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# Navigating accent variability: 24-month-olds recognize known words spoken in an unfamiliar accent but require additional support to learn new words

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ABSTRACT

As infants learn their native languages, they must also learn to contend with variability across speakers of those languages. Here, we examine 24-month-olds' ability to process speech in an unfamiliar accent. We demonstrate that 24-month-olds successfully identify the referents of known words in unfamiliar-accented speech but cannot use known words alone to infer new word meanings. However, when the novel word occurs in a supportive referential context, with the target referent visually available, 24-month-olds successfully learn new word-referent mappings. Thus, 24-month-olds recognize and learn words in unfamiliar accents, but unfamiliar-accented speech may pose challenges for more sophisticated language processing strategies.

## 1. Introduction

By their second birthdays, infants efficiently process speech in their native language and are accomplished word learners. As infants hone in on the phonological categories that underlie their native language (Werker & Tees, 1984), they also become increasingly adept at comprehending speech across a variety of speakers and contexts (for a review, see Johnson et al., 2022). This is an important skill for infants in navigating diverse linguistic environments both inside and outside the home. For instance, as global immigration has grown in the past half century (Mcauliffe & Triandafyllidou, 2021), infants' environments are increasingly likely to contain speech in a variety of accents.

By 19 months, infants can recognize known words spoken in an unfamiliar accent (Best et al., 2009; Mulak et al., 2013; van Heugten & Johnson, 2014). Nevertheless, understanding unfamiliar-accented speech often incurs a processing cost, one that persists beyond infancy. For adults and children alike, processing unfamiliar-accented speech remains taxing, yielding weaker comprehension (Bent, 2014; Cristia et al., 2012) and requiring more effort (Brown et al., 2020). This processing cost varies as a function of the paradigms employed (cf., Creel & Quam, 2015), the clarity of the speech signal (Bent & Atagi, 2015; Bent & Holt, 2018), the differences in phonemic boundaries between the unfamiliar and familiar accent (Newman et al., 2018), and the amount of visual and sentential support available (Bent et al., 2019; Creel et al., 2016; Holt & Bent, 2017). For instance, children's comprehension of an unfamiliar-accented word benefits if that word is presented within a sentence, rather than alone (van Heugten & Johnson, 2016), if the

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sentence is highly-predictable (Creel et al., 2016; Holt & Bent, 2017), and if the word's referent is visible (Creel et al., 2016).

The developmental evidence on comprehension in unfamiliar-accented speech comes primarily from infants' performance with words they already understand. Considerably less is known about their ability to learn new words from speakers with unfamiliar accents. The evidence available thus far suggests this ability is fragile: if 24-month-olds form a new word-referent mapping in an unfamiliar accent, they successfully recognize that word when it is subsequently produced in their native accent, yet if they learn a new word-referent mapping in their own, native accent, they fail to recognize the word when it is subsequently produced in an unfamiliar accent (Schmale et al., 2011). In addition, accent exposure affects infants' performance: when 24-month-olds were first exposed to an unfamiliar accent, they successfully generalized a newly learned word from their native accent to the unfamiliar accent (Schmale et al., 2012). By 30 months, infants also successfully generalize new words in both directions even without exposure. Apparently, the processing costs of unfamiliar-accented speech are steeper when it comes to learning new words than recognizing known ones.

What is less clear is how infants fare when they hear either novel or known words in the context of more naturalistic, extended conversational input from speakers with an unfamiliar accent. This kind of input, which likely occurs often in their everyday interactions with unfamiliar-accented speakers, offers a valuable resource: the sentential context in which the word is embedded. When listening to native-accented speech, infants as young as 19 months successfully use sentential context to support their word comprehension, recruiting known words to identify the referents of novel words (Ferguson et al., 2014, 2018; Goodman et al., 1998). For instance, when 19-month-olds heard a novel noun paired with familiar, animacy-selecting verbs (e.g., "The vep is *crying*") with no referents visible, they subsequently inferred that "vep" referred to an animate, rather than inanimate, object (Ferguson et al., 2014). Furthermore, by 24 months, this semantic inference becomes more robust and occurs more quickly (Ferguson et al., 2018). Thus, by 24 months, infants have made advances in two valuable skills: recognizing known words in unfamiliar-accented speech and using known words to infer the referents of new ones in their native accent.

However, there is an important gap in the literature on unfamiliar-accented speech: evidence of infants' abilities to recognize familiar words and to learn new words comes from different experimental tasks. Moreover, there is little evidence examining how infants begin to leverage their successful comprehension of known words to support their acquisition of new ones in unfamiliar-accented speech. The goal of the current experiments is to begin to fill this gap by assessing, within the same task, 24-month-olds' word recognition and ability to form new word-referent mappings in unfamiliar-accented speech. Building on the Ferguson et al.

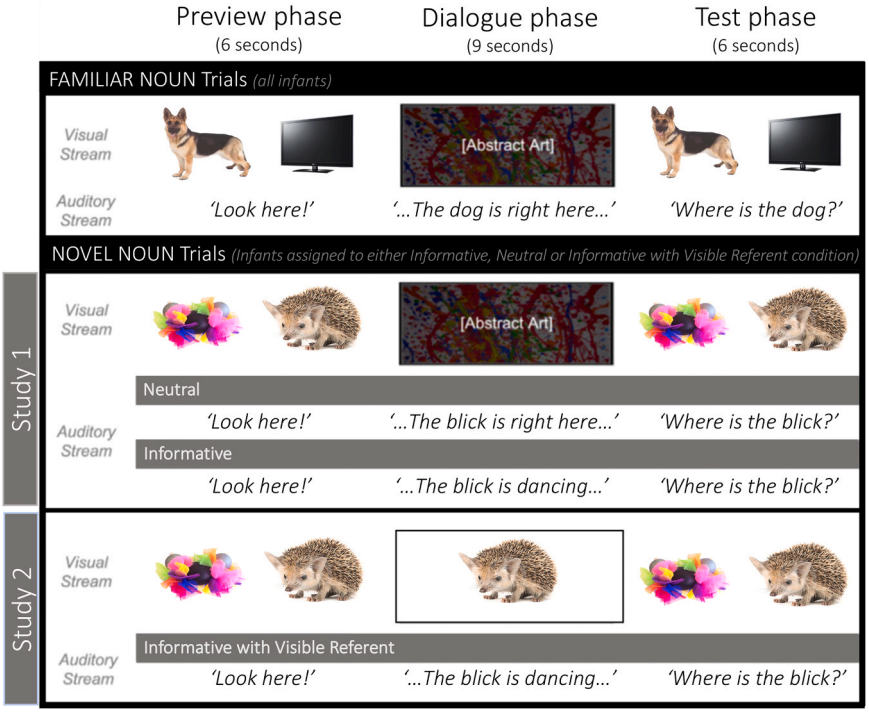


**Fig. 1.** All trials included a Preview phase (displaying two objects), Dialogue phase (naming one of the two previously seen objects), and Test phase (displaying the two Preview objects while prompting infants to look for the object named during the Dialogue). In Study 1, infants first completed six trials with Familiar nouns, featuring known objects and words presented in neutral dialogues. Next, infants completed six trials with Novel nouns. These novel nouns were presented in either Neutral dialogues featuring non-selective predicates ("so close," "nearby," "right here," "so wet," "so little", "very clean") or Informative dialogues featuring animacy-selective predicates (e.g., "crying", "dancing"). In Study 2, infants participated in an Informative with Visible Referent condition in which they heard the informative dialogue but with the target referent visible during the entire dialogue. Thus, infants in this Visible Referent condition heard the same dialogue as in Study 1's Informative condition but with the target referent present.
Experimental design: A representative trial (Ferguson et al., 2014; 2018; adapted with permission from Elsevier)

(2018) paradigm, Study 1 assesses whether, when listening to unfamiliar-accented speech, 24-month-olds successfully recognize known nouns and use known verbs to infer the referents of novel nouns. Study 2 then tests whether providing 24-month-olds with a more informative referential context facilitates the establishment of novel word-referent mappings in an unfamiliar accent.

## 2. Study 1

### 2.1. Study 1 methods

In Study 1, 48 24-month-olds (*M*=23.88, *SD*=0.70, range 23–25 months; 35 White, 8 Multiracial, 2 Asian, 2 Latinx/Hispanic, 1 Black; 22 female, 26 male) were recruited from predominantly college-educated families in a Midwestern metropolitan area. All infants were monolingual, with less than 25 % exposure to non-English languages. Caregiver reports indicated infants produced 58.56 words (*SD*=24.74) on the MCDI: Level II Form A (Fenson et al., 1994). The sample size provided approximately 75 % power for the aggregate analysis, assuming alpha= .05 and an effect size of *d*= .78, as in Ferguson et al. (2014). An additional 30 infants were excluded from analysis because they failed to contribute at least three familiar and novel word trials ($n = 21$) or encountered technical difficulties ($n = 9$).

All study procedures were implemented in accordance with the Declaration of Helsinki. After caregivers provided informed consent, infants were seated on their caregiver's lap, approximately 60 cm in front of a Tobii T60XL corneal-reflection eye-tracker. The eye-tracker presented all stimuli and recorded infants' eye movements. After infants completed a 5-point eye-tracker calibration, the experiment began.

The experiment included six Familiar trials (featuring known nouns, referring to both animate and inanimate objects), followed by six Novel trials (featuring nonce nouns). The visual stimuli and trial structure were identical to Ferguson et al. (2018). The audio scripts were also identical, with one exception: the scripts were produced in Spanish-accented English, by native Spanish-speakers (one male, one female), for whom English was their second language. As in Ferguson et al. (2018), the male speaker produced stimuli for (his part of) the Dialogue phase; the female speaker produced stimuli in all phases (i.e., Preview, Dialogue and Test phases).

All trials included three phases (see Fig. 1). First, during the Preview phase, infants saw two objects, one animate (e.g., a dog for Familiar trials, a hedgehog for Novel trials) and one inanimate (e.g., a television for Familiar trials, a colorful toy for Novel trials). These images were presented side-by-side for 6 s: at 1 s, infants heard "Oh wow! Look here!" to draw their attention to the images. Next, in the Dialogue phase, the objects were replaced by a colorful, abstract image for 9 s while infants listened to two speakers discuss one of the previously seen objects (e.g., "The dog is so close! Really, the dog is so close? Yes! Let's find the dog!"). Finally, in the Test phase, the two objects reappeared, and infants heard a sentence prompting them with the noun used in the dialogue (e.g., "Where's the dog?"). The target noun's onset occurred 1000 ms into the Test phase and was followed by 5 s of silence.

All infants began by viewing the same six Familiar trials, which featured both animate and inanimate targets. Familiar nouns were always presented in uninformative (neutral) dialogues. Next, on six Novel trials, the dialogues varied by condition, which was manipulated between-subjects. Infants in the Neutral condition heard novel nouns paired with non-selective predicates (e.g., "The blick is nearby! / Really, the blick is nearby? / Yes! Let's find the blick!"). In contrast, dialogues in the Informative condition featured the same nouns paired with animacy-selective verbs (i.e., dance, cry, eat, drink, sleep, look) in analogous sentence structures (e.g., "The blick is dancing! / Really, the blick is dancing? / Yes! Let's find the blick!"). Thus, in the Informative condition, the animate referents were always the target of the word. Caregiver reports confirmed infants understood most of the animacy-selective verbs

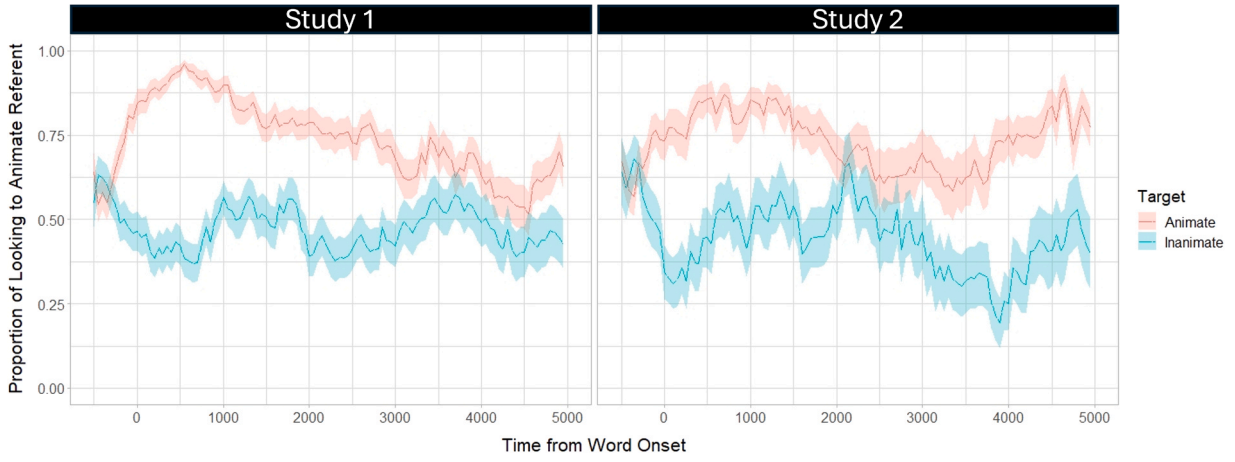


**Fig. 2.** Infants' timecourse at Test on Familiar noun trials, expressed as proportion of looking to animate referent. Colored shading represents ± 1 SEM. In Study 1 (left) and Study 2 (right), infants showed a significant overall preference for the target of the word, *ps* < .05. This is indicated by infants' proportionate increase in looking to the animate referent when hearing an animate-referring word and decrease in looking to the animate referent (and commensurate increase in looking to the inanimate referent) after hearing an inanimate-referring word. Thus, despite infants' overall preference for the animate targets, listening to the target words significantly influenced their looking in the expected direction.

(*M*=5.83 words (out of 6), *SD*= 0.52).

### 2.2. Study 1 results

To assess whether infants correctly identified the word's referent on each trial, we analyzed both their aggregate looking preference for the target referent and their looking timecourse. To compute aggregate preferences, we divided the time infants spent looking to the target by the total time spent looking to both objects. This proportion was then logit-transformed for analysis with linear models. Preliminary analyses indicated no effect of age, sex, or vocabulary size on infants' preference for the target on either Familiar or Novel trials, *p*s > .2.

We first constructed a linear mixed effects model predicting infants' looking to the labeled referent on Familiar trials, including random effects of participant and item (Preference-for-Target ~ 1 + (1|Item) + (1|Participant)). This analysis yielded a significant intercept, indicating that infants preferred looking at the referent of the noun, *B*= .22, *SE*= .071, *t* = 3.10, *p* = .025, a preference that exceeded chance levels (defined as 50 % looking to each referent). To further characterize infants' performance, we next constructed another model focusing on the effect of target type (Preference-for-Animate ~ 1 + TargetType + (1|Item) + (1 +TargetType|Participant)). This model revealed that infants looked more to animate referents when these were labeled (*M*=.75, SD=.14) than when the inanimate objects were labeled (*M*=.48, SD=.14), *B*= .35, *SE*= .09, *t* = 3.94, *p* = .014. Note that infants also devoted a greater proportion of looking to the target when the target was animate than when it was inanimate. This is likely because infants have a general preference for looking to animate referents: indeed, this overall preference for animates is in line with prior evidence using this paradigm (Ferguson et al., 2014, 2018). As is evident in Fig. 2, infants here showed an initial preference for the animate referent but quickly shifted their gaze toward the referent of the familiar noun, whether it was animate or inanimate. In addition, in an exploratory analysis, we subtracted infants' preference for the target referent during the Preview phase ("Look here!") from their preference during the Test phase ("Look at the dog!") (Target-Looking[Test – Preview] ~ 1 + TargetType + (1|Item) + (1 +TargetType|Participant)). This revealed no significant effect of target animacy in infants' increased looking to the targets from Preview to Test, *B*= .15, *SE*= .14, *t* = 1.09, *p* = .34. Thus, despite the overall preference for the animate referent, the words infants heard significantly affected their looking behavior, yielding an overall preference for the word's target. Finally, to confirm that infants in both conditions were equally successful on Familiar trials (which were identical across conditions), we added a fixed effect of condition to the model predicting looking to the target ((Preference-for-Target ~ 1 + Condition + (1|Item) + (1|Participant)). As expected, this revealed no significant effect of condition, *t* < 1.5, *p* = .37. This provides assurances that any differences that emerge between conditions on Novel trials cannot be attributed to differences in familiar word comprehension. Thus, infants understood the familiar nouns presented in Spanish-accented English.

We also compared infants' word recognition in the current study, which featured unfamiliar-accented speech, to infants' performance in the same task with familiar-accented speech in Ferguson et al. (2018). To do so, while at the same time accounting for infants' preference for looking at animate objects, we constructed a mixed-effects model examining preference for the target referent with fixed effects of accent (Native vs. Spanish) and referent type (Animate vs. Inanimate) in addition to random effects of item, participant, and referent-type-by-participant (Preference-for-Target ~ 1 + Accent + ReferentType + (1|Item) + (1 +ReferentType|Participant)). This analysis yielded the expected higher performance for animate referents, *B*= .24, *SE*= .088, *t* = 2.75, *p* = .049, and a significant effect of accent, *B*= .066, *SE*= .026, *t* = 2.59, *p* = .011. Specifically, infants' preference for the target referent was significantly stronger in familiar-accented speech (M=.72, SD=.10) than unfamiliar- accented speech (*M*=.67, SD=.11). Thus, although infants' performance exceeded chance levels regardless of accent, their word recognition was more robust in familiar- than unfamiliar-accented speech.

We then examined Novel trials, constructing a linear mixed effects model predicting infants' looking to the labeled referent with

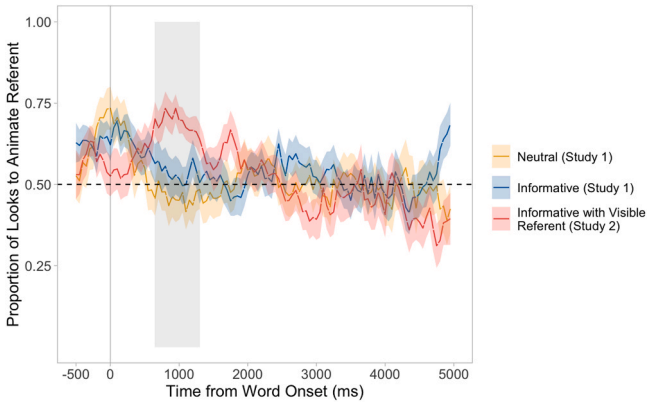


**Fig. 3.** Infants' timecourse of looking to the animate referent at test on Novel noun trials. Note that the animate referent was always the target referent. Colored shading represents ± 1 SEM. In Study 1, there was no difference in the timecourse of looking for the Neutral and Informative conditions, *p* > .5. In contrast, in Study 2, when the visible referent was available during the Dialogue phase, infants' looking the Informative with Visible Referent condition did diverge significantly, *p* = .011, from that of the Neutral condition (Study 1), with the former showing a stronger preference for the animate (target) referent between 650 ms and 1300 ms post-noun-onset, as indicated by the grey shaded area.

random effects of participant and item and a deviation-coded fixed effect of condition (Preference-for-Target ~ 1 + Condition + (1|Item) + (1|Participant)). The model revealed a non-significant intercept, $B$= .049, $SE$= .046, $t$ = 1.07, $p$ = .30, and a non-significant effect of condition, $t$ = 0.005, $p$ = 1. Thus, infants performed at near-chance levels in both the Informative ($M$=.54, SD=.12) and Neutral condition ($M$=.53, SD=.17).

To test whether differences between conditions emerged at any point within the trial, we also conducted a cluster-based permutations test (Maris & Oostenveld, 2007). Specifically, we conducted t-tests comparing performance across conditions in each 50 ms timebin. To identify divergences between conditions, we summed t-statistics from adjacent bins with a significant (alpha=.05) t-statistic and assessed their likelihood of occurring by chance by conducting 1000 simulations with shuffled condition labels and comparing our observed divergences against this chance-based distribution. This analysis also identified no significant divergences between conditions, $p$s > .5, (Fig. 3).

Finally, to evaluate the processing cost of unfamiliar-accented speech in inferring the referents of novel words, we compared the timecourse of infants' looking in the current study's Informative condition with the familiar-accented Informative condition in Ferguson et al. (2018). See Supplementary Figure 1. To do so, we used a cluster-based permutations test to assess whether performance in the different accent conditions diverged at any point during the test trial. This analysis revealed a significant divergence between infants' performance with familiar- vs. unfamiliar-accented speech, lasting from 850 ms to 1950 ms, $t_{cumulative}$=55.9, $p$ = .005. Infants showed a significantly stronger preference for the target referent in the familiar-accented condition (Ferguson et al., 2018) than in the current unfamiliar-accented condition.

### 2.3. Study 1 discussion

Thus, although infants reliably recognized familiar words in unfamiliar-accented speech, a processing cost of unfamiliar-accented speech was evident—both in infants' less accurate looking behavior for known nouns and in their failure to use familiar verbs to infer the referents of novel nouns. In particular, infants' performance on Novel word trials differed significantly from the prior performance of infants hearing familiar-accented speech in the very same paradigm: only those hearing familiar-accented speech used informative familiar verbs to identify the referent of a novel word (Ferguson et al., 2018).

There are two possible interpretations of this difference between 24-month-olds' performance when listening to familiar- versus unfamiliar-accented speech. Perhaps they were disinclined to learn new words from unfamiliar-accented speakers (cf. Kinzler et al., 2011; Schmale et al., 2011; Wagner et al., 2014). Alternatively, perhaps processing costs of the unfamiliar-accented speech interfered with infants' comprehension, thereby reducing their capacity for making complex, verb-based semantic inferences in the absence of referential context (Bent et al., 2019; Creel et al., 2016). Study 2 was designed to disentangle these possibilities.

## 3. Study 2

### 3.1. Study 2 methods

The procedure in Study 2 was identical to that of Study 1, with one exception: during the Dialogue phase of Novel trials, the target referent was visible on the screen. Infants therefore had an opportunity to associate the novel noun directly with its animate referent, rather than relying only on linguistic context. If infants are generally disinclined or unable to learn words from speakers with unfamiliar accents, then performance in this new Informative with Visible Referent condition should mirror performance in Study 1: with no preference for the animate referent at test. However, if infants' failure in Study 1 instead reflected the difficulty of computing a semantic inference from unfamiliar-accented speech in the absence of referential context, then infants should succeed in this new, Informative with Visible Referent condition.

For Study 2, 23 24-month-olds ($M$=23.74, $SD$=0.79, range 23 - 25.5 months; 15 White, 5 Multiracial, 2 Black, 1 Native American or Alaskan Native; 14 male, 9 female) participated. Infants were exposed to English more than 75 % of the time and came from predominantly college-educated families in a Midwestern metropolitan area. Caregiver reports indicated infants produced 48.09 words ($SD$=14.76) on the MCDI: Level II Form A (Fenson et al., 1994). Caregiver reports also showed infants knew the animacy-selecting verbs used in the study ($M$=5.83/6, $SD$=0.5). An additional 10 infants were excluded for failing to contribute at least 3 trials for both familiar and novel words ($n$ = 7) or technical difficulties ($n$ = 3).

Stimuli and procedure were identical to the Informative condition in Study 1 with one exception: during the Dialogue phase of Novel trials, the target referent was visible on-screen (Informative with Visible Referent). See Fig. 1.

### 3.2. Study 2 results and discussion

As in Study 1, we first considered infants' recognition of familiar nouns, constructing a linear mixed effects model predicting infants' looking to the labeled referent and including random effects of participant and item (Preference-for-Target ~ 1 + (1|Item) + (1|Participant)). This analysis revealed a significant intercept, $B$= .22, $SE$= .071, $t$ = 3.10, $p$ = .026, indicating an above-chance preference for the noun's target. Specifically, a model focusing on the effect of target animacy (Preference-for-Animate ~ 1 + TargetType + (1|Item) + (1 +TargetType|Participant)) revealed that although infants again preferred to look at the animate over the inanimate referents overall, they devoted significantly more attention to the animate referents when they were labeled ($M$=.73, SD=.13) than when they were not ($M$=.44, SD=.15; indicating a stronger preference for inanimate referents in this latter case: $M$=.56), $B$= .37, $SE$= .13, $t$ = 2.94, $p$ = .04. See Fig. 2.

We next assessed whether infants in the Informative with Visible Referent condition mapped novel words to their target animate referents. Here, we constructed a linear mixed effects model with random effects of participant and item (Preference-for-Target ~ 1 + (1|Item) + (1|Participant)). This analysis indicated that the aggregate preference for the animate referent was not significantly above chance ($M$=.55, SD=.11, $t = 1.63, p = .12$). We next asked if the timecourse of infants' looking in the Informative with Visible Referent condition diverged from the baseline Neutral condition reported in Study 1. Here, we observed a significant divergence between conditions lasting from 650 ms to 1300 ms post-noun-onset, $t_{cumulative}$= 39.1, $p = .011$: as predicted, the Informative with Visible Referent condition showed a stronger preference for the animate referent during this time period. In addition, performance in the Informative with Visible Referent condition did not diverge from the familiar-accented Informative condition in Ferguson et al. (2018), $p > .1$. Together, these analyses suggest infants in the Informative with Visible Referent condition, like those in Ferguson et al.'s familiar-accented Informative condition, successfully mapped novel words to their animate referents.

## 4. Discussion

These results provide the first direct evidence that by 24 months, infants listening to unfamiliar-accented speech not only successfully recognize known words, but also establish new word-referent mappings and then recognize these words when they are presented shortly thereafter in the same unfamiliar accent. This latter capacity, in which referential context plays a crucial role, is likely essential to infants in interacting with, and learning from, speakers with unfamiliar accents.

This new evidence highlights both infants' strengths and challenges in processing unfamiliar-accented speech. First, the results bolster prior evidence that by 24 months, infants recognize known words even when produced in an unfamiliar accent (e.g., Best et al., 2009; Mulak et al., 2013). At the same time, the current results also reveal a cost for infants' word recognition in unfamiliar-accented speech. Because infants performed above chance levels on familiar word trials, the cost associated with processing unfamiliar-accented speech appears to be a moderate one. Nevertheless, infants hearing unfamiliar-accented speech did show a less robust preference for the target referent than infants hearing familiar-accented speech, and this was especially evident for inanimate referents (cf. Ferguson et al., 2019). This suggests that unfamiliar-accented speech interferes with word recognition to some extent, perhaps contributing to greater uncertainty about the word or to processing delays in identifying the word's referent.

Second, we find that despite their overall success in identifying the referents of known words, 24-month-olds are unable to use known words to identify the referent of a novel noun when listening to unfamiliar-accented speech. When required to infer the referent of a novel word using its linguistic context alone, 24-month-olds succeed when listening to a familiar accent (Ferguson et al., 2018) but fail when listening to an unfamiliar accent (Study 1). However, when the word-referent mapping was made more transparent–by keeping the target referent visible throughout the dialogue introducing the novel word–infants listening to unfamiliar-accented speech successfully mapped the novel word to its referent (Study 2). This indicates that infants' difficulties establishing new mappings in an unfamiliar accent likely reflect the lexical processing challenges imposed by unfamiliar-accented speech, rather than a broad social disinclination or difficulty in learning words from unfamiliar-accented speakers.

These results also open new avenues for investigation. First, it will be important to investigate the mechanism by which infants successfully formed a word-referent mapping in Study 2, including whether informative linguistic contexts play any role in facilitating learning. Prior work has found that infants successfully learn word-referent mappings when the bare word is paired with the referent (Schmale et al., 2011), but it is an open question whether the addition of informative sentence contexts can also be helpful at this age. Future research should further evaluate the potential benefits of linguistic context, including whether and when infants can comprehend and learn words even without supportive referential contexts. Future research might also examine a broader set of possible semantic inferences: verb-based semantic inferences, like those used in the current study, may be especially difficult to compute in unfamiliar-accented speech. Even 4-year-olds show some difficulty in making online, verb-based inferences from unfamiliar-accented speech, compared to familiar-accented speech (Atik, LaTourrette, & Waxman, 2024). Indeed, use of sentential context in word comprehension continues to improve from 5 years into adulthood (Bent et al., 2019). Finally, because most research addressing these questions has only required infants to retain words across short (typically <1 min) delays, it will be important in future work to specify whether infants successfully retain the words learned from unfamiliar-accented speech in long-term memory, enabling retrieval after hours or days.

Future work should also assess infants' performance with a broader range of unfamiliar accents. Because Spanish is the most common foreign language spoken in the United States (Dietrich & Hernandez, 2022), infants in our sample may have encountered Spanish-accented speech before, so future work might examine other, less common accents. Investigating other unfamiliar accents will also help to identify how word recognition and word learning are influenced by perceptual distance (e.g., in phonology, rhythm, tone) between infants' native accent and a novel one. Finally, future work might directly examine the importance of accommodation. Here, infants always started with trials featuring familiar words (totaling roughly 2 min), but this exposure was evidently insufficient to boost infants' subsequent word learning. Perhaps other forms of exposure would better support comprehension (cf. Schmale et al., 2012), or perhaps infants with exposure to a greater variety of accents or languages would perform better (cf. Potter & Saffran, 2017). As infants gain exposure to a particular unfamiliar accent, or potentially even to a range of other accents, they may become more adept not just at recognizing words in this accent but at learning words as well.

In conclusion, our findings underscore both the challenges infants face in understanding and learning from unfamiliar-accented speech and infants' resourcefulness in navigating these challenges. We have shown that despite 24-month-old infants' difficulty in processing unfamiliar-accented speech, they flexibly recruit other, extra-linguistic resources, including the presence of a novel word's referent, to compensate for these processing difficulties and successfully learn from unfamiliar-accented speakers.

## Author Notes

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## CRediT authorship contribution statement

**Alexander LaTourrette:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **Cynthia Blanco:** Methodology, Investigation, Formal analysis, Conceptualization. **Naz Deniz Atik:** Writing – review & editing, Writing – original draft, Visualization, Formal analysis, Data curation. **Sandra R Waxman:** Writing – review & editing, Visualization, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

## Data availability

I have shared the data on OSF at https://osf.io/f9nhj/?view_only= 68c15088b4f841e597ad9732842832e1.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.infbeh.2024.101962.

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