Development in Children’s Comprehension of Linguistic Register

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Abstract

For socially appropriate communication, speakers must command a variety of linguistic styles, or registers, which vary according to social context and social relationships. This study examined pre-school children’s ability to use a speaker’s register choice to infer the identity of their addressee. Four-year-olds could draw correct inferences based on Spanish and Formal speech, and had limited success with Infant-directed and Casual styles. Five-year-olds drew appropriate inferences with all four styles; moreover, these children demonstrated strong explicit understanding of register, as measured through response justifications. These results demonstrate that children can use language for social judgments that extend beyond evaluating the speaker, and can interpret social implications of language even when not directly engaged in the particular social interaction.
Development in Children’s Comprehension of Linguistic Register

We talk to different people differently. The speech style used to talk to a baby would be a strange way to address one’s doctor and we do not talk to our employers the same way we talk to friends and peers. To engage in socially appropriate communication, we must command a variety of linguistic styles, or registers, which vary according to social context and our particular social relationship to the person we are speaking to. Part of acquiring a language, therefore, is learning what different linguistic registers signal about the social context as well as how to combine various linguistic elements into coherent register styles. The study reported here is an examination of children’s developing skill at drawing inferences about the identity of a speaker’s addressee based on the register that the speaker chooses to use.

Recent work has shown that young children are aware that language is a relevant indicator of social information. Kinzler, Dupoux and Spelke (2007) found that 10-month-old infants prefer to take a toy from an adult that speaks their native language as opposed to a foreign language, and pre-school age children prefer to play with children who share their language natively, as opposed to speaking it with a foreign accent. Indeed, this social preference for people who speak the same way as oneself may even be stronger in some cases than a social preference for people of one’s own race (Kinzler, Shutts, DeJesus & Spelke, in press). These results suggest that children understand how language is a marker of group affiliation; people who speak like you (or your parents) are part of your own group.

In many instances, language is in fact a stable trait of the speaker: people who are non-native speakers of English will generally remain that way. Certainly, they will not suddenly become native speakers of English just because they are given a new conversational partner. Native language (or native dialect) is therefore a good marker about stable properties of a
speaker, such as where they are from. By contrast, linguistic register provides social information that shifts flexibly depending on the situation. The very same person speaks in one register when talking to an infant and a completely different register when speaking to her boss. Every individual must command a variety of linguistic registers to accommodate a variety of social situations. Identifying a specific register, therefore, tells one little about who the speaker is in general, but instead indicates information about the social interaction the speaker is having.

Understanding register requires one to appreciate these social interactions, as well as the linguistic devices that are used to signal them. Registers are marked through a variety of linguistic elements. For example, infant-directed speech involves characteristic changes in pitch (Fernald, 1992), lexical items (e.g. “goo goo”), and syntactic complexity (Newport, Gleitman & Gleitman, 1977). Similarly, formal polite speech involves special lexical items (words like “please” and “thank you”), syntactic constructions (Ervin-Tripp, 1977) and in some languages, pronoun choices (Brown, 1996). The specific lexical and syntactic elements used to signal different registers vary from language to language (Brown, 1996; Nakamura, 2001) and children must learn the mapping between linguistic elements and social situations. Moreover, there is also some variation in which social situations warrant distinctive registers (see e.g. Nakamura, 2001), so children must also learn their cultural norms to fully master this dimension of language use.

Previous work looking at children’s ability to shift their own style of speech as a function of social context suggests that seeds of this ability may be present quite early: Weeks (1971) found that even a 1-year-old would shift his speech to reflect the social environment (e.g., indoor vs. outdoor speech). However, it is not until about age 4 years that children seem to command registers roughly parallel to those in the adult language. In a pioneering study, Shatz and
Gelman (1973) found that 4-year-olds talk differently (e.g. using shorter, less complex utterances) to younger children than they do to either peers or adults. Moreover, in her extensive production studies, Andersen found that starting around age 4 years, children can shift their speaking style in response to a variety of social factors (Andersen, 1992; Andersen 1996, Andersen, Brizuela, DePuy & Gonnerman, 1999). In these studies, children were given various puppets and asked to provide their voices in different situations. Children demonstrated sophisticated knowledge about the range of ways that language reflects social status. For example, when speaking for the doctor puppet, children used more imperative commands and asked fewer questions than when speaking for the nurse puppet. Similarly, children adjusted the choice of lexical items (using terms like “sweetie” more when speaking as the mommy puppet), the pitch of the utterance (using a deeper voice when speaking as the daddy puppet), and the use of discourse markers designed to help a speaker keep their turn in the conversation (they held their turn more aggressively when speaking as the doctor and teacher puppets).

Other researchers have similarly found that by age 4 years, children can shift their speech register to be more polite (James, 1978), and more impressively, to facilitate actual interpersonal interactions (Ervin-Tripp, 1977; Kyratzis, Marx & Wade, 2001). However, children’s skill at shifting registers improves dramatically with age. In Andersen’s studies, the 6-year-olds were far more consistent about changing their speaking style and did so over a broader range of social contexts. Other researchers have also found that children improve their control of register throughout childhood. For example, children develop in their ability to ask ‘nicely’ when requesting a desirable object from an older adult (Bates & Silvern, 1977; Nippold, Leonard & Anastopoulos, 1982) and do not command the subtleties of polite speech until late in the grade-school years (Pedlow, Wales & Sanson, 2001, Pedlow, Sanson & Wales, 2004). Children’s
comprehension of polite speech shows a similar developmental trajectory (Bates & Silvern, 1977; Bernicot & Legros, 1987; Nippold et al. 1982; Baroni & Axia, 1989; Pedlow et al., 2001; Pedlow et al., 2004).

The current study expands on previous research in two critical ways. First and foremost, this study focuses on the intrinsic flexibility at the core of register: the very same individual should command multiple registers and deploy them appropriately depending on their listener. Previous experimental studies have examined only a single register at a time and therefore cannot speak to children’s appreciation of how a single speaker shifts speech styles. This study tested children with three different registers, each associated with social interactions that should be reasonably familiar to children: formal polite speech (as a child might use to a teacher), casual speech (as a child would use to a peer), and infant-directed (ID) speech (as one would speak to a baby). Secondly, this study focuses on children’s comprehension as opposed to their production abilities. As noted previously, appropriate production of registers requires facility with a full range of linguistic levels and children may well understand the import of registers before they can produce an adult-like example of one. Indeed, recent work suggests that before 2 years of age, children can extract a great deal of information from speech not directly addressed to them, including detecting differences in fluency (Soderstrom & Morgan, 2007) and even learning the meanings of words (Akhtar, 2001; Floor & Akhtar, 2006). Similarly, children may be able to extract register information and use it despite limited command in their own production.

In addition, to provide a baseline of ability in this task, we tested children with a foreign language (Spanish). Hirschfeld and Gelman (1997) found that by age 4 years children associate people who speak a foreign language with foreign objects (e.g. non-western housing and clothing). Linking a foreign language to someone from far away is conceptually similar to
linking a particular register with the right social partner; in both cases, one needs to know that the language is providing information about the social identity of the listener. However, since even newborns can discriminate among different languages (Mehler et al., 1988), it was expected that the linguistic features of Spanish would be easy for children to detect and use.

In our task, children were asked to identify who a speaker was addressing based on her choice of register. In addition, for half the trials, we asked children to justify their responses. This additional task was added in an exploratory spirit to see if children’s success with register was linked to their meta-linguistic understanding of it. The motivation for this task came from the field of bilingualism. For bilingual speakers, the language they speak (e.g. French vs. Spanish) is not stable, but instead, like register, switches flexibly depending on the social situation. Bilingual children tend to be quite sophisticated at understanding how social situations should guide their language choices (Pettito et al., 2001) and they are ahead of their monolingual peers on some meta-linguistic tasks (Bialystok, 2001; Jessner, 2006). Moreover, Jordá (2003) found that bilingual adults were better than monolinguals at providing relevant justifications for their performance on a linguistic task. To the extent that both register and bilingualism require one to choose among one’s repertoire of speech styles to match a social situation, we might find a similar link between meta-linguistic skill and register understanding.

Method

Participants

Participants were 56 children, divided into three groups: 3-year-olds (N = 18, mean = 42.2 months); 4-year-olds (N = 20, mean = 55.5 months); and 5-year-olds (N = 18, mean = 68.3 months). Approximately half the children in each group were girls. The data from an additional
10 children were excluded because of equipment failure/experimenter error (5 children), or because the children failed to pass the pointing task described in the Procedures section (5 children, mean age 46 months). All children were monolingual speakers of English from a large American Midwestern city; most of the children were Caucasian and were from a mid to high SES. All were recruited by telephone and were tested in a university laboratory setting.

**Stimuli**

A frog puppet was the nominal speaker of all sentences. Neither the gender nor the age of the puppet was specified, and it spoke with the voice of a college-aged woman (the second author). All sentences were pre-recorded and played as quicktime files on a laptop computer.

The same four linguistic tokens were used throughout; each began with an attention-getting introduction and then asked for a person’s name. Inquiring after names was chosen because pilot testing found that children accepted it as a plausible question to ask a variety of people, including infants. The tokens varied with respect to speech style and differed at many linguistic levels, including prosody, phonology, lexical choices, and syntax. Transcripts of the tokens can be found in Table 1. The **INFANT-DIRECTED (ID)** token was spoken in a high-pitched voice with large pitch excursions; this special prosodic contour was particularly pronounced in the attention-getting word (“Awwww”). Syntactically, the infant-directed token used an indirect question. The **FORMAL** speech token used explicit politeness terms (“Excuse me, Please”), an indirect question in a modal verb construction (“can”) and did not contract across words phonologically. The **CASUAL** token used an informal attention-getter (“Hey”), a simple question construction, and contracted the auxiliary verb. The **SPANISH** token was spoken in a casual register in Spanish.
The target addressee for the ID speech was a picture of an infant; for the Casual speech, a blonde toddler girl; for the Formal Speech, an adult woman; and for Spanish, a dark-haired toddler girl. Note that all the pictures (except those of the infants) depicted females. Thus, gender could not be used in the study to differentiate among the choices. The pictures were all presented on 8” X 6” laminated cards. There were three exemplars of each picture type used in the study. One example of each type is shown in Table 1.

Procedure

To insure that children were familiar with all the target pictures and could classify them appropriately, participants began by identifying the person in all 12 of the target pictures (three of each target type) and sorting them into the 4 target groups. To insure that children distinguished between the two kinds of little girls, the first example of each of these types was presented with a special introduction. For the little blonde girl, children were told: “This little girl lives right here in town. She lives very close by.” For the little dark-haired girl, children were told: “This little girl lives very far away. She lives in a completely different country.” Feedback was given during the sorting, and children were encouraged to use our labels for the pictures (baby, teacher, little girl who lives far away, little girl who lives nearby). These descriptions were repeated as needed throughout the sorting session. Following the sort, children were asked to point in a pseudo-random order to six pictures to insure that they could identify all the types. Children who failed to get 100% correct at this pointing task were excluded from analysis.

Children were then introduced to the frog puppet who wanted to meet new people and were asked to tell the frog their own name. They were told that the frog would meet some of the
people in the pictures and were instructed to listen to the frog and say who she was talking to. For each test trial, children saw a pair of pictures: a target (the correct answer) and a foil. The foil pictures were all targets for different registers. The linguistic stimulus was played and the child was asked: “Who was she talking to?” Each type of target was tested three times, once paired with each of the possible foil picture types, for a total of 12 test trials. Children’s responses consisted of selecting one of the two pictures. On the last six trials, children were also asked to justify their choices.

Results

An ANOVA was conducted on the proportion correct with Age as a between-subjects factor (3, 4, and 5-year olds) and Speech style as a within-subjects factor (ID, Casual, Formal, Spanish). The analysis found a main effect for Age: $F(2, 53) = 24.3, p < .001, \eta^2 = .48$. Post-hoc comparisons (Tukey’s HSD, $p < .05$) found that 5-year-olds did significantly better than 4-year-olds who in turn did significantly better than 3-year-olds. A main effect was also found for Speech style: $F(3, 51) = 9.5, p < .001, \eta^2 = .15$. Post-hoc paired t-tests (all $p$’s < .05) found that children did significantly better with Spanish than all other speech styles; they did significantly better with the Formal register than with the other two styles; and they did equally well with the Casual register and the ID register. There was no significant interaction between Age and Speech style. The means for all registers by age group are shown in Figure 1.

To assess children’s objective level of ability with each speech style, we compared their performance to chance (.50). The 5-year-olds were significantly above chance with all four speech styles (Spanish $t(17) = 18.2, p < .001, d = 8.8$; Formal $t(17) = 11.2, p < .001, d = 5.4$; Casual $t(17) = 3.6, p < .01, d = 1.7$; ID $t(17) = 5.5, p < .001, d = 2.7$). Moreover, the number of
5-year-olds scoring at least .67 correct for all four speech styles was significantly above chance by a binomial test (17/18, \( p < .001 \)); even for the hardest style (Casual speech) a significant number of 5-year-olds were above chance (14/18, \( p = .031 \)). The 4-year-olds were significantly above chance with Spanish (\( t(19) = 5.3, \ p < .001, \ d = 2.4 \)) and the Formal register (\( t(19) = 4.2, \ p < .001, \ d = 1.9 \)) but performed at chance with the Casual register (\( t(19) = 0.74, \ n.s. \)) and the ID register (\( t(19) = 1.88, \ n.s. \)). The subjects analysis confirmed that a significant number of participants performed above chance with Spanish and the Formal register (in both cases, 17/20, \( p = .003 \) by binomial test) but not for ID speech (12/20, \( p > .5 \) by binomial test). However, despite the fact that the overall score was not above chance for the Casual register, a significant number of 4-year-olds did score at least .67 correct with it (15/20, \( p = .041 \) by binomial test).

Finally, the 3-year-olds scored no better than chance with the Formal, Casual, and ID registers (all \( p’s > .1 \)) but did score above chance with Spanish (\( t(17) = 3.5, \ p = .003, \ d = 1.7 \)). However, the subjects analysis revealed that for none of the speech styles did a significant number of participants score above .67, not even for Spanish (13/18, \( p = .096 \) by binomial test). We were surprised at how poorly the children performed with ID speech and checked to see if children with more exposure to the use of ID speech – e.g. children with younger siblings – would better understand its use. We compared the performance with ID speech of participants with and without younger siblings but there was no difference between these groups (\( F(1, 53) = 0.53, \ p > .4 \)). Raw exposure to ID speech directed to others did not determine success in understanding it.

Inspection of the data revealed that there were base-rate effects for choosing different types of pictures. In particular, 3 and 4-year-olds avoided choosing pictures of babies and were positively disposed to choose pictures of the girls who lived far away. The chance comparisons just noted may therefore have underestimated children’s ability with ID speech (where the baby
pictures were the correct targets) and overestimated their ability with Spanish (where the pictures of the girl who lived far away were the correct targets). Therefore, the chance analyses were re-done with chance corrected to the actual base-rate for choosing the target (that is, the average rate at which the target was chosen across the entire experiment). For the 5-year-olds, the base-rates varied between .44 and .56 across targets, and the new analyses were qualitatively identical to the standard chance analysis. For the 4-year-olds, the base rates varied between .33 (for the baby pictures) and .63 (for the girls who lived far away). The corrected chance analyses yielded qualitatively identical results except for the case of ID speech: 4-year-olds did choose the picture of the baby significantly more frequently than their base rate preference ($t(19) = 2.2, p = .039, d = 1.0$). For the 3-year-olds, the base rates varied between .38 (for the baby pictures) and .66 (for the girls who lived far away). The corrected chance analyses also yielded qualitatively identical results except for the case of Spanish: 3-year-olds failed to choose the correct target more than their base rate preference ($t(17) = 1.2, p > .2$). One additional analysis (suggested by a reviewer) looked at whether the 3-year-olds could successfully contrast Spanish and the Casual register just in those cases where the pictures contrasted the two kinds of little girls. The results found that they were equally likely to choose the little girl who lived far away with both those speech styles ($t(17) = 0.6, \text{n.s.}$), reinforcing the base-rate-corrected analysis that these children do not succeed with Spanish.

Finally, we analyzed children’s justifications of their choices. Children’s responses were classified into one of four categories. The first category was Uninformative and was comprised of justifications such as “I don’t know” and “just because”. The Language Oriented category was broadly construed, and included any answer making any reference to the linguistic stimuli, no matter how vague (“That’s what it sounded like”, “because she had a pretty voice”, “because
she said awwww”). It also included justifications that simply identified the stimuli as being Spanish (“because she’s speaking Spanish”). The Picture Oriented category was used for references to the people in the pictures with no mention of language: “because she had the same color hair as me”, “because she’s from far away”. Lastly, the Social-Language category consisted of answers that expressed an understanding of how the language was being tailored to the social category of the people in the pictures; for example, one child justified choosing the little girl who lives nearby after hearing the Casual register by saying “because people say ‘hi’ to kids”.

The distribution of the justifications is shown in Figure 2. The 3-year-olds’ justifications were almost always Uninformative (94.4%), which stands in marked contrast to the older children’s justifications. One-way ANOVA comparisons between the 4- and 5-year-olds’ justifications showed that the older children gave significantly fewer Uninformative justifications ($F(1, 37) = 6.3, p = .017, \eta^2 = .15$) and significantly more Language Oriented justifications ($F(1, 37) = 6.7, p = .014, \eta^2 = .16$) as well as Social Language justifications ($F(1, 37) = 4.7, p = .036, \eta^2 = .12$). Moreover, children who gave better justifications also did better on the task as a whole. Looking just at the 4- and 5-year-old children (that is, children who gave a range of justification types), a Pearson’s correlation found a significant negative relationship between children’s overall proportion correct on the task and the proportion of Uninformative justifications that they gave ($r = -.48, n = 38, p = .002$). That is, as children did better on this task, they were more likely to offer a reasonable justification for their choices.
Discussion

This study investigated children’s developing ability to understand the social implications of using a particular register: Can a child tell who someone is speaking to based on the style in which they choose to talk? The results show that there is a dramatic improvement in children’s ability to interpret register information around the age of 4 years and that this ability is broad-based, applying flexibly to many different registers from a single speaker. Understanding of register continues to improve with age, and 5-year-olds are much more facile in their understanding. Moreover, these older children also have an improved appreciation of the basis of that understanding, and provide substantially better justifications for their responses. These results suggest that there may be a connection between being flexible with register understanding and being able to explicitly think about language itself.

These results go beyond recent findings of Kinzler and colleagues (Kinzler et al., 2007; Kinzler et al., in press) about children’s ability to link linguistic and social information. Kinzler and colleagues found that pre-school age children can use the language of a speaker as a stable indicator of their social desirability; by contrast, these results show that by age 4 years, children also understand that speakers can shift their style of speaking depending on their conversational partner. Children’s success with register suggests that they understand not only how language can stand proxy for stable social categories, but also how language can be used to respond to different social partners. Moreover, the fact that children succeed with multiple registers shows that they understand the inherent flexibility of register; a speaker’s social partners are subject to change and so are a speaker’s registers.

The age of children’s success was not notably different from what has been found in production studies (Gelman, 1973; James, 1978; Anderson, 1992; Kyritzis et al., 2001),
suggesting that children’s comprehension of register is tied to their earliest successful attempts to produce it. What is notable about these results is the fact that the children succeeded despite the fact that they were essentially eavesdropping on other people’s conversations. Akhtar and colleagues (Akhtar, 2001; Floor & Akhtar 2006) have previously shown that children can listen in on adult conversations to learn the meanings of words, but the children in this study were extracting social linguistic information far beyond word meanings. Despite having no social position in the conversation of their own, the children were nevertheless identifying critical social characteristics of the participants (e.g. being a peer vs. being an adult) as well as social characteristics of the language being used (e.g. ID speech vs. formal speech). Children’s success even as third-party observers shows how salient language is as a social marker (it is one that does not even require personal engagement); moreover, it points to a potential path for acquisition. Rogoff et al. (2003) discuss the importance of eavesdropping – or what they call “listening-in” – in children’s acquisition of a variety of skills cross-culturally. Interestingly, they argue that a critical feature to this process is that children anticipate that they will themselves eventually be asked to engage in the activity which they are listening-in on. If this argument is correct, it implies that children may in fact anticipate the need to modulate their own speech style for different social settings before they themselves have direct need of it.

Finally, this study suggests that there is a positive link between children’s ability in the comprehension task and their meta-linguistic appreciation of the speech styles involved, as measured by their justifications. An examination of the differential success among the speech styles further supports the idea that the two are connected. For example, Spanish was the easiest style for children to link to a social category, and it was also the style for which children did the best job of justifying their choices: a full 47.9% of the Language Oriented justifications made
reference to the Spanish language in some way. No other speech styles were mentioned so explicitly in the justifications, however, a comparison between the Formal and Casual registers further suggests a role for explicit knowledge. Children performed far better with the Formal register than the Casual one: 4-year-olds succeeded robustly with the former, but only marginally with the latter (although a significant number of 4-year-olds did comprehend this register successfully, children did not succeed as a group until age 5 years). The Formal register was distinguished by its inclusion of polite terms such as “please” and “excuse me”. Previous research suggests that in naturalistic settings, parents explicitly encourage their children to use these particular words when speaking to adults (Becker, 1994; Gleason, Perlmann & Greif, 1984), and they appear to serve as critical markers of polite speech for children as old as ten years (Pedlow et al., 2001). By contrast, the Casual register was largely defined by what it lacked: it was normal, neutral speech with no distinctive intonational patterns or lexical items. The differential success of these two registers suggests that children may require specific, familiar linguistic markers to categorize the speech and connect it to their social understanding. If this suggestion is correct, it predicts that children may find it easier to understand register distinctions in languages which have specific grammatical elements associated with them (such as the way pronoun choice signals casual vs. formal speech in many Romance languages).

In both these cases, of course, the data is only correlational, and it is unclear whether children’s facility with the speech styles is driving improvements in their meta-linguistic abilities (presumably the direction of causation for bilingual children), or whether independent improvements in meta-linguistic ability are helping them better comprehend speech registers. Further studies will be needed to determine if there is a strong parallel between knowing multiple
languages and knowing multiple registers, or if the two are linked to improved meta-linguistic understanding for different reasons.

Altogether, these results suggest that around age 4 years, children develop an appreciation for register and linguistic style that extends beyond their own social interactions. They understand that individual speakers can flexibly shift their speaking style as a function of their conversational partner; moreover, they understand which specific registers in their native language should be used with different social partners. Children’s success reflects, on the one hand, a language specific ability, namely the particular way that English signals Formal, Casual, and ID registers. The fact that there are some differences in how well children perform with these different registers speaks to the very English-specific knowledge that children must acquire. On the other hand, the fact that children succeed with multiple registers at once suggests that they have grasped the general principle underlying register use, namely, that language can be used to signal a social relationship between conversational partners.
References


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Special thanks are due to the Center for Science and Industry of Columbus, OH, where initial versions of this study were piloted. The data reported here served as the basis for MGH’s honors thesis. Preliminary findings were presented at the International Association for the Study of Child Language conference held in Edinburgh, Scotland in 2008.

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Table 1
Linguistic and Visual Stimuli Used

<table>
<thead>
<tr>
<th>Test Register</th>
<th>Linguistic Stimuli</th>
<th>Target picture</th>
<th>Target picture choice (1 example of 3 used)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Directed Speech</td>
<td>Awww, I wonder what your name is?</td>
<td>Baby</td>
<td></td>
</tr>
<tr>
<td>Casual Speech</td>
<td>Hey, what’s your name?</td>
<td>Little girl who lives nearby</td>
<td></td>
</tr>
<tr>
<td>Formal Speech</td>
<td>Excuse me please, can you tell me your name?</td>
<td>Teacher</td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>Hola! Como se llamas?</td>
<td>Little girl who lives far away</td>
<td></td>
</tr>
</tbody>
</table>
Figure Captions

*Figure 1.* Mean correct responses by Speech style and Age

*Figure 2.* Percentage of the different justifications used.