Brown Bear, Brown Bear, what do you see? Speakers use more redundant color adjectives when speaking to children than adults

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Abstract

Speakers are often over-informative, referring to the color and shape of a referent even when all objects in a scene are unique. Interestingly, this helps listeners locate the target. If speakers are indeed sensitive to listeners' online processing demands, they should be more over-informative when addressing someone whose processing is especially slow. Here we show that English-speaking adults produce more redundant color adjectives when speaking to children than adults (Exp 1); that although Spanish-speakers produce fewer redundant color adjectives than English-speakers overall, they too do so more often for children (Exp 2); that these results are independent of experience with young children (Exp 3), and that children themselves (ages 4-10) are more over-informative when speaking to younger children than adults (Exps 4 and 5). Collectively, these results suggest that sensitivity to listeners' online processing demands is robust, emerges early in development, and may be especially tailored to young learners.

Keywords: Language; Communication; Pragmatics; Incremental Efficiency Hypothesis; Rational Speech Act; Development

Introduction

It might seem strange to begin a Cogsci Proceeding by explaining that what follows is a six page paper, on a topic relevant to cognitive science. Leading off in this way violates a fundamental principle of cooperative communication: People should provide only information necessary to the audience, not information that is already known or otherwise redundant (Grice, 1975).

However, this principle is often broken as providing apparently redundant information can be helpful. In referential contexts, being over-informative enables listeners to arrive more rapidly at the referent (Arts, Maes, Noordman, & Jansen, 2011; Brown-Schmidt & Konopka, 2011; Deutsch & Pechmann, 1982; Pechmann, 1989; Belke & Meyer, 2002; Engelhardt, Bailey, & Ferreira, 2006; Koolen, Goudbeek, & Krahmer, 2013; Nadig & Sedivy, 2002; Rubio-Fernandez, 2016, 2019; Sonneschein & Whitehurts, 1982). This phenomenon has perhaps been most extensively investigated in Visual World Paradigms (Cooper, 1974; Tanenhaus, Spivey-Knowlton, Eberhard, & Sedivy,1995) in which speakers are asked to help a listener locate a target in an array. If for instance, the array consists of different colored shapes, speakers tend to mention both the shape and color of the target (e.g., "Find the blue square") even when the shape uniquely identifies the referent.

Researchers have suggested that these redundancies reflect rational decisions about the tradeoffs between the cost and informativeness of communication (Degen, Hawkins, Graf, Kreiss, & Goodman, 2020), consistent with a Rational Speech Act framework. The Rational Speech Act framework formalizes the ways that speakers and listeners reason recursively about each other's beliefs and utilities to select the most informative thing to say in context (Frank & Goodman, 2012; Franke & Jäger, 2016; Goodman & Frank, 2016). This approach has been very influential, accounting for a wide range of communicative phenomena (see Degen, 2023 for discussion and review).

Recently, researchers have suggested that one of the factors that rational speakers take into account are the incremental, online processing demands on the listener (the Incremental Efficiency Hypothesis; Jara-Ettinger & Rubio-Fernandez, 2022; Rubio-Fernandez, Molica, & Jara-Ettinger, 2021). Some evidence for this comes from cross-linguistic studies. Although Spanish speakers are equally as likely as English speakers to produce redundant color adjectives given large arrays (e.g., with 16 shapes), they are much less likely to do so in arrays with fewer shapes.

Why? Color adjectives precede nouns in English but follow them in Spanish. A Spanish speaker who is sensitive to the online processing demands of the listener might assume that, given just a few shapes in an array, the listener will already have located the target before the color adjective is processed (Jara-Ettinger & Rubio-Fernandez, 2022; Rubio-Fernandez, 2016; 2019; Rubio-Fernandez, et al., 2021). Further evidence for a sensitivity to listener's online processing demands comes from work showing that English speakers are no more likely than Spanish speakers to produce redundant number determiners. Critically, number determiners are prenominal descriptors in both languages (Wu & Gibson, 2021).

If speakers produce utterances that are closely attuned to listeners' incremental, online information processing, then they might be sensitive not only to effects of language (prenominal vs. postnominal) and context (the size of the array or the uniqueness of the referent) but also to developmental differences in listeners' processing speed. Children, like adults, process speech incrementally (Fernald, Swingley, & Pinto, 2001; Swingley, Pinto, & Fernald, 1999) but children are slower than adults at a wide range of tasks (Hale, 1990; Kail, 1986). Of most relevance here, both the speed of children's language processing (Fernald, Pinto,

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Swingley, Weinberg, & McRoberts, 1998; Fernald, Perfors, & Marchman, 2006) and the efficiency of children's visual search (Donelly, et al., 2007; Mackworth & Bruner, 1970) improve over development. To what degree are adults aware of this, and to what extent do they adjust their communication accordingly?

Many studies have looked at children's evaluation and production of over-informative utterances (Bass et al., 2022; Davies & Katsos, 2010; Davies & Kreysa, 2018; Gweon, Shafto, & Schulz, 2018; Katsos & Bishop, 2011; Morriseau, Davies, & Matthews, 2013; Perner & Leekham, 1986). To our knowledge, however, although some work suggests that adults tailor their communication to highlight salient features when speaking to children (Bergey et al., 2020; Tal et al., 2023), to our knowledge, no studies have equated task demands and looked at whether adults systematically produce more redundant information when they believe they are speaking to a child than an adult.

Of course, adults speak differently to young children than adults in many ways (Ferguson, 1964). Child-directed speech emerges robustly across languages and cultures (Hilton et al., 2022) and has characteristic acoustic (higher pitch, elongated vowels, purer tones, etc.), and structural features (word repetition, grammatical simplicity, consistency of associations between onset cues, object labels and sentence position, etc.) that facilitate language acquisition (Golinkoff, Can, Soderstrom, & Hirsh-Pasek, 2015; Hayes & Ahrens, 1988; Hills, Maouene, Riordian, & Smith, 2010; Hilton et al., 2022 Ma, Golinkoff, Houston, & Hirsh-Pasek, 2011; Newport, Gleitman & Gleitman, 1977; Snow, 1972; Yurovsky, Chu, & Smith, 2012). However, child-directed speech is rarely ever observed *except* in communication with children (Dominey & Dodane, 2004; Parousek & Papousek, 1987). That is not the case with over-informative utterances, which are common in adult communication. Here we test whether it is even more common when adults talk to children.

If adults are sensitive to incremental processing constraints on the listener in general, then even controlling for prosody, task context, and grammar, speakers might be more likely to be over-informative when they are speaking to a child than an adult. We test this hypothesis with a visual search task in Experiment 1. And although children's incremental language processing is slow, to the degree that their visual search is slower still, color adjectives might facilitate visual search even in postnominal languages. If adults intuitively compensate for children's processing delays, the tendency to produce more redundant color adjectives might emerge in Spanish as well as English. We test this prediction in Experiment 2. In Experiment 3, we compare parents and non-parents to look at whether experience with children affects adults' tendency to produce redundant adjectives for young children. Finally, in Experiments 4 and 5, we look at whether children themselves are more likely to be over-informative when speaking to young children than adults.

Experiment 1

We adapt the visual search paradigm used in previous research (Rubio-Fernandez, 2016, 2019; Rubio-Fernandez et al., 2020) to look at whether adults are more likely to produce redundant adjectives when they believe they are speaking to young children than adults. We used a three-year-old as the target child audience. We wanted the child's youth to be salient to see if adults might use it as a cue to adjust their communication and we thought that three was the youngest age at which adults would believe children capable of identifying shapes and colors. Although adults thought they were communicating with either young children or adults, there was no real audience; stock images (from istockphoto.com) were used throughout. (See Figure 1 below.)

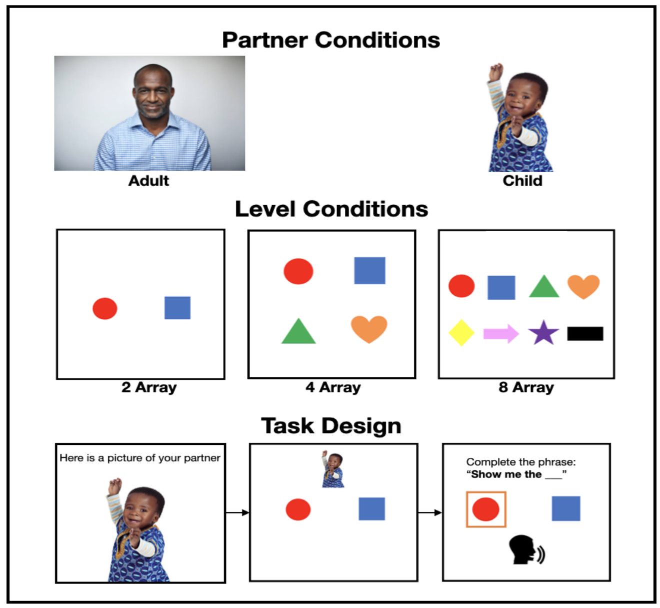

Figure 1: Example stimuli used in Experiments 1-3. The arrays were identical in Experiment 4 and 5 but the image of the child partner portrayed a slightly younger female child, and the target shape was identified by moving back and forth rather than an outline.

Method

Participants

Adults (N = 240) were recruited on the online research platform Prolific.com (132 females, 108 males; mean age = 36.0, SE = 0.87). Inclusion required adults to be native, fluent English speakers and pass the inclusion trial below.

Procedure

This and all subsequent experiments were pre-registered on the Open Science Framework (OSF): https://osf.io/7fysr. Each participant was randomly assigned to one of two conditions: child partner or adult partner. Within each condition, participants were randomly assigned to a 2-shape array, 4-shape array or 8-shape array in one of three pseudorandom display orders such that there were 40 participants per array type.

At the start of the experiment, each participant was presented with an image of a child or adult partner. Both were matched on gender and race (a Black boy and man) such that age was the only factor differentiating them. Participants were given the following instructions: "In this task your goal is to help your partner identify an object in the array as fast as possible. Your partner will see the same items displayed but presented in different positions than in the array that you see. You will be generating instructions by repeating the words "Show me the ___" and completing the sentence out loud. Your instructions will be recorded and presented to your partner at the end for them to complete the task."

Participants were shown an example trial and an inclusion trial. The trials began with a screen in which participants saw the array and an image of their partner. Participants then clicked to the next screen. The image of their partner disappeared, the target was identified with an orange border, and participants were prompted to record their response. The example trial involved an array of three shapes – a purple star, a red circle and a green triangle; the inclusion trial involved an array of three utensils: a knife, a fork and a spoon. The spoon was the target and participants who did not record the phrase "show me the spoon" were excluded from further analysis. Then the test displays began.

Every participant received ten trials. All critical display arrays used fixed color-shape pairings: green triangle, red circle, purple star, black rectangle, yellow diamond, blue square, pink arrow, and orange heart. Across the ten trials these shapes were presented such that each shape was the target shape at least once. See Figure 1.

After finishing the test trials, participants were presented with two attention-check questions. 1) Did your partner see the same shapes you saw? and 2) Did they see them in the same order? Participants who did not answer 'yes' for question 1 and 'no' for question 2 were excluded from further analysis. Data were analyzed, blind to condition, from transcripts of the audio recordings. (Pilot data on 20 participants found that Phonic.ai, an integrated audio recording/transcribing service for Qualtrics, was 100% accurate at transcribing and this was used throughout.) Phrases that included a color adjective were coded as a '1' while phrases without a color adjective were coded as a '0'. Responses which did not follow the format of "show me the ___" were excluded from analysis.

Results and discussion

We ran a generalized mixed effects model using the glmer function in R. The binary outcome variable was the presence/absence of a color adjective (1=color adjective, 0 = bare noun) with level (display density) and condition (partner type) as predictors:

Color Adj. ~ level_condition + partner_condition + (1| Item).

As predicted, adults were more likely to use color adjectives when they believed they were speaking to a child than an adult ($\beta = 0.269$, $p < 0.005$). In contrast to previous work (Rubio-Fernandez, 2019) we found no effect of array density. 2 array vs. 4 array: $\beta = -0.028$, $p = 0.791$; 2 array vs. 8 array: $\beta = 0.127$, $p = 0.238$; 4 array vs. 8 array: $\beta = -0.155$, $p = 0.318$). See Figure 1, grey bars. This may be because the earlier task was conducted in person and in a university lab; the clutter and appearance of the arrays might have differed across studies, especially given the variable screens used by online participants. Importantly however, the critical prediction was confirmed: Adults are more likely to produce redundant color adjectives when speaking to adults than children.

Experiment 2

In Experiment 2, we ask whether, replicating previous research (Rubio-Fernandez, 2016; 2019), Spanish-speaking adults are less likely to use redundant color adjectives than English-speaking adults but are nonetheless more likely to be over-informative when speaking to children than adults.

Method

Participants

Adults (N = 240) were recruited on the online research platform Prolific.com (106 females, 134 males; mean age = 29.54, SE = 0.60). Inclusion required adults to be native, fluent Spanish speakers and pass the inclusion trial below.

Procedure

The Procedure was identical to the Procedure in Experiment 1 except that all materials were translated into Spanish by a native Spanish speaker and the purple star was changed to a purple octagon so that all shapes were masculine nouns and count not be distinguished by the article preceding them.

Results and discussion

We ran the same mixed effects model used in Experiment 1 and observed the same pattern. Spanish-speaking adults also produced more redundant adjectives when speaking to children than adults ($\beta = 0.353$, $p < 0.001$). Strikingly, this emerged even when there were just two shapes on the screen; there was no effect of array (2 array vs. 4 array: $\beta = -0.189$, $p = 0.064$; 2 array vs. 8 array: $\beta = -0.012$, $p = 0.910$; 4 array vs. 8 array: $\beta = -0.200$, $p = 0.121$). See Figure 1, red bars. Per a pre-registered exploratory analysis (conditioned on showing an effect of audience age in Experiment 2), we then compared the English-speaking adults in Experiment 1 with the Spanish-speaking adults in Experiment 2. English speakers produced more redundant color adjectives than Spanish speakers in both the child condition ($t = 2.19$, $p < 0.05$) and the adult condition ($t = 3.31$, $p < 0.001$). These results provide further support for the Incremental Efficiency Hypothesis. Speakers of prenominal languages produce more redundant color adjectives than speakers of postnominal languages, but all speakers take listener's online processing into account and provide more redundant information to children than to adults.

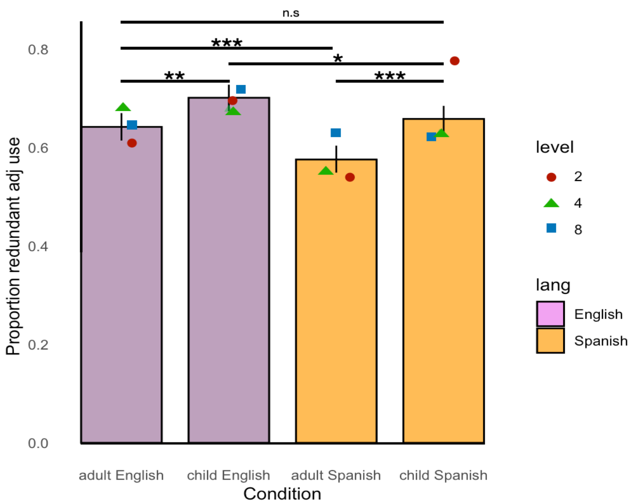

Figure 2: Proportion of redundant color use for English speakers (grey) and Spanish speakers (red). Shapes represent mean adjective use per level. Black lines indicate confidence intervals.

Experiment 3

Do all adults provide more redundant information to children than their peers or does it depend on the speaker's experience and familiarity with young children? The few previous studies that have directly compared parents and non-parents' interactions have found considerable overlap in how parents and non-parents relate to children although some responses differ, including attention to infant faces (Thompson-Booth, et al., 2013, 2014), responses to priming secure attachment (Jones et al., 2021), and reporting (though not rating) of infants' mental states (Shinohara & Moriguchi, 2017). To our surprise however, we could find no studies directly comparing parents and non-parents speech to children. Here we look at whether parenting affects adults' tendency to provide redundant information to young children.

Method

Participants

We recruited 240 English-speaking adults, 120 parents (69 females, 51 males; mean age = 32.28, SE = 0.60) and 120 non-parents (55 females; mean age = 34.25, SE = 1.13) on Prolific.com. Because we thought any effect of parenting on adult speech would be strongest for adults currently parenting a verbal but very young child, we restricted the parent group to those with children born in 2018-2021: children who would have been between the age of two and six at the time of the study. Non-parents had to indicate that they had never raised children. The inclusion criteria were otherwise as in Experiment 1.

Procedure

The Procedure was identical to Experiment 1 except that all participants were presented with the child as their partner. Therefore, in this study the two conditions were either being a parent or non-parent rather than the child and adult conditions of the previous studies.

Results and discussion

We ran the same mixed effects model used in Experiment 1 and observed no effect of array (2 array vs. 4 array: $\beta = -0.069$, $p = 0.500$; 2 array vs. 8 array: $\beta = 0.144$, $p = 0.171$; 4 array vs. 8 array: $\beta = -0.214$, $p = 0.103$) and no effect of parenting ($\beta = -0.091$, $p = 0.286$). We cannot rule out the possibility that some of the non-parent adults had extensive experience with young children in other contexts (i.e., through other kinship relations or professionally), however, it is unlikely that this was true of most of the childless adults. Rather, these results suggest that adults in general are sensitive to the difference between the rate of information processing in children and adults.

Experiment 4

Adults selectively provide redundant color adjectives to young children in referential search tasks; what about children themselves? Children are active informants, from the earliest stages of development. Even two-year-olds selectively communicate information unknown to their audience (O'Neill, 1996), selectively correct others' false beliefs (Knudsen & Liszkowski, 2012), and communicate verbally when pointing is ambiguous (O'Neill & Topolovec, 2001). By preschool, children are more informative when their conversational partner lacks epistemic access to a scene (Matthews, Lieven, Theakston & Tomasello, 2006) and can decide what information to share or withhold to effectively teach and deceive others (Rhodes, Bonawitz, Shafto, Chen, & Caglar, 2010). Children also tailor the information they provide to others' goals and competence (Gweon & Schulz, 2019), consider others' expected costs and rewards in deciding what to teach (Bridgers, Jara-Ettinger, & Gweon, 2020), and strategically inform others to manage their own reputation (Asaba & Gweon 2022). And cross-culturally, older children (and especially siblings) teach and inform younger ones (Azmita & Hesser, 1993; Maynard, 2003).

Nonetheless, children's ability to inform others improves with age and experience (Carmiol & Vinden, 2013; Davis-Unger & Carlson, 2008; Matthews, Lieven, & Tomasello, 2007; Maynard, 2003; Strauss, Ziv, & Stein, 2002). In particular, the ability to understand how evidence can be open to different interpretations, to reason recursively about other minds, and to understand non-literal and contrastive pragmatic inferences continues to develop through middle childhood (Glenwright & Pexman, 2010; Kronmüller, Morriseau, & Noveck, 2014; Lalonde & Chandler, 2002; Lagattuta, Sayfan, & Blattman, 2010; Lecce, Ronchi, Sette, Bischetti, & Bambini, 2019; Osterhaus & Koerber, 2021; Osterhaus, Koreber, & Sodian, 2016). Here we look at four to seven-year-olds' ability to adjust to younger children's slower information processing by providing more redundant adjectives when they believe they are speaking to a three-year-old than an adult.

Method

Participants

We recruited 160 native English-speaking children on the Children Helping Science platform: 40 four year olds (21 girls, 19 boys; mean age = 4.47yrs, SE = 0.05), 40 five year olds (22 girls, 18 boys; mean age = 5.47yrs, SE = 0.05), 40 six year olds (18 girls, 22 boys; mean age = 6.44yrs, SE = 0.04), and 40 seven year olds (25 girls, 15 boys; mean age = 7.56yrs, SE = 0.04). Half of each age bin was randomly assigned to each condition so that there were 20 children /condition.

Procedure

Since there was no effect of array size in previous studies, we did not vary arrays in this study; every child saw an 8 shape display. The image of the child was changed from previous studies to a to a two-year-old girl {Ellie} rather than a three-year-old to ensure the child appeared younger than even the youngest participants. The same adult image {Mr. Smith} used in previous studies was used here. The experiment was self-running (i.e., no experimenter was present) and was administered online in families' homes.

The experiment began with an introduction "We are going to be helping our friend today. {Ellie/Mr.Smith} is playing a game where s/he needs to find a special object. You can see the same objects s/he sees. But her/his objects can be in any order. They could look like this, or this, or like this." A different alignment of the same objects was displayed each time. "So you can't just point to the object, you have to tell her/him out loud! The special object {Ellie/Mr.Smith} needs to find is right here. You can see the object wiggle, but {Ellie/Mr.Smith} can't! Your job is to get {Ellie/Mr.Smith} to find the special object as fast as possible. {Ellie is only 2/Mr. Smith is very busy}, so s/he will need to be reminded what s/he is looking for by saying the phrase: show me the ___." Participants were then shown two sample arrays with black and white images of an apple, a banana and a strawberry. In the first array the apple was indicated as the target object and participants were told explicitly to say, "Show me the apple". In the second array the banana was indicated as the target object and participants were told explicitly to say, "Show me the banana". They then were told: "Remember, you have to say: 'show me the' every time so {Ellie/Mr.Smith} knows you are talking to her/him.

The same inclusion task from Experiment 1 was used. Unlike in Experiment 1, target shapes for participants were identified by moving back and forth on screen. All video recordings were collected through the Children Helping Science platform and coded by individuals blind to the condition and hypothesis of the experiment.

Results and discussion

We ran a similar mixed effects model using the glmer function in R. Here the binary outcome variable was the presence/absence of a color adjective with condition (partner type) and age (in years, continuous and centered) as main effect predictors as well as interaction between condition and age:

*Color Adj. ~ partner_condition * age_centered + (1| Item).*

Four to seven-year-olds showed a marginal effect of condition ($\beta = 0.003$, $p = 0.055$) and no effect of age ($\beta = 0.095$, $p = 0.7882$) nor interaction ($\beta = 0.044$, $p = 0.882$). These results suggest that even the youngest children tend to be more informative when they believe they are speaking to a two-year-old than an adult. This is however, not because children were over-informative in general; rather, as clear in Figure 2(A), children rarely produce redundant adjectives in either condition.

Experiment 5

As noted, the development of children's understanding of pragmatics and ambiguity develops well through middle childhood (Glenwright & Pexman, 2010; Kronmüller, Morriseau, & Noveck, 2014; Lalonde & Chandler, 2002; Lagatutta, et al., 2010; Lecce, et al., 2019; Osterhaus & Koerber, 2021; Osterhaus, et al., 2016). However, it is likely that children's understanding of other children as less capable than themselves depends on the age differences between themselves as younger children. Here we replicate Experiment 4 but look at older children, ages 8-10, to see if they are more likely to modify their communication depending on whether they believe they are speaking to a much younger child (age two) or an adult.

Method

Participants

We recruited 120 native English-speaking children: 40 eight year olds (17 girls, mean age = 8.55, SE = 0.04), 40 nine year olds (16 girls, mean age = 9.44, SE = 0.04), 40 ten year olds (18 girls, mean age = 10.54, SE = 0.04), in age bins, with half of each age group randomly assigned to each condition such that there were 20 children /condition.

Procedure

The Procedure was identical to the Procedure in Experiment 4.

Results and discussion

We ran the same mixed effects model from experiment 4 with children aged 8-10 years old. For these older children we find a significant effect of partner condition ($\beta = 0.009$, $p < 0.001$), a significant effect of age ($\beta = 0.003$, $p < 0.001$) and a significant interaction ($\beta = 0.004$, $p < 0.001$) suggesting that older children are sensitive to the age of their partner and that this effect is modulated by age. Interestingly, we find that 8-10 year olds are not just more informative toward children ($\beta = 0.340$, $p < 0.001$), but also toward adults ($\beta = 0.137$, $p < 0.001$), compared to 4-7 year olds. In a post-hoc exploratory analysis, we looked at children in both Experiments 4 and 5. We compared mixed effect models with and without age as a factor and found a significant effect of age ($\chi^2 = 121.95$, Df = 1, $p < 0.001$); see Figure 2(B).

Note that in Experiments 4 and 5 we referred to the adult as a "busy adult", so it is conceivable that rather than adding redundant information for the younger children, participants selectively eliminated the adjectives for the "busy" adults. Although possible, this account would require positing one explanation for the children's results (eliminating redundant information) and a different explanation for comparable results in adults (adding redundant information). Future research could see if the results replicate without the adjective "busy".

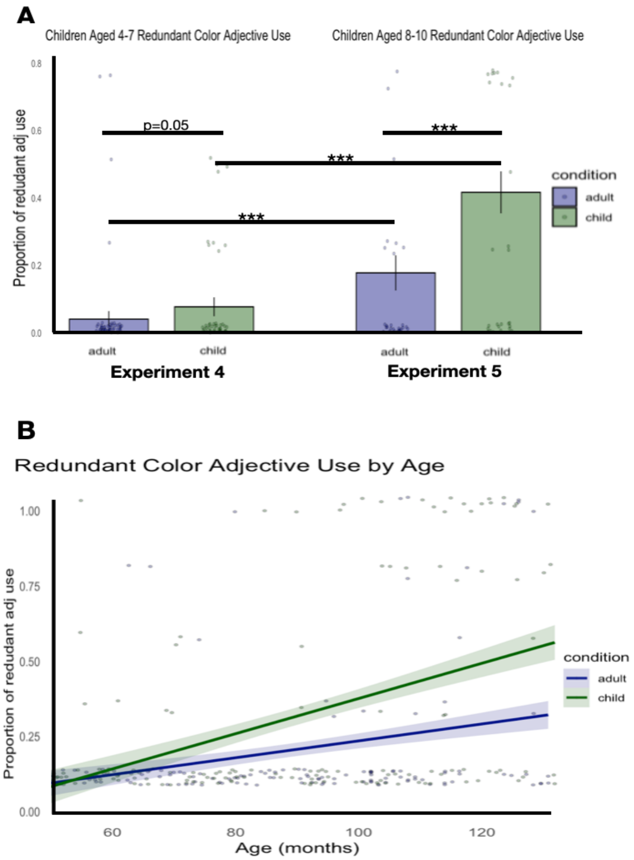

Figure 3: **A)** Proportion of redundant color adjective use for children in Experiment 4 (4-7 years) and Experiment 5 (8-10 years). Dots represent mean adjective use per child. **B)** Collapsing across both experiments, there was a significant effect of age on children's tendency to produce redundant adjectives when speaking to children vs. adults.

Conclusion

Across five experiments, we found that English-speaking adults use more redundant color adjectives when speaking to children than adults. This effect was also obtained among Spanish speakers, even though Spanish speakers were less likely to use redundant color adjectives than English speakers overall (replicating previous work on differences in redundant color adjective use in speakers of prenominal and postnominal languages). We found no evidence that this effect was due to experience talking to young children. Parents and non-parents were equally likely to be over-informative when talking to children and young children themselves produced more redundant color adjectives for children than adults.

Collectively, these results are consistent with Incremental Efficiency Hypothesis (Jara-Ettinger & Rubio-Fernandez, 2022; Rubio-Fernandez, et al., 2021). Adults appear to be intuitively sensitive to children's relatively slow online processing and spontaneously compensate by building more redundancy into their communication.

Of course, there are other reasons besides sensitivity to incremental processing that might cause speakers to produce more redundant color adjectives when communicating with children than adults. Speakers might believe for instance that children are more distractible than adults; they may provide more redundant cues to compensate for the possibility that children are more likely to have missed a key piece of information. Alternatively, speakers might recognize that shapes and colors are relatively novel concepts for young children. In these arrays, either color or shape by itself was sufficient to identify the target. Speakers may have provided redundant information on the grounds that if the child did not know the referent of one concept, they could rely on the other.

Although these accounts are possible and worthy of future investigation, it is noteworthy that English speakers speaking to adults were as likely to use redundant adjectives as Spanish speakers speaking to children. Clearly, no speaker of either language believes that English speaking adults are as distractible (let alone unfamiliar with shapes and colors) as Spanish speaking children. Nor is it likely that speakers believe that English speaking adults and Spanish speaking children engage in visual search at comparable rates. Rather, we suggest that speakers of both languages recognize that as soon as verbal cues to the referent are processed, they are useful to the listener. Cues about color information will reach Spanish speakers later than English speakers, and children later than adults, but insofar as speakers assume that children's visual search is slower still, redundant cues will be helpful.

This study also raises many questions for future investigation. We showed that adults are more over informative when they believe they are speaking to a young child but how do adults titrate their informativity as children grow up? Do speakers gradually wean children from additive information or are there more abrupt transitions? And given that adults with minimal experience and children themselves provide compensatory information to young children, how do people learn to adjust their communication appropriately? Finally, although we know redundant cues facilitate visual search in adults, we do not know to what extent young children benefit. Here we find robust evidence that speakers are over-informative when speaking to children. Over-informativeness may serve to facilitate teaching about the world for young children. If it turns out that the benefits to children are substantial, it would be intriguing to speculate that much of human sensitivity to incremental online processing might be driven by the support it provides to the very young.

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