

## 2-year-olds' comprehension of personal pronouns\*

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### 1 Introduction

Pronouns present a special case of the poverty of the stimulus problem (Chomsky 1980): the nature of their reference cannot be gleaned from direct linguistic input as they refer to individuals by way of the unobservable discourse role that the individual occupies. Any individual may occupy a discourse role, and vice-versa: they shift in conversation. For example, each of the authors on this paper could be an *I* when speaking, a *you* when being spoken to, and a *she* or *he* when being spoken about. Likewise, multiple pronouns can refer to the same individual: in a single conversation, I am *I* when speaking, and I am *you* when being addressed. Given this varied input, at first blush it could seem that a pronoun has no reference rule at all, from the early learner's perspective. For compared to proper names and nouns, pronouns appear to refer to almost anyone. Of course as adults, we know better—and so do children above the age of three. Who a pronoun refers to depends on who is speaking, who is being addressed, and who is salient in the discourse context. In contrast, proper names often have a stable reference: for the child usually only one person is *Mommy*, and one is *Daddy*. To determine the meaning of a pronoun, the learner must take the extra step to abstract from individual referents to discourse roles by reasoning about the speaker's intentions, knowledge states and the discourse situation. These factors thus all conspire to supply the value of a pronoun.

Two distinctions are relevant for the acquisition of personal pronouns: (1) indexicality (2) discourse participation. These distinctions, to which we now turn, track significant semantic and pragmatic aspects of first and second pronouns on one hand, and third person pronouns on the other.

Speakers use *I* when referring to themselves; it marks the speaker role in a conversation. Speakers use *you* to refer to anyone they are talking to; it marks the addressee role. These are the “indexical” pronouns. Indexical elements receive their referential values from the discourse context: *I* and *you* are indexed to speaker and addressee, respectively. The reference rule for first person points to the speaker in the context. Likewise, for *you*, the reference rule points to the addressee in the context. Indexical pronouns (especially *I*) shift each time a new person speaks:

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their referent is thus speaker-dependent. Not so for third person pronouns. Third person pronouns differ from indexicals, in that they can refer to the same person across different speakers. They are not speaker-dependent.

In terms of conditions of use, the pronouns *he* and *she* must refer to a salient male or female individual. In addition, when a speaker uses *he* or *she*, usually the referent is not participating in the discourse, as a first or second person pronoun would be more appropriate. This is the second relevant distinction, which relates to how pronouns are *used* by competent speakers. A competent speaker will use first and second person pronouns to refer to *discourse participants*, but third person pronouns for salient non-participants. There are, however, some exceptions: it is not unusual, for instance, for a parent to refer to his- or herself in the third person to the child (e.g., *Mommy's going to wash her hair now*).

It is thus possible for all three pronouns to refer to the same individual. Which one is used depends on the individual's discourse role. Thus, to achieve adult-like competence, the child must infer on the basis of the input, that *I* marks speaker, *you* marks addressee, and *s/he* marks a salient individual, usually a non-participant. To do so, she must pay attention to the discourses in which pronouns are used, specifically at each given moment, who is speaking, who is being addressed, and who is participating (or not) in the conversation. When do children develop this adult competence? When do they understand pronoun meaning? When do they understand pronoun use? The evidence from previous studies examining two year olds' competence is mixed, with some studies finding children succeeding with pronouns as early as (22-24 months; e.g. Oshima-Takane 1985), others finding success much later (32-36 months; e.g. Strayer 1977), and some with children succeeding at a range of ages (e.g. Charney 1980). However, two year olds' poor performance might be due to the unnaturalness of the experimental conditions under which they have been tested. Given pronouns' sensitivity to the discourse, it is important to test pronoun comprehension in natural discourse contexts. We thus propose a novel experiment, testing children from 2;0-3;0, designed to reexamine children's pronoun comprehension in natural interactions. Section 2 briefly reviews results from previous studies. We present our experiment in section 3. Section 4 discusses the possible implications of children's competence in the larger scheme of socio-cognitive development.

## 2 Summary of previous data

Previous literature has mixed evidence regarding when and how children acquire pronouns. Most suggest a production/comprehension asymmetry, which is not unusual. **Production** studies (Strayer 1977, Shipley & Shipley 1969, Macnamara 1980, a.o.) suggest that children begin producing pronouns around 15-18 months, starting with first person, then second person, and finally third person pronouns (Shipley & Shipley, 1969, Strayer, 1977; Chiat, 1981; Clark, 1978; Charney, 1980; Oshima-Takane, 1985, 1988, 1996). These early productions typically include some errors where the child reverses first and second person, but on the whole consistent errors are few (Shipley & Shipley 1969, Bloom, Lightbown & Hood 1975, Huxley 1970, Nelson 1975, Sharpless 1974, Chiat 1982, Oshima-Takane 1985, 1988). On the other hand, **comprehension** data focusing on speech addressed to the child, suggest that children first understand second person pronouns, then first person, and finally third person (Sharpless 1974, Strayer, 1977; Charney, 1980; Loveland, 1984). These studies have looked at a range of ages, from 15 months to 3 years. This asymmetry, between the production and comprehension of individual person features, is claimed to originate in children's tendency to learn pronouns in an

egocentric fashion (Charney 1980, Loveland 1984, a.o.). Children would initially comprehend before they produce second person pronouns because these refer to the child in speech addressed to her. In contrast, first person pronouns only refer to the child when produced by her. Therefore in addressed speech, these never refer to the child. This literature suggests that learners begin producing first person pronouns before they are comprehended. There have been objections to this argument (Chiat 1981): how can the child produce *I* before she understands it, when, necessarily, to use *I* correctly, she has to understand how other speakers have used it? Indeed, upon closer look at production data, we see that many of these initial productions of *I* are in so-called ‘undifferentiated’ or ‘formulaic’ forms, such as *I wanna* or *I do it* (Charney 1980, Chiat 1981). These have been argued to be so called “pronoun islands” (Laakso & Smith 2007, Tomasello 1992) where the pronoun potentially serves as a fixed element which helps the learner acquire different syntactic frames (Lieven, Pine & Baldwin 1997, Childers & Tomasello 2001). As for third person pronouns, learners are able to use gender to resolve the reference of a third person pronoun in off-line (4-5 years, Wykes 1981; 2-5 years, Brener 1983).

Macnamara (1982) first noticed the importance of non-addressed speech. With only addressed speech as input, the learner is likely to think that *you* always refers to herself. It would be possible to learn that *I* refers to speakers when both mother and father use it, but perhaps not that *you* refers to addressees. Indeed, some children seem to go through a phase where they perhaps have lexicalized *you* as another name for themselves (Oshima-Takane 1985, 1992) though it is indeed rare. Difficulty would also arise with *she/he*: in addressed speech these would never refer to the child. With non-addressed speech *she/he* as well as *you* shift, the former potentially referring to the child, and the latter to someone other than the child. To assess children’s pronoun comprehension, it is thus important to test both speech addressed to the child, where the child is an addressee (henceforth *addressed speech*) as well as speech not addressed to the child, in which the child is neither a speaker nor an addressee (henceforth *non-addressed speech*). On the other hand, a recent study (Weisleder & Fernald 2013) showed that open-class vocabulary growth was affected by the quantity of child-directed speech but not the quantity of overheard speech. It is necessary to acknowledge the possible role of other mechanisms which may be at work besides overheard speech when it comes to learning pronouns.

In a longitudinal study, Oshima-Takane (1985, 1988) had parents model pronoun use to their children, starting 1;4-1;11. In the addressed speech condition game 1, parents would point to themselves and say, “Me.” In game 2, they would then point to the child and say, “You.” The child was supposed to imitate the parent’s pronoun use. In the non-addressed speech games, parents would do this with each other while the child sat and watched. Again the child was supposed to imitate the parents: in game one by pointing to herself and saying “Me,” and in game 2 by additionally pointing to her parents and saying “You.” No child in the addressee condition responded with the correct imitation pattern. The non-addressee condition improved children’s performance by about half, i.e. out of seven children, four correctly imitated their parents. This task requires its subjects to guess what an appropriate response to the parent’s behavior, a problem that may interfere with subject’s ability to correctly produce pronouns in the task.

Charney (1980) collected both comprehension and production data from girls aged 1;6-2;4 initially, to 1;8-2;6 at the end. She only tested girls so that gender could not be used as potential clue for resolving third person reference in the comprehension task. She visited each child at two ‘ages’, seeing her 2-3 times during that week to collect data. The production study was a filmed free-play session with toys and assessed children’s competence as speaker. The

comprehension tasks assessed children's competence as addressee (addressed speech condition) and non-addressed listener (non-addressed speech condition) in a hiding task.

The hiding task tested both addressed and non-addressed speech. The experimenter took a Polaroid picture of the child and the mother (there was already one of herself). A toy was hidden under one of the pictures and the child was given a sentence with a pronoun as a clue. Before the clue was uttered, the experimenter announced the speech role assignments (e.g. *Now Mommy's gonna tell [child]*). In the addressed condition, the experimenter or the mother addressed the child (e.g. *[Child], it's under my/your/her picture*), and in the non-addressed condition, the mother and the experimenter addressed each other (e.g. *Mom, it's under my/your/her picture*).

There were multiple visits where subjects played the hiding game, but subjects showed little improvement by the final visit. Overall, children were consistently above chance (33%) for first and second person, but consistently below for third person. The general trend of this data show that as addressees, *your* was easier than *my*, but as non-addressed listeners there was no statistical difference in accuracy between *my* and *your*. For all three speech roles, third person was always most difficult, even at the second session; no child passed *her* without first passing *my* and *your*. Charney argues that the evidence for first and second person support her hypothesis that children learn pronouns based on the speech roles that they are in, as the order of their comprehension depended upon the child's speech role: as speakers, first>second, as addressees, second>first, but as non-addressees, there was no consistent order between first and second. However the data for third does not. If children really learned pronouns based on themselves in speech roles, than we would expect that as non-addressed listeners, third would be easier than first or second. Of course, this assumes that learners are able to pay attention in non-addressed speech situations.

These results thus suggest that two year olds haven't yet mastered the distinction between discourse participant and non-participant, and performed poorly when the context did not support the felicitous use of especially third person pronouns. These studies (Oshima-Takane and Charney's being a representative sample) removed naturalistic discourse from the testing environment. Pronouns are highly sensitive to the context in which they are used. Removing the context from a pronoun's production would require a listener to have a developed extralinguistic capability to determine the speaker's intention, especially for third person. For example if I were to say, "*He likes cats,*" out of the blue, my addressees would be confused who I was talking about. If you were familiar with me, maybe you would have some extra information to help figure out who *he* is. Maybe we had talked about someone earlier who liked cats. This inference requires sophisticated pragmatic reasoning to reconcile the lack of context. Now imagine a context that supports an utterance like this, and the problem solving becomes easier. A task that requires a child to perform this complex problem solving while likewise exhibiting a newly emergent linguistic ability may well underestimate 2-year-olds' linguistic competence by causing them to perform badly.

We framed the experiment in a hiding game where the players were involved in a larger goal—the building of a block structure. Participants looked for blocks in boxes using clues with pronouns (e.g. *You have it/It's in your box*). During some of the trials, they were then instructed to add the blocks they found to the block structure that an experimenter was constructing. Hamann et al (2011) showed that children as young as three are good at working collaboratively toward a common goal, and Dunfield & Kuhlmeier, (2010) showed that generally they like to be helpful, especially to agents that have themselves proven to be helpful. Participants' instructions

were framed in terms of helping the experimenter build this block structure which the child is allowed to knock down at the end of the experiment. The next section will further explain the experimental procedure and the results. We found that two-year-olds were adult-like in their comprehension of all pronouns, but performance was slightly improved for third person when the pronoun could be disambiguated using gender features.

### 3 Experiment

We implemented a hiding task similar to Charney (1980). However, the current study is different in the following ways: (1) we removed the picture matching aspect to remove a layer of complexity and (2) we incorporated a more natural discourse context around the non-addressed speech condition, by having two experimenters, one (Experimenter 1, E1) directly playing and interacting with the child, and another (Experimenter 2, E2), working separately in another corner of the room. This was modeled after Beier, Over & Carpenter 2014. The goal was to design an experiment testing children’s comprehension of pronouns in a natural setting—a setting that is more felicitous in its testing of both addressed and non-addressed speech. In the addressed speech condition, E1 talks to the child alone. In the non-addressed speech, E2 interrupts the game by talking to E1. This sets up a natural context for a non-addressed conversation between the two experimenters.

#### 3.1 Design

The study uses a 2x3 within subjects design with factors of speech type (addressed, non-addressed) and person feature of pronoun (first, second, third). There were a total of twenty-five trials: each pronoun was uttered four times in the addressed trial, and three times in the non-addressed trial. Additionally and as a control, each experimenter used the names of the other two in the room, e.g. “It’s in E2’s box” or “E2 has it”. Criterion for exclusion was (1) failure to finish most of the study (i.e., half or less), or (2) failing 2 out of 3 trials with the child’s own name.

#### 3.2 Procedure

**Introduction to the Game and Training** One researcher (E2) is sitting in the playroom, constructing a wall of blocks. The other researcher (E1) leads the child into the playroom, and upon seeing E2 busy at work, asks what E2 is doing and if she needs help. E2 gives the child a block to add to the wall. E2 then thanks E1 and the child for their help, and declares that she will return to her work. This setting up of E2 being busy at work is crucial because we want her to be minimally involved with the regular hiding play, during which the child receives pronouns in the addressed speech condition.

Next, E1 and the child turn aside to three boxes. The participant and E1 pick a box, which are then labeled as their own. With the remaining box, E1 suggests that E2 may want one. As E2 is extremely busy with her building, she accepts a box but says that she is still too busy to play (“I guess I could have a box, but I’m really too busy to play.”). The final aspect of training is to ensure that the child knows whose box is whose. E1 points to each box and asks, “Whose box is this?” and then asks, “Which box is X’s box?” for each participant’s name.

**Addressed Speech (AS) condition** The addressed-speech interactions between E1 and the child constitute the regular game play. E1 hides the block while a large cardboard occluder is up, then before removing it, says, “OK, ready to find the block? *You* have it! (*occluder removed*) It’s in *your* box!” Two points about the delivery of the clue: we use both nominative and possessive pronouns as clues, and we deliver one clue both while the occluder is still up and one after it is removed. Charney (1980) reported that she did not find case differences in this age group. We therefore decided to use both, giving children as much pronoun information as possible. Furthermore, case features do not give away any clue to the location of the block. Rather, children must rely on speech roles and the associated pronoun in order to find the block. As for the second point, in early piloting phases of the experiment, the clue was given only once, before the occluder was removed. It seemed that in these early trials children tended to pick their own box as a default. Perhaps it was too much of a cognitive load for the child to both remember the clue and resolve the pronoun with the boxes out of sight (Bernier, Carlson, & Whipple 2010).

**Non-Addressed Speech (NAS) condition** Right after E1 hides a block, E2 interrupts the addressed speech game and asks E1 to return that block because she needs it for her wall. This marks the beginning of the non-addressed speech trial. When E2 asks for it back, E1 says, “Sure. Uh-oh! I’ve forgotten where I hid it. Did you see?” The interruption takes place after E1 hides the block, and says, “OK, ready to find the block?” thus right before the clue would typically be given in a addressed speech trial. It is plausible that E2 has seen because she is positioned just behind the occluder (though a little far away) and in view of the boxes. E2 declares that she did see, and then gives a clue in a similar fashion as E1: e.g. “*I/You/she/he* have/has it, (*occluder removed*), it’s in *my/your/her/his* box.” Crucially, this exchange is between the two experimenters and does not involve the child; E2 is the speaker and E1 is now the addressee. E1 then turns to the child and says, “Can you help E2 find the block?” The child then has two chances to find the block. Once she has the block, the child then further helps E2 by placing the block on E2’s structure.

**Gender Manipulation** Both E1 and E2 are females. As a result, when the child is also female, third person pronouns could potentially refer to any of the three participants in the game in both AS and NAS conditions. In contrast, male subjects hear *It’s in her box* (referring to E2) in DS, but *It’s in his box* (referring to the child) in NAS. Thus, in the AS condition, the pronoun can potentially refer to either one of the experimenters but not the child; in the NAS condition, the pronoun can only refer to the child.

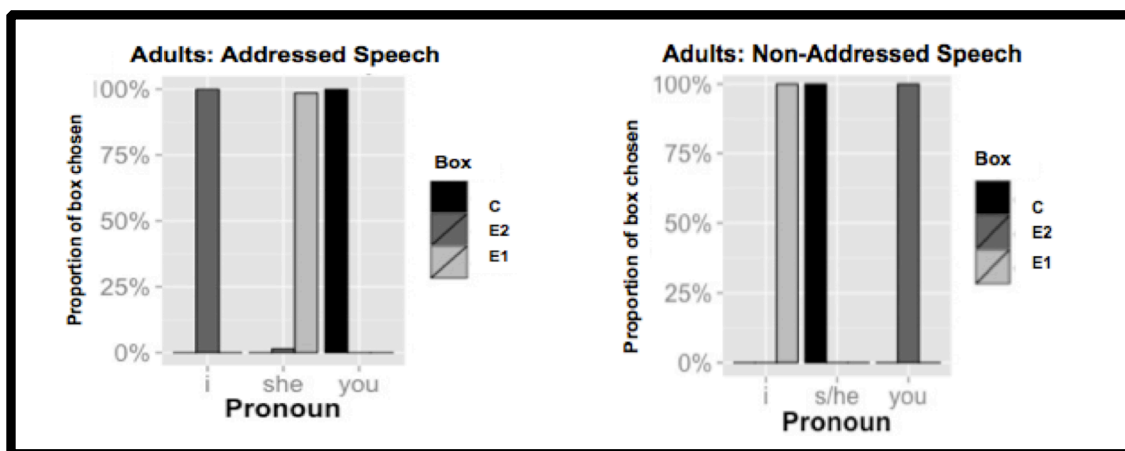
### 3.3 Subjects

Subjects were 43 children (23 female, 20 male) aged 2;1-2;11, recruited from the University of Maryland Infant & Child Studies Consortium Database. Subjects came to the Project on Children’s Language Learning lab at the University of Maryland, College Park for one visit. The experiment lasted about 20 minutes. All participants were typically developing monolingual English speakers. 17 additional subjects (7 female, 10 male) were excluded for (a) not finishing the game, (b) failing both control trials of the child’s own name or (c) if the parent intervened in the game. We also tested 18 adult undergraduates at the University of Maryland, College Park.

### 3.4 Results

#### 3.4.1 Adults

Using a mixed effects model ANOVA, we found significant main effects of speaker ( $p > 0.0001$ ) and pronoun ( $p > 0.0001$ ), a two-way interaction between pronoun and speaker ( $p > 0.0001$ ), and a three-way interaction between pronoun, speaker and condition ( $p > 0.0001$ ). In the Addressed Speech condition, adults chose E1's box when they heard *I/my*, their own box when they heard *you/your*, and E2's box when they heard *she*. In the Non-Addressed Speech condition, adults chose E2's box when they heard *I/my*, E1's box when they heard *you/your*, and their own box when they heard *she/her* or *he/his*.



**FIGURE 1: ADULT PERFORMANCE**

In addressed speech, adults chose their own box when they heard “It’s in your box”, E1’s box when then heard “It’s in my box,” and E2’s box when they heard “It’s in her box.” In non-addressed speech, they chose their own box when E2 said “It’s in her/his box,” E2’s box when they hear “It’s in my box,” and E1’s box when they heard “It’s in your box.”

#### 3.4.2 Children

In a mixed-effects model ANOVA, we found an speaker by pronoun interaction ( $p < .0001$ ), demonstrating that children could choose the right box given different combinations of speaker and pronoun. We also found a pronoun by speaker by gender interaction ( $p = 0.008$ ). While children could select the target box across speakers, boys were more accurate than girls with 3<sup>rd</sup>. Overall, in both conditions children choose correctly for 1<sup>st</sup> and 2<sup>nd</sup>.

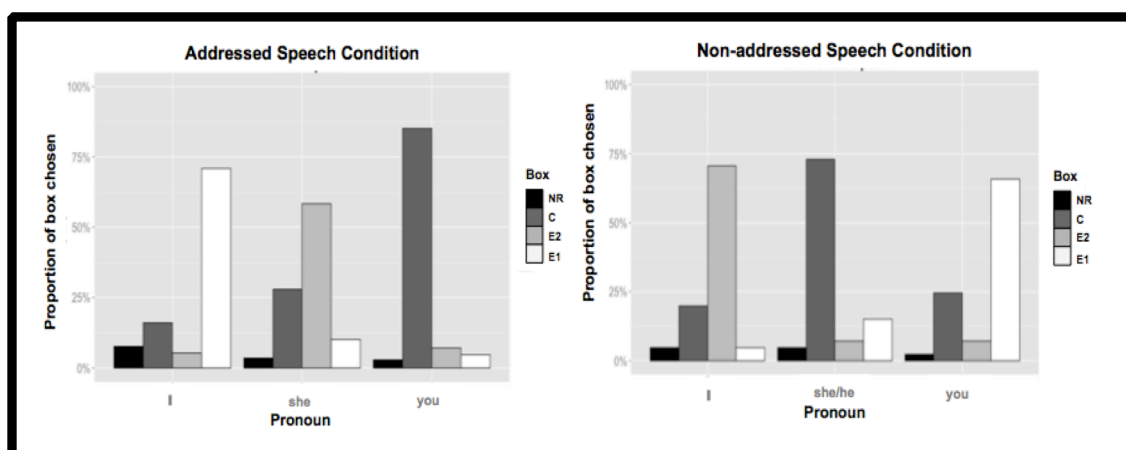
We furthermore used a multinomial logistic regression with the dependent variable box selected. To analyze the effects of speaker, pronoun and gender, we used likelihood-ratio tests to assess the reliability of different predictors in the model. To test the three-way interaction, the full (simple, two-way, and three-way) model was compared against a model with only two-way interactions (simple and two-way). To test the two-way interactions, second and third models were fit by removing each of the two two-way interactions and compared against the full two

way model. We removed the three-way interaction, which is significant ( $\chi^2(4)=10.67$ ,  $p<0.05$ ).

From that model, we removed the pronoun by gender and the speaker by gender interactions. The result was pronoun-gender is not significant ( $\chi^2(6)=10.20$ ,  $p=0.12$ ) but speaker-gender is ( $\chi^2(2)=8.23$ ,  $p<0.05$ ). Results are shown in Figure 1 by box selected per person feature, per condition. In AS (Figure 2, left side), children reliably chose E1's box for *I*, and their own box for *you*; in NAS (Figure 2, right side), they reliably chose E2's box for *I*, and E1's box for *you*. For third person, in AS they reliably picked E2's box, and in NAS, they reliably chose their own box. However, in AS some children picked their own box, though not greater than chance (which is 30%). We do see generally a tendency for the child to choose her own box, but again not greater than chance.

As the speaker-gender interaction is significant ( $\chi^2(2)=8.23$ ,  $p<0.05$ ), we broke down the data by gender to see the distribution of responses in female and male subjects. Figure 2 shows the gender split in third-person pronoun trials, where the interaction between the pronoun's gender features and the gender of the participant becomes evident.

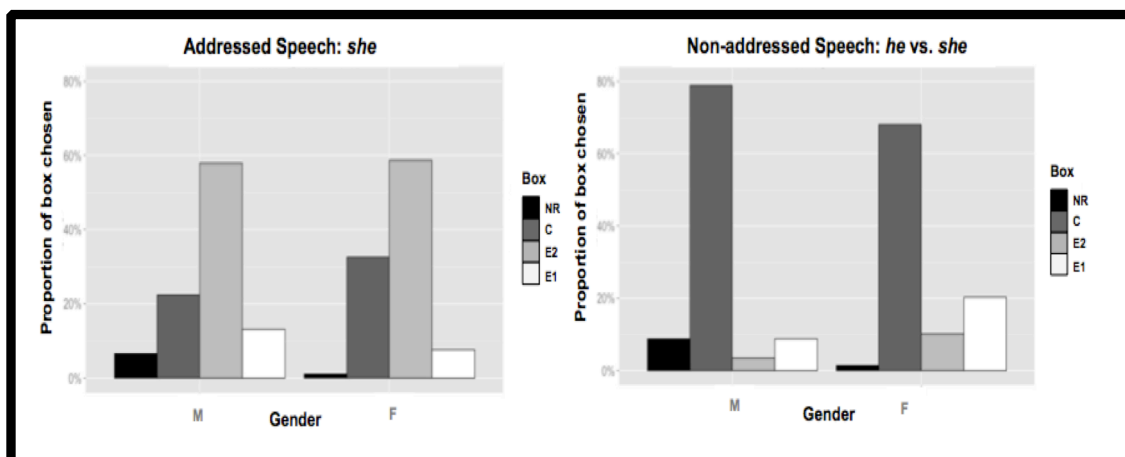
In AS condition, boys seem to have an overall higher tendency for non-response than girls. For first person, boys chose their own box more than girls, but not more than chance, and generally both groups chose the right box (E1's) most of the time. For second person, again, boys seem to be making more errors in general, but both groups chose their own box more than 75% of the time. Turning to third person, girls chose their own box more than boys, about around 30% of the time. But again, both boys and girls chose the right box (E2's) the majority of the time. In the NAS boys again seem to fail to respond more often than girls. But as in the AS, both groups chose the correct box (E2's) on first person trials, and on second person trials (E1's box). For third person trials, girls chose E1's box some of the time, and more often than boys did. However, they here again chose the correct box (their own) most of the time.



**FIGURE 2: ADDRESSED SPEECH ON THE LEFT, NON-ADDRESSED SPEECH ON THE RIGHT: M = E1, K=E2, C=CHILD**

In addressed condition (left), correct response for “I have it, it’s in my box” (leftmost cluster) is choosing E1’s box (white bar). Correct response for “She has it, it’s in her box” (middle cluster), is E2’s box (light gray bar). Correct response for “You have it, it’s in your box” (rightmost cluster) is child’s box (dark gray bar). In non-addressed condition, correct response for first person is E2’s box (light gray), for third person is child’s box (dark gray), and for second person is E1’s box (white).





**FIGURE 3: THIRD PERSON BROKEN DOWN BY GENDER**

In addressed speech (left), both boys and girls hear E1 say to them, “It’s in her box/She has it.” Adults-like response is E2’s box (light gray). Both male and female children are choosing adult-like the majority of the time. Girls are sometimes choosing their own box, more than males. In non-addressed speech (right), boys hear E2 say to E1, “He has it, it’s in his box.” Girls hear “She has it, it’s in her box.” Adult-like response is the child’s box. Both males and females are adult-like. Females are choosing E1’s box slightly more than males are.

### 3.5 Discussion

The subjects in this experiment were adult-like in their comprehension of first and second person pronouns. Across conditions, children chose the same box that an adult would choose. It thus seems that by the age of 25 months, children have mastered first and second person pronouns.

Previous studies had reported that the bulk of children’s errors occurred with third person. The current study improved children’s performance for third person trials—the highest proportion of responses are correct. However, children were not perfect. When the pronoun gender feature was unambiguous (that is for male subjects in the non-addressed condition, third person trials), the performance of male subjects improved. For female participants, third person pronouns were ambiguous between all the females in the room—the two experimenters and female participants, and we did see female participants sometimes picking their own box in these trials, as in Figure 2. While this could be due to a more general bias that children have to pick their own box, looking at the breakdown of males, we see that they are not choosing their own box as much as girls are. This suggests that the performance of female participants was affected by the ambiguity, but not by much: they were nonetheless choosing the correct box most of the time.

One possibility is that they choose a referent for third person pronouns through a process of elimination—they know first and second person, and when they hear a third person pronoun, they choose the right box by eliminating the referent for first and second. For example, if they understand first and second well, but not third, and then first hear first and second followed by third, they can rule out two boxes and then guess which one is correctly referred to by third person.

## 4 General Discussion and Conclusion

2-year-olds in this experiment were mostly adult-like. However, they did show slightly reduced accuracy with third person pronouns. Their trouble with third person seems to be due to difficulty determining who is not a participant. There are two possibilities that could account for this. First, subjects could have been unsure whom E2 was addressing in the non-addressed trials. This would explain why some chose their own box rather than E1's. Another possibility is that these learners have not yet fully mastered this aspect of third person, that it refers to a non-participant. This could be a matter of exposure. It is not the case that adults always use third person in such a way. For example, mothers sometimes refer to themselves in the third person (e.g., *Mommy's brushing her hair*). However, Laakso & Smith's 2007 study of child-directed speech shows that this type of input is minimal. Looking at syntactic subjects, 2408 out of 2500 coded utterances contained *you*, 1248 out of 2500 contained *I*, while only 321 and 135 out of 2500 contained *he* and *she*, respectively. In contrast, parent names were used in less than 100 out of 2500 utterances.<sup>†</sup> Two things to note from this data, the infrequent use of parent names as subject, and the overall infrequent use of *he* and *she*. Subjects' performance in the current experiment in spite of the lack of input for these pronouns as well as their flexible nature in discourse is indicative of a deeper underlying pragmatic competence which is sometimes blocked by other factors such as task demands or underdeveloped executive functioning mechanisms.

Furthermore, children younger than 24 months are attuned to features of the social environment around them, for example determining the goals and intentions of the adults (e.g. Woodward 1998, Csibra & Gergely 2003), and using social cues like eye gaze to reason about the referential intentions for novel words (Baldwin 1991). Perhaps it is not surprising that 2-year-olds are able to track the relations between interlocutors to determine pronominal reference.

Felicitous discourse is crucial to studying pronoun acquisition because determining pronominal reference depends on information from the discourse context. Removing that context renders the task of reference resolution difficult. The current experiment attempted to create a felicitous discourse that would support the use of pronouns by different speakers naturally referring to different individuals who were either participating in a conversation or not participating. We showed that children are more subtly attuned to discourse than previously assumed. Their performance in our experiment was adult-like across pronouns and across discourse roles. Furthermore, though ambiguity in third person pronouns was resolved using gender clues by male subjects, female subjects were nonetheless also able to resolve ambiguity by determining which individuals could be classified as not participating. Thus, our results indicate that 2-year-olds have a much more developed and subtle capacity for reasoning about the referential intentions of speakers than what previous studies suggested.

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<sup>†</sup> It is unclear from the paper whether these parent names were used by the parent themselves, as in a mother calling herself "Mommy," but nonetheless, these subjects are much less frequent than pronominal subjects.

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