Young Children Create Partner-Specific Referential Pacts With Peers

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In 2 studies, we investigated how peers establish a referential pact to call something, for example, a cushion versus a pillow (both equally felicitous). In Study 1, pairs of 4- and 6-year-old German-speaking peers established a referential pact for an artifact, for example, a woman’s shoe, in a referential communication task. Six-year-olds, but not 4-year-olds, continued to use these same expressions with the same partner (even when they were overinformative) but shifted to simpler expressions, for example, shoe, with a new partner. In Study 2, both age groups were successful in establishing such partner-specific referential pacts with a peer when using a proper name. These results suggest that even preschool children appreciate something of the conventional nature of linguistic expressions, with significant flexibility emerging between ages 4 and 6.

Keywords: referential pacts, common ground, referential communication, partner specificity, peer interactions

For successful communication, speakers design their communicative acts to fit within the common ground—the mutual knowledge, beliefs, and assumptions—that they share with their interlocutors (H. H. Clark, 1992, 1996). Cultural conventions such as the words of a natural language are common ground for all the members of the relevant speech community (E. V. Clark, 1993, 2007). More locally, however, interlocutors create more ad hoc conventions within interaction for referring to, for example, the cushion instead of (equally felicitously) the pillow. These more locally created conventions are often referred to as referential pacts (Brennan & Clark, 1996; H. H. Clark & Wilkes-Gibbs, 1986; Garrod & Anderson, 1987; Metzing & Brennan, 2003).

Research with adults suggests that once two speakers establish a referential pact, referring to a dog as a cocker spaniel, they consistently use and expect to hear this specific description for that referent in their subsequent interactions, even in contexts where it is overinformative and a simpler description, for example, a dog, would suffice (Brennan & Clark, 1996; see also Barr & Keysar, 2002; Brown-Schmidt, 2009; Metzing & Brennan, 2003). When speakers violate the referential pact and use a new term (e.g., a dog), the interlocutors are slower to identify the referent, even if it is an acceptable description (Metzing & Brennan, 2003; Shintel & Keysar, 2007). However, when speakers interact with new partners, who did not share this referential pact, they switch to an optimally informative description (e.g., a dog; Brennan & Clark, 1996), and when they hear a new partner referring to the object with a new, optimally informative expression, a dog, their reaction times in identifying the object do not suffer compared with that of a partner familiar with the referential pact (Metzing & Brennan, 2003). Thus, one important aspect of referential pacts is that they are partner specific.

There are two accounts explaining the mechanism for referential pacts, mostly diverging on when the “partner information” is used during language production and language comprehension. One account, building on the Gricean maxim of cooperativeness, suggests that partners jointly take a perspective on a referent and both mutually agree on a referential term and that this common ground shared with partners is part of the early stages of utterance planning and language processing (Clark, 1992, 1996). The second account explains referential pacts through lower level cue-based memory mechanisms. In this account, people remember the context in which referential expressions are associated with certain speakers. When people talk about the same referents with the same
people, these referential terms are activated and preempt the use of other terms (Horton, 2007; Horton & Gerrig, 2005; Shintel & Keysar, 2007). This account, however, emphasizes that the initial utterance planning (the choice of referential terms in production) and comprehension of referential terms is egocentric. People make use of the information available to them regardless of with whom it is shared; and the partner specificity plays a role only later as an adjustment mechanism (Barr & Keysar, 2002; Horton & Keysar, 1996; Keysar, Barr, Balin, & Brauner, 2000).

Incorporating the perspectives of conversational partners into language production and comprehension is a fundamental milestone in children’s communicative development. Therefore, the onset of children’s sensitivity to the partner-specific nature of referential pacts is informative in terms of their ability to incorporate the perspectives of their interlocutors. Since the partner specificity of referential pacts requires perspective-taking skills about the knowledge states of others, young children may not appreciate the complex perspectival aspects of referential pacts until preschool age.

Matthews, Lieven, and Tomasello (2010) showed that by age 3, children begin to demonstrate sensitivity to referential pacts. In this study, an experimenter asked children to relocate some objects from one shelf to another. In one condition, the experimenter referred to an object as the car and later on as the truck. In the other condition, after the experimenter referred to the object as the car, a new experimenter came in and used the new term, the truck, for the same object. Both 3- and 5-year-olds were slower to execute the action in the former condition than the latter. Moreover, children occasionally protested the use of these new terms regardless of the conversational partner. One explanation was that children were “hyperconventional” and preferred the more conventional referring expression to the other (see also E.V. Clark, 1992, 1993; Diesendruck, 2005; Diesendruck & Markson, 2001). Calling an object a truck after referring to it as a car could be perceived as an inaccurate description, because a car and a truck are two different objects, despite their physical and functional similarities. Thus, it is not clear whether children slowed down (and displayed protests) because their partner broke the referential pact or their partner used an incorrect or unconventional label.

One way to rule out the expectations of conventionality in responding to referential pacts is to rely on different linguistic forms. Graham, Sedivy, and Khu (2014) suggested that if the referential pacts are in the form of modified noun phrases that include descriptions or details about the object such as the striped ball, later references to that object as the purple ball would not contradict the fundamental identity or the conventional label of that object. In an eye-tracking paradigm, Graham et al. (2014) had 4-year-olds establish a referential pact, the fluffy dog, with an experimenter for a dog that was both fluffy and spotted. Later, children heard either the original speaker or a new speaker referring to that dog as the fluffy dog or the spotted dog. Four-year-olds were quicker to locate the target object when the original speaker used the same expression than when that speaker used a new expression. There was no difference between the expression types with the new speaker demonstrating children’s partner-specific expectation for the use of referential pacts.

Another linguistic form for referential pacts that does not conflict with the conventional labels might be proper nouns. For instance, referring to a person as a girl or Emma are both acceptable; the choice depends on whether the interlocutors are familiar with this person. The literature on proper names suggests that early on children understand that proper names are privileged information among a select group of people (Hall, 1998; Macnamara, 1982). In a study by Diesendruck (2005), 4-year-olds were introduced to a novel, animate-looking object either with a common noun (“This is a/the teega”) or with a proper name (“This is Teega”) in the absence of a puppet. The results suggested that 4-year-olds assumed that the puppet would know the name of the object only when it was introduced as a common noun (see also Diesendruck & Markson, 2001), but not when it was introduced as a proper noun. Similarly, Birch and Bloom (2002) demonstrated that preschoolers are aware that only people who are familiar with an individual can know that individual’s proper name. In this study, children were asked to select one of two toy dogs as the referent of either a proper name, Jessie, or a common noun, the dog. The crucial manipulation was that one referent was introduced as familiar to the speaker (“This is a dog I brought from home”), while the other was labeled as unfamiliar by the speaker (“I’ve never, ever seen that dog before”). When instructed with a proper name (“Where did Jessie go? Can you find Jessie?”), 2- and 3-year-olds chose the familiar referent significantly more often than the unfamiliar referent, whereas in the common noun condition they did not. Taken together, these studies demonstrate that preschoolers are aware of the partner-specific nature of proper names. Thus, referential pacts on proper names might facilitate young children’s partner-specific use of these expressions.

All of the studies investigating children’s sensitivity to referential pacts have addressed the question of how young children come to adopt and respond to referential terms created by adults, mostly using indirect measures such as eye tracking and reaction time (Graham et al., 2014; Matthews et al., 2010). There is no study to our knowledge that has examined how children productively use referential pacts and whether their adherence to these pacts differs depending on their conversational partner who may or may not share this common ground (but see Garrod & Clark, 1993 about dialogical coordination between school-age children). Moreover, establishing referential pacts with adult experimenters who provide scripted utterances might undermine the spontaneity and the mutual agreement on a referential term, since children are simply presented with referential terms and are not actively creating referential pacts themselves. In the present study, therefore, we created an experimental setting in which children together with peers would actively establish a referential pact for an object and later on had to refer to this object with a peer either familiar or unfamiliar with the pact.

In Study 1, we modified the procedure of Brennan and Clark (1996) for 4- and 6-year-old children, who participated in a referential communication task with their peers and established referential pacts on modified noun phrases, such as the woman’s shoe (because there were three kinds of shoes). Later in the critical trials, they had to refer to this shoe again when it was next to a tree and a horse so using the referential pact, the woman’s shoe, would be overinformative. We predicted that 6-year-olds would be more sensitive to the partner specificity of referential pacts than 4-year-olds and stick to the referential pact with familiar partners, even when it was overinformative but would use optimally informative descriptions (a/the shoe) with new partners. These age groups were selected because by age 4, children are able to...
produce appropriate referential expressions in referential communication tasks (Glucksberg, Kraus, & Weisberg, 1966; Matthews, Butcher, Lieven, & Tomasello, 2012; Matthews, Lieven, & Tomasello, 2007), but it is unclear when children are able to take into account the knowledge state of their interlocutors in producing modified noun phrases (but see Nadig & Sedivy, 2002; Power & Dal Martello, 1986).

In Study 2, we modified the procedure to see whether the nature of the linguistic forms would make a difference for the partner specificity of referential pacts, particularly for 4-year-olds. Children were asked to name a character together so the referential pacts were on proper names, rather than modified noun phrases. Since preschoolers are sensitive to partner-specific nature of proper nouns, we predicted that while referring to this character, both 4- and 6-year-olds would use proper names with familiar peers but switch to common nouns with unfamiliar peers.

**Study 1**

**Method**

**Participants.** Ninety-three 4-year-olds ($M = 4$ years, 5 months, range = from 4 years, 0 months to 4 years, 11 months; 53 girls, 40 boys), and ninety 6-year-olds ($M = 6$ years, 5 months, range = from 5 years, 11 months to 6 years, 11 months; 40 girls, 50 boys) participated in Study 1. Children attending the same kindergarten were grouped into 36 dyads (in the familiar partner condition) and 37 triads (in the new partner condition), which were composed of children who knew each other. All children were native speakers of German with various socioeconomic backgrounds. One group of 4-year-olds was not included in the analyses, because they could not arrive at a referential pact. Overall, there were 72 groups.

**Materials.** The set-up of the study involved two boards separated by a curtain, so children could not see each other’s boards but could hear one another. On each board, there were three spots for hanging three pictures vertically, and there was a blue star on the left side of the top spot, marking the starting point. There were three sets of pictures: (a) the warm-up set, (b) Set A pictures, and (c) Set B pictures. Each set had three pictures. The three warm-up pictures depicted the same boy with a kite, a ball, and a bicycle. Set A and Set B had one common picture, which was a kind of shoe (a woman’s shoe, a man’s shoe, or a baby’s shoe). Set A had a shoe, a horse, and a tree. Set B had a woman’s shoe, a man’s shoe, and a baby’s shoe (see Table 1).

**Procedure.** The study took place in a quiet room in kindergartens in a mid-size German city. The whole session lasted about half an hour and all the sessions were videotaped. In this room, the two boards were separated by a curtain. On one side of the curtain, the *director side*, there were three pictures (the warm-up pictures) hung up vertically on the board with Velcro tapes. On the other side of the curtain, the *matcher side*, the board was empty and the same three pictures were on the floor. When the children first entered the room, only the backs of the pictures could be seen in both sides. There were two experimenters in the room (E1 and E2). In the new partner condition, a third experimenter (E3) kept the third child busy outside the room.

In the new partner condition, three children and Experimenter 1 (E1) entered the room and stood in front of the boards so that the children could see the set-up. The experimenter told the children that they were going to play a picture game. In this game, the pictures on the board were the same pictures as the ones on the floor on the other side. The ones on the floor had to be placed on the board such that it would match the order of the pictures on the other side so whoever sits on the director’s side had to explain the others where each picture should go. Among the three children, one was randomly assigned to the director role (Child A) and was seated in front of the board on the director side; and the other two (Child B and Child C) were seated in front of the board on the matcher side. Then the warm-up trials began.

E1 asked the children to flip the pictures over and said, 

Now you, [Child A], will explain to [Child B] and [Child C] which picture goes to the top next to the star, which picture goes in the middle, and which picture goes to the bottom. You, [Child B] and [Child C], listen to [Child A] carefully and if you don’t understand, you can ask him [her].

Once the instructions were delivered, the experimenter turned his back to the children, so that the children could not talk to her. At the end of each trial, E1 and the children stepped back and checked if the order of the pictures was the same on both sides. If it was the same, E1 told the children, “Well done!”; if not, E1 told them, “Next time you, [Child A], describe the pictures better, and you, [Child B] and [Child C], listen to [Child A] more carefully.” At the end of each trial, E1 and the children played a distractor game (each child put a marble into a box that makes clanging sounds) in the corner, while E2 rearranged the pictures on the director’s side and placed the pictures on the floor on the matcher’s side. There were two warm-up trials to familiarize children with the picture game. In the warm-up trials, in case a child was shy or confused, E1 encouraged him or her to speak or sat next to him or her to help out.

After the two warm-up trials, children moved to the experimental trials, and there was a change in roles (see Figure 1 for role changes). The director (Child A) became the matcher, one of the matchers (Child B) became the director, and the other matcher (Child C) went outside with E3 to play a game. E1 told Child A and Child B, “Now you have new pictures, but the picture game is the same as before.” In the first three experimental trials (Trials

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**Table 1**

<table>
<thead>
<tr>
<th>Picture</th>
<th>2 warm-up trials</th>
<th>Trials 1–3</th>
<th>Trials 4–6</th>
<th>Trials 7–9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A boy with a kite</td>
<td>Horse</td>
<td>(Man’s) shoe</td>
<td>Horse</td>
<td></td>
</tr>
<tr>
<td>2 A boy with a ball</td>
<td>Tree</td>
<td>(Baby’s) shoe</td>
<td>Tree</td>
<td></td>
</tr>
<tr>
<td>3 A boy with a bike</td>
<td>(Woman’s) shoe</td>
<td>(Woman’s) shoe</td>
<td>(Woman’s) shoe</td>
<td></td>
</tr>
</tbody>
</table>
First, we analyzed how many directors overall used basic level terms and overinformative terms for different sets of pictures. In Trials 1–3 (with Set A pictures), 67 out of 72 directors (93%) used a basic level description, [ein/der] Schuh ([a/the] shoe), for the target item as das kann man anziehen (what one can wear) in all three trials. One 6-year-old director described the target item as das kann man anziehen (what one can wear) in all three trials, and one 4-year-old director described it as stinke Schuh (stinky shoe) in Trials 2 and 3. Two 6-year-old directors and one
4-year-old director used an overinformative term to describe the target shoe in one out of three trials. In Trials 4–6 (with Set B pictures), 64 out of 72 groups (89%) arrived at a referential pact on the fourth trial, six groups on the fifth trial, and two groups on the sixth trial. In Trials 7–9 (with Set A pictures), 48 directors out of 72 (73%) used an overinformative term in at least one of the three trials. Forty-five of these directors used the same descriptions that their peer had used in Trials 4–6.

Next, we compared the description of the target item in Trials 7–9 depending on two factors of interest (age and condition), using a generalized linear mixed model (GLMM) with binomial error distribution. To test the significance of the full model, we compared its fit with that of a null model using a likelihood ratio test. The response variable was the binary measure of whether the referential term was part of the referential pact within Trials 7–9 (part of the pact vs. not). The full model included age group (4 years vs. 6 years), condition (familiar partner vs. new partner), their interaction, the order of trials, and the gender of the director as predictors; the two random factors were the group (N = 72), and the set of stimuli (two different orders for each of the three types of shoes, N = 6). The null model comprised the gender of the director and the two random factors. The full model improved the fit compared with the null model, \( \chi^2(4) = 25.36, p < .001 \). There was a significant interaction between the factors of age group and condition (\( z = -2.09, p = .04 \)). The order of trials was also significant, suggesting that the directors were more likely to switch to basic-level informative descriptions in later trials (\( z = -4.04, p < .001 \)). The gender of the director did not have a significant effect on the use of referential pacts (\( z = -1.47, p = .14 \)). To localize the source of the interaction more precisely, we carried out post hoc comparisons and first tested the same model for each age group. The analyses revealed that 6-year-olds overall used the overinformative referential pacts in Trials 7–9 significantly more with familiar partners than they did with new partners (\( z = -2.19, p = .03 \)), whereas 4-year-olds did not distinguish between partners and used basic-level descriptions (“a/the shoe”) with both partners (see Figure 2). Then, we compared the age groups in the familiar partner condition. The analyses suggested that in the familiar partner condition, 6-year-olds used the overinformative referential pacts significantly more than did 4-year-olds (\( z = 2.69, p = .01 \)).

Figure 3 presents the percentage of directors who appealed to the referential pacts by trial showing that in Trial 7, which was right after the establishment of referential pacts, all children tended to be overinformative in both conditions. Thus, they all persevered in using the last successful, albeit overinformative, referential term. However, all the directors gradually got rid of the redundant information in the next trials and switched to basic-level descriptions.

**Discussion**

The results suggested that 6-year-olds used the referential pacts, even in contexts where these were overinformative, like adults (Brennan & Clark, 1996). Four-year-olds, on the other hand, preferred contextually appropriate descriptions such that they used specific-level descriptions in Trials 4–6 and basic-level descriptions in Trials 7–9, and they did not distinguish between partners. There are two possible explanations for the response patterns of the 4-year-olds. First, 4-year-olds had a harder time coming up with specific-level descriptions in Trials 4–6 when there were three different shoes. Although they were able to arrive at a referential pact eventually, perhaps the referential pacts were not salient enough. Second, in Trials 7–9, using referential pacts and using the overinformative term versus the optimally informative term did not influence the success in the game. Thus, 4-year-olds, perhaps, did not pay attention to their partners and were too focused on the game instead. In fact, in Trial 7, almost half of the 4-year-olds did use the referential pacts, again without distinguishing between partners, however they got rid of the redundant information in the subsequent trials (see Figure 3).

To aid these problems, we modified the procedure in Study 2. We created a more engaging task to enable the children to arrive at a referential pact. Instead of playing the picture game in Trials 1–6, the two children narrated a picture book, which had four pictures of a character. The two children jointly agreed on name for the character and arrived at a referential pact on a proper noun (e.g., Emma). As mentioned earlier, children are aware that a proper name of an individual can only be known to people who are familiar with that individual (Birch & Bloom, 2002; Diesendruck, 2005). Since the children were asked to come up with the proper name themselves, they would be further sensitive about the arbitrariness of the pact and with whom they shared this common ground. After naming the character, children would have to refer to this character within the picture game. We hypothesized that 4-year-olds, as well as 6-year-olds, would be more committed to the referential pact and use the proper names to refer to that character only with familiar partners and use common nouns with unfamiliar partners.

**Study 2**

**Method**

**Participants.** Ninety-seven 4-year-olds (\( M = 4 \) years, 6 months, range = from 3 years, 1 months to 4 years, 11 months; 45 girls and 52 boys) and ninety 6-year-olds (\( M = 6 \) years, 5 months, range = from 5 years, 11 months to 6 years, 11 month; 49 girls and 41 boys), who did not participate in Study 1, participated in Study 2. Children attending the same kindergarten were grouped into 38 dyads (in the familiar partner condition) and 37 triads (in the new partner condition), which were composed of children who

![Figure 2](image-url)
knew each other. All children were native speakers of German with various socioeconomic backgrounds. Three 4-year-old groups were dropped out of the analyses (one dyad due to experimenter error, one director in a triad forgot the name of the character, and one dyad did not complete the trials). Overall, there were 72 groups.

Materials. The same two boards in Study 1 were used in Study 2. There were two sets of pictures: (a) the warm-up set: an apple, a bike, and a hat; and (b) Set A pictures: a cat, a bunny, and the boy/girl (see Table 2).

In addition, there were two picture books, which were identical except that the main character was a girl in one and a boy in the other. Each book had four pictures: (a) the girl/boy is flying a kite, (b) the girl/boy is shopping with her/his mom, (c) the girl/boy is carrying bags with her/his parents, and (d) the girl/boy is holding a birthday cake and a gift (see Table 2).

Procedure. The study took place in a quiet room in kindergartens in a mid-size German city. The whole session lasted about 15 min, and all the sessions were videotaped. The warm-up procedure, in which the picture game was introduced, was the same as Study 1. A different set of pictures (an apple, a bike, and a hat) was used, because the boy in the warm-up pictures in Study 1 was used in the picture book in Study 2.

In the new partner condition, one child (Child A) was randomly assigned to the director role, and the other two (Child B and Child C) were assigned to the matcher role during the warm-up (see Figure 4 for role assignments and role changes). After the warm-up, Child A went outside with E3. Instead of Trials 1–6 in Study 1, E1 took the picture of a boy/girl and the picture book with the same character as he sat next to Child B and Child C. E1 said, “I have a picture of a boy/girl here. Look at this page in this picture book. It is the same boy/girl, right? I say we give a name to this boy/girl. Do you have any idea?” Whatever name was suggested first by the children, E1 agreed to that name unless the name proposed was the same name as Child A, Child B, or Child C. If the children were reluctant to give the character a name, E1 suggested them to give the name of one of their friends. Once they agreed on a name, they moved to the picture book in which children would see various pictures of the character they just named. For the first picture (a boy/girl with a kite), E1 asked, “Who is flying the kite?” For the second and third pictures, E1 asked a more open-ended question, “What is happening here?” If the children described the picture without using the proper name, E1 asked, “And who are they?” For the last picture, E1 asked, “And whose birthday is it?” Eventually, each child produced the proper name at least twice.

Before the experimental trials began, there was a pause of approximately 2 min. During this 2-min pause, E1, Child B, and Child C went outside to get Child A. After the break, there was a change in roles (see Figure 4). Child B became the director, Child C stayed outside with E3, and Child A became the matcher. E1 told the children, “Now we will play the picture game. You, [Child B], will explain to [Child A] which picture goes to the top next to the star, which one goes to the middle, and which one goes to the bottom. And you, [Child A], you listen to him carefully. When you do not understand, you can ask him [her].

In Trials 1–3, children sorted the Set A pictures (a cat, a bunny, and the boy/girl).

In the familiar partner condition, there were two children. The procedure was exactly the same, except that the role change was simply role reversals between two children (see Figure 4). Before Trial 1, the children played the distractor game with marbles for about 2 min to have the same length of a break.

The gender of the character in the picture book matched the gender of the director in Trials 1–3. There were equal number of male and female directors in both conditions and in both age groups. The order of the pictures in each trial was counterbalanced across groups such that the picture of the target character appeared at a different position in each of the three trials, so there were three versions of the stimuli for each gender.

The recordings from five groups of 6-year-olds did not have audio due to the malfunctioning of the microphone. These groups were still included in the analyses, since children’s descriptions were also coded live. One director in a triad did not get to describe the target picture in Trial 3, because the matcher placed the picture without waiting for the director’s description, so only Trials 1 and 2 of that triad were included in the analyses.

Coding. E2 live-coded the directors’ descriptions of the target child in Trials 1–3 and coded whether the director used a common noun (e.g., ein Kind [a child], ein Junge [a boy], and ein Mädchen [a girl]) or the proper name used during the picture book reading (e.g., Emma, Nico, and so forth). In a total of six trials, the directors used both a common noun and the proper noun in phrases such as Mädchen das Marscha heisst (The girl whose name is Marsha). These trials were coded as trials with the proper names. A second coder recoded

Table 2

<table>
<thead>
<tr>
<th>Stimuli in Study 2</th>
<th>Picture book with four pages</th>
<th>Trials 1–3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An apple</td>
<td>A cat</td>
</tr>
<tr>
<td>2</td>
<td>A bike</td>
<td>A bunny</td>
</tr>
<tr>
<td>3</td>
<td>A hat</td>
<td>The girl/boy</td>
</tr>
<tr>
<td>4</td>
<td>The girl/boy holding a birthday cake and a gift</td>
<td>The girl/boy</td>
</tr>
</tbody>
</table>
all the data for whether the director used the common name or a proper name in Trials 1–3. The agreement was $\kappa = 0.98$.

**Results**

We compared the type of nouns that the directors used in Trials 1–3 across the two factors of interest (age and condition), using a GLMM with binomial error distribution. The response variable was the binary measure of whether the referential term was the proper name, which was part of the referential pact within Trials 1–3 (proper noun vs. common noun). The full model included age group (4 years vs. 6 years), condition (familiar partner vs. new partner), their interaction, the order of trials, and the gender of the director as predictors; the two random factors were the group ($N = 72$) and the set of stimuli (three different orders for each of the two characters, $N = 6$). The null model comprised the gender of the director and the two random factors. The full model improved the fit compared with the null model, $\chi^2(4) = 40.53$, $p < .001$. However, the interaction between age and condition was not significant ($z = -0.04$, $p = .97$) so this interaction was dropped from the model to get the interpretable results of the main effects. There was only the significant main effect of condition, which suggested that both age groups used the proper name significantly more with the familiar partners than with new partners ($z = -2.38$, $p = .02$; see Figure 5). In contrast to Study 1, the order of trials was not significant, so children were consistent in the way they used proper names across trials ($z = 0.01$, $p = .99$; see Figure 6). Finally, the gender of the director did not have a significant effect on the use of referential pacts on proper nouns ($z = 0.04$, $p = .97$).

**Discussion**

With the modified procedure, both 4- and 6-year-olds used the referential pacts on proper nouns with familiar partners but switched to common nouns with new partners. The referential choices of the directors did not change throughout the Trials 1–3 in the picture game, and this suggested that they took into account the partner information the entire time.

**General Discussion**

Our results suggested that the way 4- and 6-year-olds used referential pacts differed. Six-year-olds could use the referential pacts partner-specifically regardless of whether the pact was on a modified noun phrase or a proper noun; whereas 4-year-olds could only apply the partner specificity when the pact was on a proper name. One explanation for the developmental differences could be children’s perspective-taking skills. Due to their better perspective-taking skills, the 6-year-olds in both studies were able to incorporate the knowledge state of their partners into their referring expressions and to modify them depending on the common ground that they shared with their conversational partners. The 4-year-olds, on the other hand, were less consistent in their partner-specific use of referential pacts across the two studies.
In addition to perspective-taking skills, some contextual factors might have contributed to the inconsistent pattern of 4-year-olds. One such factor is the nature of the linguistic forms on which the referential pact was built. It is known that by age 2 or 3, children treat proper nouns as privileged information among a group of people compared with common nouns known to all the speakers of that language (Birch & Bloom, 2002; E. V. Clark, 1992, 1993; Diesendruck, 2005; Diesendruck & Markson, 2001). Moreover, studies have shown that when a referent is animate or a novel object is animate-like, children are more likely to treat a novel label as a proper noun or as privileged information than when the object is an artifact such as blocks or a shoe (Gelman & Taylor, 1984; Hall, 1994; Katz, Baker, & Macnamara, 1974; see also Hall, 1998, for a review). In Study 2, the fact that the referential pact was on a proper noun of an animate boy/girl (rather than a noun phrase for an artifact in Study 1) might have aided the partner-specific use.

Another contextual factor, which might have facilitated 4-year-olds’ performance in Study 2, could be the explicitness of agreement or saliency of the common ground. The mutual agreement on the referential pact between the speakers was more emphasized in Study 2 than in Study 1. In Study 2, the experimenter explicitly got the approval of both children about the proper name; whereas in Study 1, the mutual agreement on the modified noun phrase was subtle, because the matcher could simply place the picture on the board without verbally marking his or her agreement with the pact. In fact, in a study with adults (Brown-Schmidt, 2012), speakers were observed to be more committed to the referential pact when they gave one another feedback while establishing the pact such as repeating the description, asking clarification questions, or even simply saying “OK.” Based on these findings, Brown-Schmidt (2012) argued that common ground should not be conceptualized as a binary distinction between common versus privileged but rather as a gradient phenomenon. Our results are in line with this proposal. We argue that children’s sensitivity to referential pacts might progress in a gradient manner. As soon as children are able to incorporate the knowledge states of their conversational partners in their language processing and language production by age 3 or 4, they start becoming sensitive to referential pacts (Graham et al., 2014; Matthews et al., 2010; see also Stephens & Matthews, 2014, for a review), but this early sensitivity is somewhat limited. At age 4, they need more scaffolding in the discursive context to appreciate the partner specificity of referential pacts, such as establishing pacts on proper names for animate objects and more explicit marking of the mutual agreement on the pact. Later on, by age 6, such scaffolding may not be necessary. Six-year-olds become sensitive to more subtle referential agreements and grasp that even an arbitrary description like the mama shoe can be a pact or a convention that marks the linguistic common ground shared by a group of people. This is parallel to the idea that in late preschool years, children’s understanding of conventions becomes more flexible, and they start appreciating the arbitrariness of the conventions (Kalish, 2005; Rakoczy, 2008).

Our findings do not directly speak to the question of at what point in utterance planning the partner information is used or whether the partner information is part of the early stages of language production or not. However, the changes in the referring expressions in the three critical trials of both studies (the order effect for the trials) are informative about what kinds of adjustments children made. In Trial 7 of Study 1, children of both ages persevered in using the last successful referring expression, the overinformative referential pact (e.g., the mama shoe) in both conditions and gradually got rid of the redundant part of the referring expressions in the subsequent trials, although 6-year-olds in the familiar partner condition overall used these overinformative referential pacts more than other groups (see Figure 3). This pattern seems to be consistent with the view that speakers egocentrically use the information available to them regardless of with whom it is shared and later they rely on the partner information as an adjustment mechanism (Barr & Keysar, 2002; Horton & Gerrig, 2005; Shintel & Keysar, 2007). In Study 2, however, this was not the case. Children’s referring expressions (their choice of proper and common nouns) did not change across Trials 1–3 (see Figure 6), suggesting that partner information was incorporated into the referring expression in the earliest trial, and no adjustments were made. Therefore, 6-year-olds’ partner-specific use of referential pacts, especially when the pacts are on modified noun phrases (in Study 1), may not be quite adult-like yet. Perhaps, after age 6, the partner information might not only become more automatic and be used as part of the earlier stages of utterance planning and language production but also become more stable across time. That is, older children might not necessarily persevere in using the last successful referential term but switch to basic level descriptions in Trial 7 while interacting with new partners.

Moreover, older children might also stick to the referential pacts with familiar partners more consistently in their subsequent mentions of these referents. The finding that some of the 6-year-olds in the familiar partner condition in Study 1 did not stick to the referential pact in the last trial could be explained by the fact that the referential pact, the mama shoe, and the basic-level terms, the shoe, overlap lexically. Thus, children could easily reduce the referential pact to a basic-level description through omitting the adjective. On the other hand, in Study 2, there was no lexical overlap between the referential pact, Emma, and the common noun, the girl, so the switch between these two terms was not as easy because children could not “reduce” the proper names the way they could reduce the modified noun phrases into shorter forms.

To conclude, in contrast to comprehension studies using indirect measures such as eye-tracking and reaction times, the studies reported here are the first, to our knowledge, to show how children actively create and use referential pacts in their peer interactions. Our results suggest that by age 4, children are able to actively establish a pact with a peer and use these pacts in their subsequent interactions in a partner-specific manner. However, 4-year-olds need more scaffolding and rely on more salient cues (explicit agreements, use of proper names) to appreciate the partner specificity of referential pacts. On the other hand, 6-year-olds were able to rely on more subtle cues and conventionalized even simple common noun phrases within their peer interactions.

References


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