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# Social and linguistic cues facilitate children's register comprehension

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## Abstract

Speakers must command different linguistic registers to index various social-discourse elements, including the identity of the addressee. Previous work found that English-learning children could link registers to appropriate addressees by 5 years. Two experiments found that better cues to the linguistic form or to the social meaning of register could improve 3-year-old children's ability to access their knowledge of register. Experiment 1 contrasted children acquiring English and Spanish, as Spanish provides more consistent grammatical cues to register through its pronoun system than English does. The Spanish-learning children showed earlier success in a forced-choice comprehension task. Experiment 2 provided English-learning children with enhanced cues to register's social meaning and also found improved performance. These results suggest that the underlying knowledge about register is available from an early age, but can be accessed only with sufficiently strong cues.

## Keywords

Cues, register, social language, sociolinguistics, Spanish

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Linguistic registers are different styles of speech that reflect the identity, relationship, social status and environment of the speaker and addressee; that is, they *index* properties of the speaker's social identity and social situation (for a range of perspectives about this well-studied phenomenon, see Bell, 1984; Brown & Levinson, 1987; Giles, Coupland, & Coupland, 1991; Labov, 1966). Some kinds of indexical information are quite stable: for example, a speaker indexes where she is from through the use of her particular dialect or accent. Children appear to be quite sensitive to this kind of stable index from very early on. For example, in Kinzler, Dupoux, and Spelke (2007), 6-month-old infants preferred to look at a speaker who had previously spoken in the infants' soon-to-be native language over a speaker who had previously spoken in a foreign language. This preference was found even though the test phase was conducted while the speakers were silent: infants had effectively indexed the people themselves by the language they used. The indices associated with linguistic register, by contrast, typically do not depend on the properties of the speaker per se, but rather provide information about the social situation the speaker is in. Every individual must command a range of registers and be able to vary them in accord with particular social interactions: one speaks in a more formal register at school than at a party; one uses a more casual register with friends than with prospective employers. Register therefore provides a somewhat different problem for children – both in terms of knowledge acquisition and in terms of access – than indexical markers that are tied to more stable information, such as regional accent.

Nevertheless, children do learn some aspects of register at a young age. Weeks (1971) found that by one year of age, children understand that they need to change the way they speak depending on their environment: they know when to produce indoor vs. outdoor voices. Moreover, before age 2, children can change the content and cohesion of their conversations as a function of their addressee (mother or older child) and situational context (e.g., book-reading or mealtimes) (Hoff, 2010). By the age of 4, children can adjust some aspects of their speech to be more or less assertive (e.g., imperatives vs. use of tag questions) as a function of their specific social relationship with peers (Kyratzis, Marx, & Wade, 2001). These results suggest that from quite a young age, children understand that they can use their speech style to index social information and do so, particularly with social situations that are intimately connected to their personal experiences.

However, it is not until children are 5 years old or older that they appear to command a more general ability with register that involves more conventionalized adult targets and perspectives that are not directly connected to the child herself. For example, 4-year-old children do produce some aspects of child directed speech when speaking to children 2 years their junior (Shatz & Gelman, 1973) but they do not produce the full range of adult-like features. Moreover, by the end of the pre-school years, children can purposefully adjust their speech to be more polite so that they 'ask nicely' (Bates & Silvern, 1977; Nippold, Leonard, & Anastopoulos, 1982), but these skills improve over the school years, including the ability to appropriately judge speech as being polite or not (Baroni & Axia, 1989; Nippold et al., 1982; Pedlow, Sanson, & Wales, 2004). A similar developmental trajectory was found by Andersen (1992). She found that around age 5 – 6 years old, children begin to adjust their speaking styles when voicing a range of puppet characters; for example, they use a deeper voice for the daddy puppet than the

mommy puppet, and they also make the doctor puppet use more imperatives than the nurse puppet. However, younger children had difficulty with the task and skills improved markedly through the school years. Finally, in work closely related to the experiments reported here, Wagner, Greene-Havas, and Gillespie (2010) asked children to identify the addressee of a puppet based on her speech. They found that English-speaking 5-year-olds were able to correctly link infant directed speech to infants, formal speech to teachers, and casual speech to children. By contrast, 3-year-olds were unable to reliably make any inferences about the addressee based on the register used.

However, it is possible that children's more protracted development with some aspects of register stem not from lack of knowledge but from difficulty in accessing that knowledge, particularly in experimental tasks. For example, in Wagner et al. (2010), children were not only asked to identify the speaker's addressee but also to justify their choices. Children who had shown explicit awareness of register in their justifications, especially awareness of its linguistic form, performed better on the task. That is, children who mentioned properties of the speaker's utterance itself – even if those properties were only mentioned vaguely (e.g., 'that's what it sounded like') – were more accurate in identifying the addressee. Apparently, children who could explicitly focus on the right parts of the experimental stimuli did better at using those stimuli to guide their behavior.

Why would an explicit appreciation of register be so important for making use of it in an identification task? One distinct possibility is the diffuse way that the speech signal encodes register. For example, in English, the difference between casual speech and polite speech is relatively subtle. Polite speech differs from casual speech in that it typically contains special lexical items (e.g., *please, excuse me*), uses indirect questions (e.g., Polite: *Could you pass the salt?* Casual: *Pass the salt*), and is more carefully articulated phonologically (e.g., Polite: *going to*; Casual: *gonna*). But these features are largely optional, and none of them is an unequivocal signal of a particular style. Unlike the case of word learning, registers are not signaled by individual forms, but by clusters of probabilistic features across an utterance. Children who can think explicitly about what a register is may be better positioned to notice these form cues, particularly in the context of an interpretive task where the children themselves cannot control what combination of features are produced. If indeed explicit register awareness helps children because it helps them compensate for a relatively weak signal, then a straightforward prediction is that children who are given especially strong cues about what register they are hearing will be better able to access their knowledge about register.

One way to test this prediction is to look at children's ability to access register in a language that provides consistent cues to them. Spanish distinguishes polite and casual registers using all the same kinds of cues as English, but also distinguishes them with pronoun choice: the appropriate 2nd person pronoun for polite speech is *usted* while for casual speech, it is *tú* (Brown & Gilman, 1960; Butt & Benjamin, 2000). Pronouns have several features that make them good cues for identifying the forms of the different register styles. First, pronouns are highly frequent in the language. Even given the fact that Spanish allows null subjects, overt subjects (approximately a quarter of which are pronouns) are used in adult speech to children in about 30% of utterances and 2-year-old children produce overt subjects themselves in about 20% of their utterances (Grinstead,

2000; Paradis & Navarro, 2003). In addition, pronouns – whether overt or not – are integrated with various aspects of the grammar. For example, *tú* and *usted* differ in the form of their verb agreement. For the verb *comer* ('to eat'), the verb form for *tú* is *comes* while for *usted* it is the same verb form used with 3rd person singular subjects, *come* (Butt & Benjamin, 2000). The change in verb forms also means that in constructions involving reflexive clitics (including the one used in Experiment 1) the casual and formal/polite versions differ in the form of the clitic used (2nd person *te* for casual vs. 3rd person *se* for formal). There is therefore a lot of evidence for children to draw on to notice the differences between the registers. One additional feature of the Spanish system is that both the formal/polite and the casual register have a distinctive form associated with it. This symmetrical relationship contrasts with English, where the polite register has some linguistic features positively associated with it, but the casual register is largely characterized by what it lacks – no special lexical items, phonological articulation, or syntactic constructions.

With respect to the polite and casual registers, therefore, Spanish provides better cues than English does. A straightforward prediction is that children learning Spanish will have an advantage over children learning English in accessing these registers and using them to identify properties of the social situation. To the best of our knowledge, there have been no direct tests of Spanish-learning children's understanding (or production) of registers. By early in the pre-school years, Spanish-learning children appropriately produce the relevant pronouns and verb forms (Grinstead, 2000; Paradis & Navarro, 2003) and by the late pre-school years, Bilingual Spanish–English children have been found to linguistically differentiate between high and low status speakers. When asked to act out the voices of different puppets, these children, similar to monolingual English and French children, made higher status puppets like doctors use longer strings of discourse markers (*well, you know ...*) than lower status puppets like students (Andersen, Brizuela, DuPuy, & Gonnerman, 1999). By the end of the pre-school period, therefore, it is clear that Spanish-learning children have access to relevant forms and at least some relevant meanings involved with register, but it is unclear if they have made the particular mappings encoded through the pronoun and verb morphology systems. Nevertheless, based on the consistency and frequency of these cues, we predict that Spanish-learning children will show better understanding of these registers at a younger age than English-learning children.

## Experiment 1: Cross-linguistic cue comparison

In this study, pre-school aged children learning English and Spanish were tested on their ability to use different registers to identify the addressee of the conversation. Because Wagner et al. (2010) had found the most dramatic developmental differences between 3- and 5-year-old children, those two age groups were chosen for this study. Three registers were examined: Infant Directed Speech (IDS), Casual Speech, and Formal/Polite Speech. The critical test cases were with Casual and Formal Speech, as it is in these cases that Spanish contains additional form cues relative to English: Casual Speech uses the singular pronoun *tú* while Formal Speech uses the pronoun *usted* paired with 3rd person singular verbal agreement.

## Participants

The English-learning participants consisted of 36 pre-school aged children divided into a 3-year-old group ( $N = 18$ ,  $M$  age = 44.1 months, range: 36.7–47.8 months) and a 5-year-old group ( $N = 18$ ,  $M$  age = 61.3 months, range: 49.2–74.7 months). Approximately half ( $N = 17$ ) of the children were boys. By parental report, all children were monolingual native speakers of English with no history of language disorder. These participants were tested by a native English speaker at a local science museum in Columbus, OH.

The Spanish-learning participants consisted of 36 pre-school aged children divided into a 3-year-old group ( $N = 18$ ,  $M$  age = 44.0 months, range: 36.0–47.8 months) and a 5-year-old group ( $N = 18$ ,  $M$  age = 61.6 months, range: 49.9–74.8 months). Approximately half ( $N = 19$ ) of the children were boys. By parental report, all children were monolingual native speakers of Spanish with no history of language disorder. These participants were tested by a native Spanish speaker in their pre-schools or in their homes in Mexico City, Mexico.




Although no formal measures of cultural background or SES were taken, all participants in both countries were being raised in an urban environment and all were recruited from local environments predominantly populated by mid to high SES families. Moreover, to facilitate across-language comparisons (as well as comparisons with the participants in Experiment 2), the children were matched by age across the language groups; the largest discrepancy in age matching was 1 month. To achieve this matching, an additional 30 children were run but their data were not analyzed.

## Stimuli

Three registers were tested in each language: Infant Directed Speech (IDS), Casual Speech, and Formal/Polite Speech. A female adult speaker was recorded in each register asking an addressee for their name. Recordings were played on a laptop computer. For English, the speaker was a native speaker of a Midwestern dialect of American English; for Spanish, the speaker was a native speaker of the Mexico City dialect of Spanish. The IDS sentence contained the higher pitch and exaggerated pitch contours characteristic of such speech in both languages (Fernald, 1992); the speakers in both languages were shown pictures of infants when they produced this speech and were told to direct this speech as if it were towards a baby. The Formal/Polite Speech contained explicit politeness terms in both languages (English *excuse me*, Spanish *disculpe*), and the Casual Speech contained colloquial attention getters (English *hey*, Spanish *Oye*). In addition, Spanish included the grammatically appropriate pronouns and clitic and verbal agreement for each register –for IDS and Casual Speech, *tú* and the 2nd person singular clitic and verb agreement, and for Formal Speech *usted* and the 3rd person singular clitic and verb agreement.

The potential addressees were shown in pictures on laminated cards. The appropriate addressee for IDS was a baby; the appropriate addressee for Casual Speech was a young girl; and the appropriate addressee for Formal/Polite Speech was an adult woman who was consistently labeled as being a teacher. There were three token pictures for each kind of addressee – that is, three different babies, three different teachers, and three different

**Table 1.** Text of audio stimuli and sample visual stimuli used in Experiment 1.

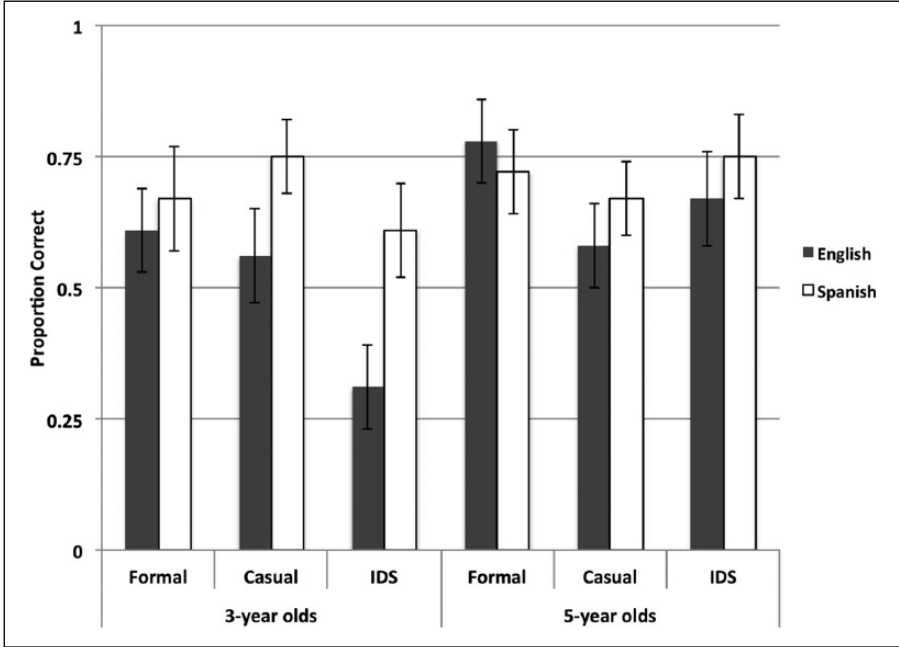
Target register	Linguistic stimuli	Target picture	Target picture choice (1 example of 3 used)
Infant Directed Speech	English: <i>Ohhhhhh, what's your name?</i> Spanish: <i>Oooooo, ¿cómo te llamas?</i>	Baby	
Casual Speech	English: <i>Hey, what's your name?</i> Spanish: <i>Oye, ¿cómo te llamas?</i>	Little girl	
Formal Speech	English: <i>Excuse me please, can you tell me what your name is?</i> Spanish: <i>Disculpe, ¿me podría decir cómo se llama usted?</i>	Teacher	

young girls. Table 1 shows the exact sentences used in each language for each register and one example correct matching picture for each register.

### Procedure

Participants were shown all nine of the addressee pictures and asked to identify them and classify them. All the participants succeeded at this task. During this process, participants were explicitly told that the pictures of adult women were pictures of teachers and that the pictures of young girls were pictures of children who were the same age as the child. Participants were then introduced to a small stuffed animal who was the nominal speaker of all the test sentences and told that she wanted to meet new people and would be finding out what people's names were. Children were also told that this speaker was female so that the voice attributed to the animal would be appropriate, and that the speaker was young to encourage them to treat the animal as a peer of the pictures of the young girls.

Children received six trials, two for each register type. On each trial, participants were shown two pictures – one of which matched that trial's target register, and one of which did not. Across trials, children heard each target register twice; in both cases, the correct matching picture was present, but each trial contained a different incorrect match. Thus, for the IDS register, one trial asked children to choose between a baby and a teacher while another trial asked them to choose between a baby and a little girl. To complete the full set of trials, one token picture of each type (one baby, one teacher, and one child) had to be used in two separate trials. Note, however, that the repeated picture was used half the time as the incorrect match and half the time as a correct match, so children gained no particular advantage (or disadvantage) from seeing a more familiar picture on a later trial. The sound file for the target register was played on the laptop, and children were



**Figure 1.** Mean proportion correct for each register in Spanish and English. Bars represent the standard errors of the means.

For Formal/Polite speech, 5-year-olds in both language groups performed above chance ( $p < .05$ ) but no groups of 3-year-olds were above chance. For Casual speech, both age groups of Spanish-learning children performed above chance but no English-learning children were above chance.

asked to point to the picture of who she (i.e., the speaker) was talking to. Sound files were repeated up to three times for the participant when environmental distractions made that necessary.

### Results

A repeated measures ANOVA was conducted on proportion of correct choices with the independent variables of Age group (3s vs. 5s), Language (English and Spanish), and Register (IDS, Casual, and Formal). A main effect was found for age group ( $F(1,68) = 4.8, p < .033, \eta^2 = .07$ ) with 5-year-olds scoring better than 3-year-olds. Another main effect was found for Language ( $F(1,68) = 4.7, p < .04, \eta^2 = .07$ ) with Spanish-learning children scoring better than English-learning children. There were no significant interactions involving language. There was no main effect for Register, but there was an interaction between Register and Age group ( $F(1, 67) = 3.5, p < .04, \eta^2 = .1$ ), largely because of the poor performance of the younger children with the IDS register. This interaction was not predicted and some possible explanations for why the IDS register was so difficult will be noted in the discussion section. No other interactions were significant. The results are presented graphically in Figure 1.



To further explore the effects of language and age, children's scores were compared not only to each other, but also to chance. This comparison allows us to determine whether children have achieved a basic level of competence with register: from an objective standpoint, can they pass this task with each register? As children were making a two-choice comparison on each trial, chance was set at .50. Across all trials, the 5-year-old groups in both languages were above chance (English 5s:  $M = .68$ ,  $t(17) = 3.6$ ,  $p < .002$ ; Spanish 5s:  $M = .71$ ,  $t(17) = 4.1$ ,  $p < .001$ ). Spanish-learning 3-year-olds were also above chance overall ( $M = .68$ ,  $t(17) = 3.0$ ,  $p < .007$ ) but English-learning 3-year-olds scored at chance levels ( $M = .49$ ). A possible concern about the 3-year-old English-learning scores is that they are being artificially lowered because of the particularly low performance with IDS. However, the mean score for English-learning 3-year-olds with just Casual and Formal speech was .58, which was also not different from chance. The chance comparisons, therefore, further confirmed the fact that Spanish-learning children can access register information more reliably at an earlier age.

The critical trials in this experiment were the Casual and Formal register trials, as these were the ones in which Spanish contained the additional pronoun cue that English did not. For the Formal/Polite register, inspection of the means showed that Spanish-learning 3-year-olds did score higher than English-learning 3-year-olds (.67 vs. .61) but neither group of 3-year-olds scored statistically above chance with this register. All 5-year-olds scored above chance with this Formal/Polite speech (English 5s:  $M = .78$ ,  $t(17) = 3.3$ ,  $p < .004$ ; Spanish 5s:  $M = .72$ ,  $t(17) = 2.7$ ,  $p < .016$ ). For the Casual register, both the 3-year-old and the 5-year-old Spanish-learning groups of children scored above chance (3s:  $M = .75$ ,  $t(17) = 3.4$ ,  $p < .003$ ; 5s:  $M = .67$ ,  $t(17) = 2.3$ ,  $p < .03$ ) but neither group of English-learning children scored statistically above chance with this register (3s:  $M = .56$ ; 5s:  $M = .58$ ). Differences were also found for IDS. The English-learning 3-year-olds, uniquely among the participant groups, scored at statistically below chance levels with this register ( $M = .31$ ,  $t(17) = 2.4$ ,  $p < .03$ ); Spanish 3-year-olds score at chance ( $M = .61$ ). English 5-year-olds showed a marginal trend towards above chance performance ( $M = .67$ ,  $t(17) = 1.83$ ,  $p < .083$ ); but only Spanish 5-year-olds scored statistically above chance levels ( $M = .75$ ,  $t(17) = 3.0$ ,  $p < .008$ ).

## Discussion

For the children learning English, these results largely replicated the findings of Wagner et al. (2010): 5-year-old children performed quite well overall, but 3-year-old children were unable to correctly match any register to the appropriate addressee. Moreover, the older English children here had a particularly difficult time with the Casual register, which in English is undistinguished by any special lexical, grammatical, or phonological properties. The Spanish-learning children out-performed their English counterparts in both age groups; most notably, the 3-year-old Spanish-learning children – unlike their English peers – performed at above chance levels. The Spanish-learning children showed a particular advantage with the Casual register, with both 3- and 5-year-old children scoring above chance. These results therefore supported the hypothesis that having a consistent linguistic cue would aid in register understanding.

Interestingly, the English-learning children scored worse than the Spanish-learning children with IDS, even though that register is expressed quite similarly across the languages. One possibility for this difference may lie in differences in the speakers' performance of IDS. There is no firm line between IDS and child directed speech, and it may be that our English speaker (but perhaps not our Spanish speaker) produced something that was actually equivalently appropriate for both infant and child addressees. If this were true, English-learning participants may have considered both the infant and young girl pictures as appropriate addressees for the IDS. An analysis of the error patterns across individual items, however, did not show the relevant pattern; in particular, English-learning children's failure with IDS was the same when the incorrect choice was the little girl as when it was the teacher. An alternative possibility is that the Spanish-learning children were more highly attuned to register differences across the board than their English-learning peers in this task. To the extent that explicit awareness of register helps children in this task, such a possibility seems plausible: Spanish-learning children could make a clear register judgment for all three types of sentences, allowing them the opportunity to clearly see that the point of the task was to link speech types to types of people.

## **Experiment 2: Influence of improved social cues**

The previous study showed that children who received a more consistent form cue to register were able to access it at a younger age. In Experiment 2, we ask if children will also benefit from an improved cue to the meaning of register. The meaning of register centers on social roles and social interactions in culturally specific ways. To give an idea of the broad range of roles that languages can index, consider Japanese. Japanese uses different registers for addressing older and younger siblings (Brown, 1996), and has different registers for addressing people in one's in-group, for people with higher status, and also for people at great social or psychological distance (Nakamura, 2001). Thus, the meanings conveyed through register are a cultural artifact and children must parse the social conventions of their culture in order to identify the right social roles that registers can signal.

In addition, even if children know in principle which social roles are relevant for a particular register, they must still be able to identify when a person satisfies a particular role. For example, a child might know that polite speech is to be addressed to adults who are socially important, but still be somewhat unsure about whether the postal carrier or grocery store clerk counts as important. Thus, accessing the meaning dimension of register depends on children's ability to spot relevant instances of that social category (see Armstrong, Gleitman, & Gleitman, 1983). Just as helping children identify the register form helped them succeed in Experiment 1, we now predict that helping children identify the relevant meanings will help them succeed in Experiment 2.

In this study, a new group of English-learning children were tested in a modified version of the task from the previous experiment. Three modifications were made, all geared towards highlighting the social positions of the conversational participants. First, to highlight the formal status of the adult addressee, the pictures of the teachers were replaced by pictures of women wearing lab coats who were described as doctors. In Andersen (1992), children were consistent about role-playing doctors as having status

over nurses and patients by 6 years of age, while they did not have such clear-cut notions about teachers until they were older. Doctors may therefore be an easier social category for children to link to speech register.

The remaining changes were made to highlight the properties of the speaker. One potential worry about Experiment 1 was that children may have been somewhat unclear about the social status of the speaker: the speaker spoke with the voice of an adult woman, but was portrayed as a small animal. To reinforce that the speaker was a peer of the participant, and further, a peer of the intended addressee of Casual Speech, a drawing of a young girl was provided as representing the speaker. This drawing was attached to every picture to emphasize that the relevant choice was about who this particular person was talking to.

The final, and most dramatic change, was that all the registers were re-recorded in a slightly expanded form by an 8-year-old girl. Thus, not only was the speaker illustrated in a more concrete form, but the sound files more closely reflected the age of the intended speaker.

If these changes successfully highlighted the relevant social relations being signaled in this task, and if such highlighting can help children notice and access register, then the English-learning children in this task should succeed earlier than the English-learning children of Experiment 1.

### *Participants*

The participants consisted of 36 pre-school aged children divided into a 3-year-old group ( $N = 18$ ,  $M$  age = 43.5 months, range: 36.9–47.0 months) and a 5-year-old group ( $N = 18$ ,  $M$  age = 61.4 months, range: 49.2–74.0 months). Approximately half ( $N = 15$ ) of the children were boys. By parental report, all children were monolingual native speakers of English with no history of language disorder. These participants were tested by a native English speaker at a local science museum in Columbus, Ohio. None of these children had participated in Experiment 1.

To facilitate comparisons with the previous experiment, the children were matched by age to the two groups of children run in Experiment 1; the largest discrepancy in age matching was 1 month. To achieve this matching, an additional 18 children were run but their data were not analyzed. Moreover, it should be noted that these participants were drawn from the same pool of potential participants and run in the exact same environment as the English-learning participants in Experiment 1.

### *Stimuli*


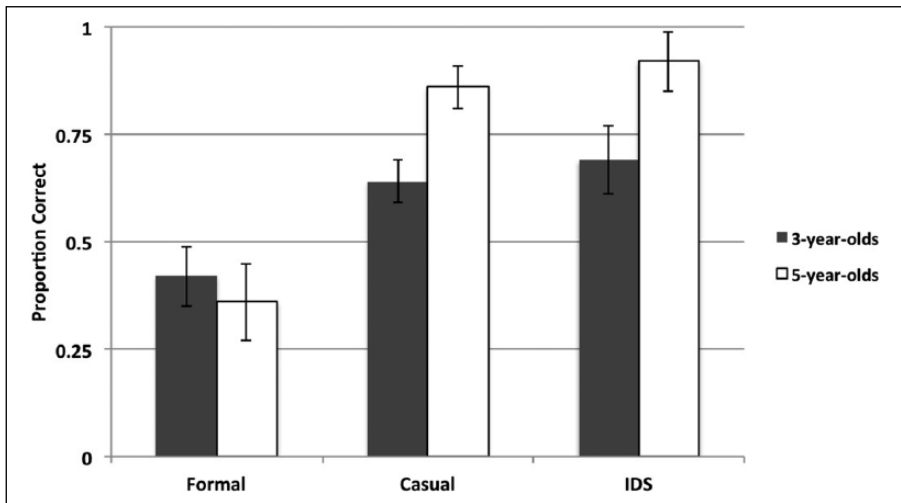
The same registers from Experiment 1 were tested again in this study: IDS, Casual Speech, and Formal/Polite speech. The speaker for these registers was a native English-speaking, 8-year-old girl. This speaker was an enthusiastic actress and was coached to insure that she produced speech in the three registers. Her script for each register was slightly expanded from the sentence used in Experiment 1; Table 2 shows the exact text of the speech.

The potential addressees were shown on laminated cards; each card also portrayed a drawing of a young girl who was labeled as the speaker. The pictures of the addressees used in this experiment were identical to those used in Experiment 1 with the exception of the Formal/Polite addressee, which was a picture of a woman wearing a lab coat and

**Table 2.** Text of audio stimuli used in Experiment 2 and sample visual stimuli showing the speaker and the doctor as Formal addressee. Note, all the target registers were produced by an 8-year-old girl.

Target register	Linguistic stimuli
Infant Directed Speech	<i>Awwwww, what's your name? Nice to meet ya! B'Bye!</i>
Casual Speech	<i>Hey! What's your name? Nice to meet ya! See ya later!</i>
Formal Speech	<i>Excuse me please, what is your name? It is very nice to meet you. Good bye.</i>

Sample choice showing the speaker and the doctor

**Figure 2.** Mean proportion correct for three registers for Experiment 2. Bars represent the standard errors of the means.

Both the 3- and 5-year-old groups of children performed significantly above chance ( $p < .05$ ) with IDS; only 5-year olds performed significantly above chance with Casual speech; neither group performed above chance with Formal/Polite speech.

was consistently labeled as a doctor. Table 2 shows a sample picture displaying a doctor and the drawing of the speaker.

**Procedure**

The procedures were the same for this study as in Experiment 1. The only exception was that the children were explicitly told that the speaker was a young girl about their age and that the drawing depicted the speaker.

## Results

The mean proportion of correct responses is displayed in Figure 2. A repeated measures ANOVA was conducted with proportion correct as the dependent variable and Age group (3s vs. 5s) and Register (IDS, Casual, Formal) as the independent variables. The results found a main effect of age ( $F(1,34) = 5.43, p < .026, \eta^2 = .48$ ), with older children performing better than younger children. In addition, there was an unexpected main effect of Register ( $F(2,33) = 15.03, p < .001, \eta^2 = .14$ ). There was no significant interaction between the factors. Post-hoc Tukey's comparisons found that the participants did significantly worse with the Formal/Polite register than they did with the other two registers. Thus, the use of a doctor over a teacher actually had a detrimental effect on children's performance. Comparing children's scores to chance (.5) confirmed the overall picture of the ANOVA. The 5-year-olds scored above chance on the IDS register ( $M = .86, t(17) = 5.3, p < .001$ ) and Casual register ( $M = .92, t(17) = 9.2, p < .001$ ) but not on the Formal register ( $M = .36$ ); the 3-year-olds scored above chance on the IDS register ( $M = .69, t(17) = 2.4, p < .03$ ) but not on the remaining two registers (Formal  $M = .42$ ; Casual  $M = .64$ ).

The critical comparison for these data, however, is with the results from Experiment 1: Did the English-learning children with strong social cues do better than English-learning children without them, and perhaps even as well as Spanish-learning children who had the benefit of stronger linguistic cues? A repeated measures ANOVA was conducted with proportion correct as the dependent variable and Age group (3s vs. 5s), Condition (English – Minimal cues [Exp 1] vs. Spanish – Strong Linguistic Cues [Exp 1] vs. English – Social Cues [Exp 2]) and Register (IDS, Casual Speech, Formal Speech) as the independent variables. The results found the expected main effect for Age group ( $F(1,102) = 9.2, p < .003, \eta^2 = .08$ ) with older children performing better than younger children. A marginally significant result was found for Condition ( $F(2,102) = 2.8, p < .067, \eta^2 = .05$ ). Post-hoc Tukey's comparisons found that the two conditions from Experiment 1 continued to be different from each other ( $p < .021$ ) but the children in Experiment 2 performed at an intermediate level and were not significantly different from either of the groups in Experiment 1.

However, these results were tempered by an interaction between Register and Condition ( $F(2,102) = 9.4, p < .001, \eta^2 = .16$ ), but no main effect of Register overall. The interaction stemmed from the fact that children in Experiment 2 did unexpectedly poorly with the Formal/Polite speech. It seemed clear that the Formal Speech in Experiment 2 was behaving idiosyncratically. Therefore, the previous repeated measures ANOVA was re-conducted with the Formal Speech removed from the data set. This analysis again found a main effect of Age group ( $F(1,102) = 9.6, p < .003, \eta^2 = .09$ ) favoring the older children, and also a main effect of Condition ( $F(2,102) = 9.5, p < .001, \eta^2 = .16$ ), but no effect of Register and no interactions. Post-hoc Tukey's analysis of the Condition effect found that the English-learning children in Experiment 1 performed significantly worse than both the Spanish-learning children of Experiment 1 and the English-learning children of Experiment 2. Moreover, the English-learning children in Experiment 2 performed just as well as the Spanish-learning children of Experiment 1. That is, the conditions with strong linguistic cues (Spanish) and strong social cues (English, Exp 2)

were statistically equivalent and better than the condition with no special cues at all (English, Exp 1).

## Discussion

Overall, the results here supported the hypothesis that highlighting the social dimension of the task would improve children's performance: the English-learning children with stronger social cues out-performed the English-learning children in Experiment 1 (who received no special social cues) and performed as well as the Spanish-learning children (whose language provides stronger linguistic cues). Of particular note is the fact that English 5-year-olds succeeded with the Casual speech where they had failed in the previous experiment.

However, all the types of social cues in this study were not equally effective. In particular, replacing teachers with doctors as the correct addressees for Formal Speech did not aid children's comprehension; quite the contrary, this change led to worse performance with the Formal Speech. It is unclear why the pictures of doctors led to such confusion. One possibility is that we are seeing early gender stereotyping in the children: all teachers and doctors were women, and previous work has found that pre-school aged children do expect doctors to be male (Durkin & Nugent, 1998). Alternatively, it is possible that children's confusion reflects changing practices in the medical profession, in particular changes directed at making doctors less intimidating to children. This possibility was suggested to us by a parent who thought Formal Speech might not in fact be the most common way pediatricians are addressed. By contrast, the changes that highlighted the properties of the speaker – adding the picture of the speaker and especially, using an age-appropriate voice for the speaker – did enhance children's performance.

## General discussion

Although even infants seem to understand that language can serve a social indexing function, previous research has found that it is not until late pre-school (around age 5–6 years) that children are able to readily access a variety of adult-like registers and use them to identify a speaker's addressee. The current studies aimed to improve children's performance by providing stronger cues about the linguistic form (Experiment 1) and about the social meanings involved (Experiment 2). The results found that both kinds of cues do help children, and that better cues in either domain improve children's ability to access register and use it to identify the right addressee.

The Spanish–English comparison examined in Experiment 1 showed that children can be influenced by the overall grammatical patterns within their language. Children learning Spanish hear a consistent pronoun difference associated with the different registers of Casual and Formal/Polite Speech that children learning English do not. This feature of the Spanish language highlighted form differences between registers and allowed children to succeed in this register comprehension task at a younger age than children learning English. This result can be seen as parallel to related findings showing that the time-course of language acquisition depends in part on the specific structures being learned. For example, children learning a language with a rigid word order, such

as English, are able to use word order as a cue to meaning somewhat earlier than children learning a language with more flexible word order, such as Turkish (Candan et al., 2012; see also Bates et al., 1984; Slobin & Bever, 1982). In that case, differences in language-specific consistency translated into differences in the rate of acquisition. In the current results, differences in language-specific marking translated into differential ability to access register information in a comprehension task.

We do not mean to suggest that children learning English lack some fundamental competence found in Spanish-learning children. Quite the contrary: the results from Experiment 2 showed that a greater emphasis on the social roles involved as well as slightly different linguistic forms could raise the performance level of English-learning 3-year-olds so that they were comparable to those of the Spanish-learning children. In their daily lives, it is likely that children acquiring both languages receive many more cues than the relatively stripped down sentences presented here, and those additional cues may be critical for the learning process. These studies, however, show how important strong cues are for accessing knowledge in the pre-school years. When a form cue is a standing part of everyday language (as the pronoun differences are in Spanish), children benefit from it even with very stripped down sentences; when cues are presented in a more ad hoc situation specific manner – whether the cue is a form cue, a cue to the social meaning, or both – children also benefit.

One aspect of the problem that these results do not speak to is the precise set of features that help children access register. As noted in the introduction, registers are composed of a diffuse set of features cross-cutting many levels of the language. Moreover, in addition to the principled features of a register (such as the use of modal verbs in formal speech or the distinctive prosody of IDS) there are correlated properties to these features that children could use. In the current studies, for example, the Formal register contained more words than the other registers and the IDS register had a longer duration. It is an interesting and open question precisely what children are noticing in the speech that allows them to identify a particular register. We strongly suspect that the cues we intended to manipulate – namely, grammatical encoding within a language (as is the case with Spanish pronouns), and information that highlights the speakers' social standing (as was done in Experiment 2) – are in fact important for helping children access register. These cues, however, are very unlikely to be the only ones that children notice or use, and future research efforts should investigate more precisely what the content of children's register representations are.

Overall, the current results are in line with the previous research with infants and toddlers supporting the idea that pre-school aged children understand the fundamentals of register, namely, that people modify the linguistic style of their speech to index their social situations. However, particularly for the younger children in this study, cues do make a difference for these children's ability to appropriately access and make use of their register knowledge. For children learning Spanish, the language itself provides salient cues to the forms of Casual and Formal/Polite registers which enabled them to succeed. For children learning English, additional cues about the social standing of the speaker served a similarly supportive function. Ultimately, however, all the Spanish-learning and English-learning children will grow up to become native speakers who are

facile with register information, and will be able to access their competence easily even in situations with relatively poor cues to work with.

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