infant's name].' (I'm going to show you our music box, [infant's name].) She touched and bent over each tube (starting with the left tube and proceeding consecutively to the right tube), looking at the opening on top of the tube. For the two tubes that the (unlabeled) distractor objects go into, she said, 'Hier kommt das rein. Aber wo ist das? Ich hole das mal.' (Here, this goes in. But where is it? I'll get it.) In contrast, for the tube that the target object goes into, E1 said, 'Hier kommt die [label] rein. Aber wo ist die [label]? Ich hole die [label] mal.' (Here the [label] goes in. But where is the [label]? I'll get the [label].) Afterwards, she looked at the clothesline, located the particular object, and said 'Ah hier.' (Ah, here.) She retrieved the object and showed it to the infant excitedly saying, 'Und jetzt Musik machen!' (And now let's make music!) Then she threw the object into the tube and shared the sound with the infant before proceeding to the next tube. This way, they played with each of the three tubes.

Afterwards, she said, 'Jetzt machen wir das nochmal, [infant's name].' (Let's do this again, [infant's name].), and repeated this whole procedure twice, each time addressing the infant and sharing excitement with her or him while E2 just passively watched from the side. Thus, in total, E1 labeled the target object nine times within each trial. In the *overhearing* condition, the procedure was almost exactly the same with the only difference that E1 played the game with E2 and never addressed the infant in any way.

Test. E1 said that it was time to clean up the game now. She retrieved one exemplar of every object and three clothespins, put them behind the music-box and then put the music-box away (while E2 interacted with the infant briefly and asked her or him to sit down on the cushion). Then E1 said: 'Und jetzt räumen wir das auf, [infant's name].' (Let's clean this up now, [infant's name].) While putting the clothespins into a basket, she said: 'Schau, die Klammern sind schon drin, und jetzt fehlt noch die [label]. Tu mal die [label] hier rein, [infant's name].' (Look, the pins are already in here. But the [label] is missing. Can you put the [label] in here, [infant's name]?) Note that at this point E1 never looked at the objects but only at the infant. E1 repeated her request if needed until the infant chose one object and put it into the basket, resulting in a maximal response period of 60 seconds. Infants who were too shy to approach the objects on their own were accompanied by their

parent to the objects. Parents were instructed to just encourage the infant to approach the objects but not to influence their choice.

Coding and reliability. Infants' responses were coded from videotape. For each trial we coded whether infants chose the target object in response to E1's request (i.e., infants put the object into the basket or, in case they did not hand it over, touched it, infants pointed toward the object, or produced the particular label while looking at the object). Trials were excluded from the analyses if infants made no choice, or if they chose two objects simultaneously ($n = 2$ in addressed condition). To assess interrater reliability, a random sample of 25% of the data was independently coded by a research assistant who was unaware of the condition and of which object the target object was. Cohen's kappa was calculated and resulted in perfect agreement between the coders ($\kappa = 1$).

Results

Preliminary analyses revealed no effects of gender, trial order or target object. Analyses were thus collapsed over these factors. For each individual, the mean number of trials in which they chose the target object was computed. An *independent-samples t-test* revealed no difference between the overhearing condition ($n = 18$, $M = .58$, $SD = .31$) and the addressed condition ($n = 18$, $M = .53$, $SD = .30$), ($t = -.57$, $p = .57$, $d = .16$).² A *one-sample t-test* comparing their performance against chance (.33) revealed that, as a group, infants in both conditions learned the label above chance in both conditions (overhearing: $t(17)=3.47$, $p < .01$, $d = .81$); addressed $t(17)=3.11$; $p < .01$, $d = .67$; see Figure 3).

Discussion

In Study 2 we examined infants' word learning in more complex situations than simpler naming games. We asked whether 18-month-old infants in these complex situations learn novel words equally well both when addressed by the adult directly or when overhearing others' conversations. Results show that, in fact, infants learned the novel labels, and that they did so equally successful in both conditions. Thus, infants as young as 18 months demonstrated sophisticated language acquisition skills: they learned novel words even though the labeling was indirect and only part of the main music game, and they did so even when not addressed by the adult (and thus not actively participating in the conversation in a joint attention frame) but also when they were merely listening in to others' conversations. The current results are in line with previous studies showing that young children learn words through overhearing in easier labeling situations (Akhtar et al., 2001; Akhtar, 2005, Study 1; Floor & Akhtar, 2006) and more indirect situations (Akhtar, 2005, Study 2). They extend these findings by showing that they do this even when any potential joint attention frame such as a previous shared interaction is eliminated and that even 18-month-old infants can learn words through overhearing in more complex situations.

General discussion

In the current studies we investigated infants' ability to learn new words from overhearing both in simpler 'naming games', in which an adult explicitly labeled an object for

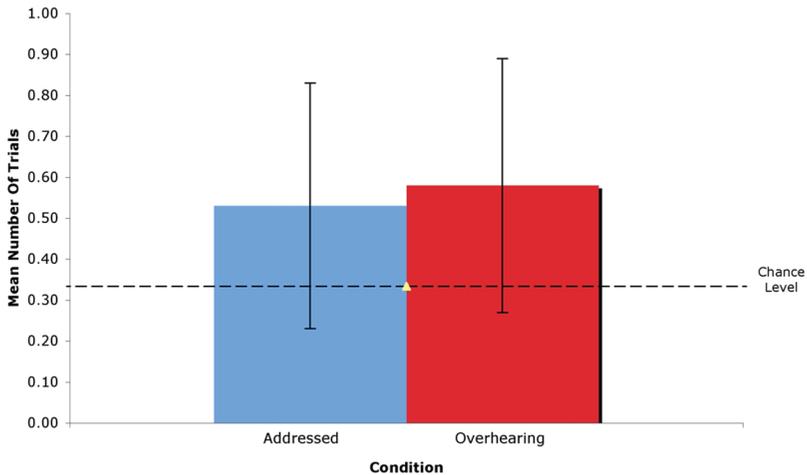


Figure 3. Mean number of trials and standard deviations in which infants chose the target object in each condition in Study 2.

another, as well as in more complex situations in which naming was not the main goal of the game and so infants had to work a bit harder to tune into the interaction between the two adults. We found that 18-month-old infants learned novel words successfully in these situations, and they did so despite having had no prior joint attention interaction with the speaking adult. These results are in line with those of previous studies (Akhtar et al., 2001; Akhtar, 2005; Floor & Akhtar, 2006), and they add the fact that even infants as young as 18 months can learn words through overhearing even in situations more complex than naming and directives.

Much previous work has documented the role of joint attention in language acquisition (e.g., Bruner, 1983; Tomasello, 1992). Infant and adult share attention about a referent, and within this framework of shared attention the adult then labels the object for the infant. However, the current results along with previous research by Akhtar and colleagues suggest that the importance of joint attention might decrease at least in the second year of life when other mechanisms kick in – especially infants' ability to learn words through overhearing others' conversations. Evidence for this also comes from other studies. For example, Gräfenhain, Behne, Carpenter, and Tomasello (2009) found that 18-month-olds understand pointing gestures when they are directed at another person to indicate the location of a hidden toy. They can readily use these gestures to find the toy themselves. Fourteen-month-olds in this task were successful to some degree, although not so robustly. And Moll and Tomasello (2007) found that 18-month-olds understand which of three objects an adult was familiar with both when the adult had played with it with the infant directly in shared engagement as well as when the infant merely watched the adult playing with the object with another adult, without actively participating. Fourteen-month-olds were successful only when the adult had played with the object with the infant in shared engagement (see also Moll, Richter, Carpenter, & Tomasello, 2008). These studies raise the question of whether infants below 18 months

of age could learn new words on the basis of overhearing. Future research will help to answer this question.

It is interesting to speculate about the skills that develop in the second half of the second year of life. Recently, Herold and Akthar (2008) suggested that the development of perspective-taking skills might be crucial for the ability to learn through overhearing. The study investigated imitation of novel actions that infants had observed in third-party interactions, mirror self-recognition, and perspective-taking in 18- to 20-month-olds. Results suggest that understanding self-other equivalence is related to third-party learning (see also Luo & Beck, 2010, for evidence of perspective-taking in 16-month-olds). Another interesting possibility is that in order for the infant to be in joint attention, the infant, as she or he gets older does not need to be addressed directly as has been proposed in the classic formulation of joint attention (Tomasello, 1995). It could be that learning through overhearing involves a special form of polyadic joint attention. The same mechanisms that allow infants to interact and understand intentions of others through dyadic joint attention (Baldwin, 1995; Tomasello, 1995) could be at work in polyadic joint attention.

The current results thus provide evidence for infants' sophisticated word learning skills. Already early in language development infants have powerful and flexible mechanisms that enable them to learn new words in many different learning situations.

Funding

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Notes

1. In 91 trials infants put the object into the basket, in one trial an infant pointed toward the object, and in five trials infants produced the particular label while looking at the object.
2. In 64 trials infants put the object into the basket, in two trials infants pointed toward the object, and in four trials infants produced the particular label while looking at the object.

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