

When is a *Dar* a Car?

Effects of Mispronunciation and Referential Context on Sound-Meaning Mappings

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1. Introduction

Infants exhibit a remarkable capacity for speech sound discrimination early in life, including sensitivity to the dimensions that define phonemic categories of human languages (e.g. Eimas, 1974; Eimas & Miller, 1980; Eimas, Siqueland, Jusczyk, & Vigorito, 1971; Miller & Eimas, 1983). Over the first year of life, infants' perceptual sensitivities are refined to reflect the phonological structure of the ambient language (e.g. Kuhl et al., 1992; Werker & Tees, 1984). Such early knowledge of language-specific phonological structure should be beneficial to infants beginning the complicated task of building a lexicon. Word learning requires not only that phonological word forms be stored in memory with appropriate specificity, but also that mappings between these phonological forms and meaning be learned. In the real world this is a daunting task: Every time a word is spoken, the learner has to decide onto which lexical entry it should be mapped or whether the new token is indeed an exemplar of an existing lexical entry. Knowledge about phonological categories at the onset of word learning should enable learners to focus on the linguistic detail critical for making such determinations. Moreover, advance knowledge of important phonological dimensions might free resources, facilitating the task of mapping between phonological form and meaning. However, there has been considerable debate about whether older infants and young children are able to apply this phonological knowledge in tasks that require attention to meaning. Older infants and young children often fail to discriminate even familiar speech sound contrasts in certain word recognition and word learning tasks (for a review, see Barton, 1980).

Recently, evidence has accumulated that older infants are able to use phonological information in some referential tasks (Fennell & Werker, 2003; Swingley & Aslin, 2000, 2002; Werker, Corcoran, Fennell & Stager, 2002). Studies using variants of the Preferential Looking Paradigm (Golinkoff, Hirsh-Pasek, Cauley & Gordon, 1987), in particular, have painted a much rosier picture of older infants' phonological competence during word learning and recognition. There are two advantages to using this type of procedure to assess infants' phonological

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knowledge. First, looking procedures make relatively few demands on infants' processing resources. Second, intermodal looking procedures can be used to probe infants' understanding of the relationship between labels and referents in a fairly naturalistic situation. Infants are presented with visual displays accompanied by an audio track; their looking behavior reflects their interpretation of the auditory stimulus. This situation is, of course, similar to what infants often experience in the real world (e.g. when parents direct attention to an object with a verbal label, *Look at the doggie!*).

In this type of referential task, infants demonstrate sensitivity to even single-feature onset mispronunciations of familiar words. Swingley and Aslin (2000) presented infants aged 18-23 months with a visual display depicting two known objects and asked questions of the type *Where is the baby?* Infants heard both correct and minimally mispronounced versions of the same item (e.g. *baby*, *vaby*). Infants fixated the appropriate referent significantly less, and were significantly slower to do so, when words were mispronounced than when they were pronounced correctly. Because there was no training involved, these results indicate not only that representations of familiar words contain considerable phonological detail, but also that infants can use this detail during word recognition. More recently this effect has been replicated and extended to younger infants (Bailey & Plunkett, 2002; Swingley, 2003; Swingley & Aslin, 2002).

Although findings from mispronunciation studies reveal that infants are sensitive to at least some phonological detail in referential situations, even here infants' phonological knowledge appears immature: Infants respond similarly to multiple-feature and single-feature onset mispronunciations (Bailey & Plunkett, 2002; Swingley & Aslin, 2002). For example, infants do not look any less at a baby when the label is pronounced as *raby* (a 2-feature deviation) than when it is pronounced as *vaby* (a 1-feature deviation), although in both cases they look less than when the label is pronounced correctly. Constant decrements in looking, regardless of the degree of mismatch, have been observed in 14-month-old infants, but also in toddlers as old as 24 months. This suggests that, throughout the second year, large phonetic deviations are no more disruptive to lexical access than smaller ones.

In contrast, adults' performance is affected by the degree of phonetic deviation from the stored representation (Connine, Titone, Deelman & Blasko, 1997; Milberg, Blumstein & Dworetzky, 1988). For example, in semantic priming tasks, adults show less facilitation for the word *dog* when preceded by the non-word prime *gat* than the prime *cat*, and still less for the non-word prime *wat* (Milberg et al., 1988). The ability to distinguish mispronunciations from correct pronunciations, but not different degrees of mispronunciation involving a single segment, suggests that infants' lexical representations are more coarsely organized than adults' or, alternatively, that infants are not able to access sub-segmental detail during word recognition. Both alternatives are consistent with infants' use of a higher-level unit of representation or processing, such as the segment or syllable.

Results from intermodal preferential looking studies have established that

infants can discriminate correct and incorrect pronunciations of familiar words in referential tasks. However, by using only familiar objects with known labels, the existing studies may have systematically underestimated infants' phonological sophistication. For example, consider an infant who is presented with a visual display containing a baby and a car. The novel tokens *baby*, *vaby*, *raby*, and *saby* are all unsuitable labels for the car. Thus, in addition to being attracted (perhaps differentially) to the lexical entry for *baby*, all of these pronunciations are equally repelled from the lexical entry for *car*. This latter effect may obscure any effects of differential attraction. Therefore, in this case we would expect the novel labels to be interpreted as mispronunciations of *baby*, regardless of subtle differences in phonological similarity.

In everyday life, however, infants likely know labels for some, but not all, of the objects in any environment. Therefore, when an infant hears a token that is phonologically similar to a known word, this could be interpreted either as a novel word that should be mapped onto a novel referent or as a mispronunciation of the known word. In this situation, the degree of phonological similarity to the known word might influence which of these strategies the infant adopts.

By 17 months, infants successfully map novel words onto nameless objects (Halberda, 2003). However, in a referential context containing two familiar objects, infants are, in essence, forced to interpret the novel label as a mispronunciation of the target, because there is no alternative (nameless) object available onto which to map the label. Whether infants are biased towards a mispronunciation interpretation in other, more natural, referential contexts remains unclear. Because many words are phonological neighbors (e.g. *hat*, *cat*, *rat*, *bat*, *pat*), even in a small lexicon (Coady & Aslin, 2003; Dollaghan, 1994), infants' interpretation of phonologically similar labels has important implications for lexical acquisition.

In the current study, we explored the effects of referential context on infants' performance, asking whether infants' putative insensitivity to degree of mispronunciation and their apparent bias to interpret similar labels as mispronunciations accurately reflect their competence and learning strategies. Is the failure to differentiate mispronunciations involving a single segment due to immature phonological knowledge? Are there qualitative changes in phonological representation or processing over development? Is a bias to interpret phonologically similar words as mispronunciations part of early word-learning strategies?

We hypothesized instead that the nature of the referential context used in previous studies drove these effects. When two familiar objects were presented along with a phonological variant of one object's label, infants had no choice but to interpret the variant as a mispronunciation, given the dissimilarity of the competitor object's label. Thus, the presence of two familiar objects may have produced an apparent mispronunciation bias. Similarly, the presence of two familiar objects may have masked any graded effects of mispronunciation degree. Therefore, in the present study we assessed 19-month-old infants' sensitivity to mispronunciations in a referential context in which the competitor object was unfamiliar. We hypothesized that any sensitivity to sub-segmental phonological

detail would be more evident in this context. Further, we expected that infants' tendency to interpret a mispronunciation as referring to the familiar, rather than novel, object in the display might differ as a function of how phonetically deviant it was from the correct pronunciation. If indeed 19-month-olds are biased to map novel labels onto novel objects, we predicted that severe mispronunciations might be interpreted as labels for the unfamiliar object in the display.

2. Experiment

This experiment was designed to establish whether infants exhibit sensitivity to degree of mispronunciation when the visual display is an unfamiliar object paired with a familiar object. In addition, we hoped to determine whether infants would show a consistent bias to interpret phonologically similar forms as mispronunciations of familiar words in such a context, or whether infants would interpret more deviant mispronunciations as labels for the unfamiliar objects. In this study we included single-feature, two-feature, and three-feature mispronunciations, a greater range than has been systematically studied previously.

2a. Methodology

Subjects and Method. Twenty-eight infants averaging 19 months (mean age = 575 days) were tested using the Preferential Looking Procedure. Ten additional infants were tested, but did not complete enough trials for analysis due to fussiness or disinterest in the stimuli (6), experimental error (2), and failure to look at both objects during the salience phase (2). Nineteen-month-olds were tested to ensure that the familiar test items would be highly familiar. In addition, because we were interested in whether infants would map mispronounced labels onto unfamiliar items, it was necessary to test an age group older than 17 months (Halberda, 2003).

The experimental session consisted of 18 trials, each of which involved a unique familiar object-novel object pair. Each trial consisted of a four-second salience phase followed by a nine-second test phase. During the salience phase, the two objects were presented simultaneously in the absence of an audio track to establish baseline looking preferences. During the test phase, the same objects were presented, but were accompanied by an audio stimulus telling the infants to look at one of the objects.

Stimuli. For the set of familiar stimuli, we chose words that are comprehended by the majority (>50%) of infants by 14 months, according to parental report norms (Fenson et al, 1994). Thus, for the majority of our 19-month-old participants, familiar words had been known for at least five months prior to the experimental session. To ensure that the visual stimuli selected to depict these words were recognizable to 19-month-olds, we conducted a pilot study with a separate group of 19-month-old infants. During the pilot, infants were presented with visual displays consisting of two familiar objects and told to look at one of the objects. Twenty-four familiar words were piloted in this manner. A set of 18

items was retained for use in the current experiment. For all of these items, infants in the pilot increased their looking to the target object following mention of the object's label. For unfamiliar items, we selected real objects that were similar in visual complexity and category status (e.g. artifacts, living things) to the familiar pictures. In some cases, colors were altered to maximize their novel appearance. With the exception of *pickle*, words referring to these objects are not included on lists of familiar words on either the infant or toddler versions of the MacArthur CDI (Fenson, et al., 1994). An example stimulus pair is depicted in Figure 1.



Figure 1. Sample stimulus pair

Auditory stimulus conditions. Of 18 total trials, each infant received five trials in which the familiar object's label was pronounced correctly, three trials in which the familiar object's label was pronounced with a 1-feature change in the onset consonant, three trials in which the familiar object's label was pronounced with a 2-feature change in the onset consonant, three trials in which the familiar object's label was pronounced with a 3-feature change in the onset consonant, and four trials in which the unfamiliar object was named. Novel trials (i.e. in which the unfamiliar object was labeled) were included so that labels were not always phonologically similar to the name of the familiar object. This was done to reduce the possibility that infants would adopt a strategy of always looking at the familiar object. Thus, in nine trials infants heard a correct labeling of one object and in nine they heard a mispronunciation of the familiar object label.

Single-feature mispronunciations involved changes in the place of articulation, 2-feature mispronunciations changes in place and voicing, and 3-feature mispronunciations changes in place, voicing and manner. All mispronunciations resulted in non-words or in words judged unlikely to be familiar to infants at this age. Pairings of familiar and unfamiliar objects remained constant across subjects. However, the assignment of these stimulus pairs to pronunciation condition was counterbalanced across subjects, with the exception of six trials (two correct filler and four novel) that were constant across subjects. Familiar items were predominantly monosyllabic (11/18); a few bi-syllabic and tri-syllabic words were also included. Of these, only two bi-syllabic words occurred in stimulus pairs that occurred in both correct and mispronunciation conditions (i.e. *cookie*, *bottle*). The remaining multi-syllabic words occurred in filler or novel trials. An example of these between-subject conditions is given in Table 1, and a complete list of stimuli and conditions is provided in the Appendix.

Table 1. Stimulus Conditions

Condition	Example Target
CORRECT	/ʃu/ “SHOE”
1 FEATURE (place)	/fu/ “FOO”
2 FEATURE (place + voice)	/vu/ “VOO”
3 FEATURE (place + voice + manner)	/gu/ “GOO”

Procedure. Testing was conducted in a sound-treated laboratory room. The parent sat with the child on his/her lap, while listening to instrumental music over noise-cancellation headphones to mask the audio stimuli. Approximately 90 cm in front of the child were two television monitors mounted side-by-side, subtending approximately 55 degrees of visual angle. A speaker was located centrally between the two television monitors behind a pegboard panel. At the infants' eye level, a blue light was mounted on the panel between the two television monitors. The participants were monitored over a closed-circuit video system. Speech stimuli were played at conversation level (75 dB).

Each trial began with the blue light flashing until the infant fixated at midline. At that point, this light was turned off and the salience event began with the simultaneous presentation of the two visual stimuli. After four seconds, the two monitors went dark. Following a pause of at least one second, the center light flashed until the infant again fixated centrally, and the test event commenced with simultaneous presentation of the same two visual stimuli. The first audio stimulus (“Where’s the X?”) was synchronized with the presentation of the visual stimuli. Three seconds after the offset of the target word a second audio stimulus was presented (“Find the X!”). The test phase last nine seconds in total. Following an interval of at least one second, the next trial commenced. Side of presentation of the familiar object was randomized between trials.

Following the session, the parent completed a questionnaire on his/her infant's comprehension and production of the study items (familiar and unfamiliar). The dependent measure was the amount of time infants looked at each object in the presence and absence of the audio stimulus. Of interest was whether looking behavior would differ as a function of mispronunciation condition.

2b. Results

Results from the parental questionnaire indicated that we were successful in our choice of familiar and unfamiliar items. On a scale of 1 (unfamiliar) to 4 (highly familiar), familiar words received an average score of 3.84. In addition, parents indicated that children were producing a number of the words themselves. Unfamiliar words received an average score of 1.25. On our scale, this indicated that some of the objects were visually familiar to some of the participants, but that the names for these objects were not. Parents reported that their children were not producing the names of any of the unfamiliar objects.

Looking behavior was coded off-line in 33-ms frames, using the Super-

Coder program (Hollich, 2003). For the salience phase, looking behavior was coded for the duration of the phase. For the test phase, looking behavior was coded only for the three seconds following the onset of the first audio stimulus. For each phase, the proportion of looking towards each of the objects was computed over the total time the infant spent looking at both objects for that phase. For each infant, a difference score was computed for each condition. This difference score measured the change in looking toward the familiar object after the target was named, and was computed using the following formula, where averages are computed over trials in a single condition:

$$\overline{\%}\text{Looking}(\text{Familiar})_{\text{Test}} - \overline{\%}\text{Looking}(\text{Familiar})_{\text{Salience}}$$

Comparison across test and salience phases allowed us to use each stimulus pair as its own control, thereby controlling for an infant's inherent preference for a particular stimulus in each pairing. In fact, infants exhibited a general preference for the familiar object in the salience phase. Average looking proportion for familiar objects across all conditions was .55, significantly above chance ($t(27)=3.48$, $p<.005$). This replicates a finding by Schafer, Plunkett & Harris (1999), who showed that 17-month-old infants prefer to look at familiar objects with known names, even in the absence of referential input. In that study, infants preferred to look at objects with known names over other familiar objects; we show that the preference holds when the competitor is completely novel. Because of the importance of establishing a baseline preference, trials in which infants did not look at both objects during the salience phase were not included in the analysis. Across all infants, forty-seven trials were discarded for this reason (approximately 9% of trials). For each infant, conditions that did not contain two usable trials were not analyzed (10 data points total across infants). Difference scores are depicted in Figure 2.

Three primary analyses were conducted on these difference scores. First, to establish that our inclusion of novel trials was effective, we compared infants' responses on correct and novel trials. In correct trials, infants' attention to the familiar object increased significantly between salience and test ($t(27)=4.5$, $p<.001$). In novel trials, on the other hand, infants' attention to the familiar object *decreased* significantly ($t(27)=-4.49$, $p<.001$). A significant condition x phase crossover interaction confirmed that infants behaved differently in these two conditions ($F(1,27)=31.68$, $p<.001$).

Second, to establish whether there was an effect of mispronunciation degree on responses, we conducted an ANOVA on conditions 1-4 (excluding novel trials). This analysis revealed that infants did not have similar patterns of looking across the conditions ($F(3,60)=5.59$, $p<.005$). Because preferences in the salience phase were similar across conditions ($F(3,60)=.95$, *ns*), differences in looking behavior can be attributed to effects of the audio stimulus at test.

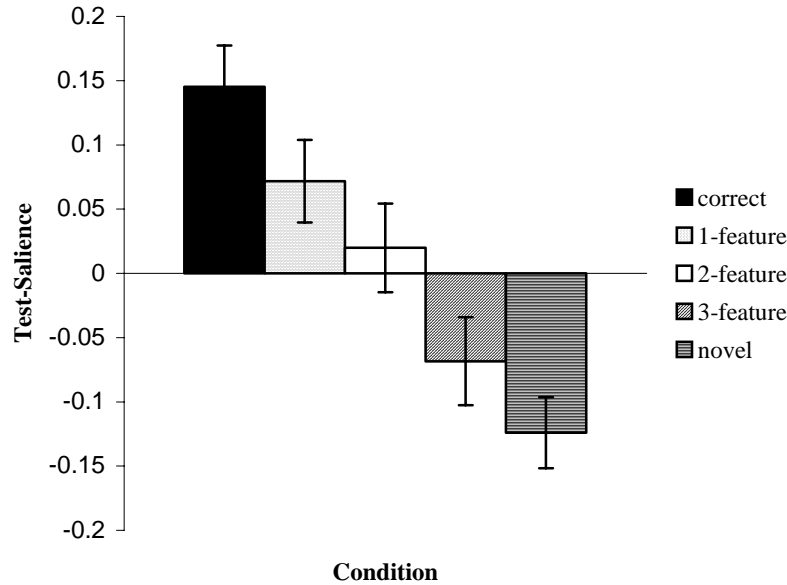


Figure 2. Looking to familiar object. Difference scores.

Third, to explore the effect of mispronunciation degree, we performed a linear trend analysis on conditions 1-4. There was a striking linear trend in difference scores ($F(1,20)=12.84, p<.005$). This trend captured 99.8% of the between-condition variance in looking behavior. In keeping with this trend, analyses of simple main effects revealed significant increases in looking towards the familiar object in the correct and 1-feature conditions ($t(27)=4.5, p<.001$; $t(23)=2.24, p<.05$). In contrast, there was no change between salience and test in looking proportion in the 2-feature condition ($t(24)=.58, ns$). Finally, there was a marginally significant *decrease* at test in looking toward the familiar object in the 3-feature condition ($t(24)=-2.0, p<.06$) and a significant decrease in looking at the familiar object in the novel condition ($t(27)=-4.49, p<.001$).

3. Discussion

These results add to a growing literature demonstrating that infants approach the task of word learning equipped with refined phonological sensitivities. Our findings confirm that, by the second year, infants perceive mispronunciations of highly familiar words (Bailey & Plunkett, 2002; Swingley, 2003; Swingley & Aslin, 2000, 2002). This was manifest as a decrease in looking to a familiar object when its name was mispronounced relative to when its name was pronounced correctly. However, the present results go beyond previous work by

demonstrating that, when both nameable and nameless objects are present, 19-month-old infants are sensitive to the degree of mispronunciation. This was revealed by a highly significant linear trend: Linear increases in the severity of the mispronunciation (in features) mapped almost perfectly onto linear decreases in looking. Finally, the results of this study indicate that under more ecologically valid conditions, 19-month-olds are relatively intolerant of phonological deviation; there is no general bias to interpret phonologically similar items as mispronunciations. Rather, 19-month-old infants appear to require a high degree of phonological match (i.e. equal to or less than a 1-feature deviation) for novel tokens to be interpreted as existing lexical items. Although infants increased their attention to the familiar object in the 1-feature mispronunciation condition, this was not the case in the 2-feature or 3-feature conditions. In fact, infants treated 3-feature mispronunciations similarly to completely novel phonological forms.

Although other studies have similarly shown that infants use phonological information during word recognition, they have not clarified the nature of this phonological knowledge. Previous findings that infants do not differentiate between small and large mispronunciations of a single segment are consistent with use of a segmental (or larger) metric of representation and processing. However, our results suggest that 19-month-old infants do have access to sub-segmental phonological detail. We attribute these discrepant findings to the referential status of the visual competitors. In other studies, infants see two familiar objects on each trial, making it unlikely that the competitor object will be considered as a potential referent for the mispronounced label. In the present study, infants were presented with familiar-unfamiliar object pairs. We posit that the competitor object's status as a potential referent for the mispronunciation allowed graded effects of mispronunciation to emerge.

The fact that infants' responses varied linearly as a function of distance in phonetic features indicates, first, that semantic activation in infants (as in adults) is a function of phonetic distance, and second, that this distance is represented in a metric that is commensurate with features. This second claim is warranted because, although infants' responses were graded in a linear fashion, the acoustic and perceptual distances between conditions were not equivalent. Recall that 1-feature mispronunciations involved a change in place of articulation, 2-feature mispronunciations added a change in voicing, and 3-feature mispronunciations added a change in manner. The three types of features have very different acoustic correlates. Moreover, studies of phoneme confusability (e.g., Miller & Nicely, 1955) have indicated that manner changes are more perceptually salient than place or voice changes. Nevertheless, infants here treated all of these changes as equivalent. To further test this claim, future research will compare responses to 1-feature mispronunciations involving each of the three features.

Even if 19-month-olds organize word representations according to a unit commensurate with phonetic features, there may still be a role for perceptual distance in processing. One possibility is that featural distance affects how reference is ultimately resolved, whereas perceptual distance has effects on the speed of processing. If this were the case, measures of overall looking might capture

effects of the former type, whereas latency measures might capture the latter type. In the present study, because infants were often looking at the familiar object at label onset, there were not enough data to make this assessment.

When does sensitivity to information below the level of the segment (e.g. features) develop? One possibility is that sub-segmental detail is represented from the earliest point of word learning, as a consequence of the phonological tuning which occurs in early infancy. On this view, phonological learning during infancy is directly relevant (and used) in early lexical acquisition. However, our findings are also consistent with the notion that representation of sub-syllabic units emerges with age, as a consequence of general experience with words. This is consistent with both holistic and underspecification accounts of early phonological development (e.g. Brown & Matthews, 1997; Storkel & Morissette, 2002; Walley, 1993). To disentangle these two possibilities it is necessary to have data from an earlier point of development. We are currently using this procedure with 14-month-old infants, an age group whose phonological sensitivities have been questioned in other referential tasks (Stager & Werker, 1997). Another possibility is that familiarity with particular words is required for feature-level sensitivity to emerge. To test this, we are measuring 19-month-olds' performance with words less familiar than those used here.

More generally, this study provides insight about the nature of the representations and strategies that subserve early word learning. Our results suggest that the mapping of sound and meaning is determined by an interaction between phonological sensitivities and learning constraints. Learners are typically exposed to new words in the context of a variety of objects, some of which have known names and some of which do not. In situations where novel referents are sufficiently salient, phonological sensitivity and the presence of learning biases, such as mutual exclusivity (Halberda, 2003) or novel-name-nameless-category (Golinkoff, Mervis, & Hirsch-Pasek, 1994), may conspire to make infants relatively intolerant of mispronunciations. Therefore, in this sort of referential context, learners should acquire novel words that differ from familiar words by at least two phonetic features with relative ease. Novel words that differ by a single phonetic feature from known words may, conversely, be difficult to learn; in the present study, infants interpreted these forms as mispronunciations. However, in situations with familiar objects only (or where novel referents are less salient), infants are more likely to interpret phonologically similar words as mispronunciations. In other words, infants may alter their criterion for phonological similarity so that more deviant forms are interpreted as mispronunciations. Because phonological sensitivity should remain constant, we posit that higher-level effects of referential context are responsible for the changes of interpretation.

In sum, infants' sensitivities to the dimensions that define phonemic categories play a role in lexical processing by 19 months. However, the deployment of these sensitivities varies as a function of the referential context. When confronted only with objects whose names are well-known, infants may be willing to accept even extreme phonetic deviations as mispronunciations. However, in more ecologically valid situations in which nameless objects are present, in-

infants' display sharper sensitivities, rejecting all but minimal deviations as mispronunciations. These findings indicate that infants' use of phonological knowledge is flexible and adapted to characteristics of the learning environment.

Appendix

FAM	UNFAM	GROUP 1	GROUP 2	GROUP 3	GROUP 4
keys	garlic	/ziz/ ³	/kiz/ ^C	/tiz/ ¹	/diz/ ²
book	roller	/suk/ ³	/buk/ ^C	/duk/ ¹	/tuk/ ²
bear	hourglass	/geɪ/ ¹	/teɪ/ ²	/seɪ/ ³	/beɪ/ ^C
cookie	birdie	/duki/ ²	/vuki/ ³	/kuki/ ^C	/puki/ ¹
foot	bottle opener	/fut/ ^C	/sut/ ¹	/zot/ ²	/gut/ ³
car	barrel	/vaɪ/ ³	/kaɪ/ ^C	/paɪ/ ¹	/daɪ/ ²
ball	pump	/gal/ ¹	/kal/ ²	/sal/ ³	/bal/ ^C
bird	pickle	/kəd/ ²	/səd/ ³	/bəd/ ^C	/gəd/ ¹
bottle	accordion	/barl/ ^C	/garl/ ¹	/karl/ ²	/sarl/ ³
shoe	padlock	/fu/ ¹	/vu/ ²	/gu/ ³	/ʃu/ ^C
cup	artichoke	/kʌp/ ^C	/tʌp/ ¹	/bʌp/ ²	/vʌp/ ³
hand	can opener	/zænd/ ²	/dænd/ ³	/hænd/ ^C	/fænd/ ¹
balloon	knocker	/bəlun/ ^F	/bəlun/ ^F	/bəlun/ ^F	/bəlun/ ^F
bunny	French horn	/bʌni/ ^F	/bʌni/ ^F	/bʌni/ ^F	/bʌni/ ^F
banana	lantern	/ləntən/ ^N	/ləntən/ ^N	/ləntən/ ^N	/ləntən/ ^N
flower	bullhorn	/bulhoɪn/ ^N	/bulhoɪn/ ^N	/bulhoɪn/ ^N	/bulhoɪn/ ^N
telephone	hive	/haɪv/ ^N	/haɪv/ ^N	/haɪv/ ^N	/haɪv/ ^N
chair	trophy	/tɹɒfi/ ^N	/tɹɒfi/ ^N	/tɹɒfi/ ^N	/tɹɒfi/ ^N

Assignment of stimulus pairs to conditions. Superscripts indicate condition type (1=1 feature, 2=2 feature, 3=3 feature, C=correct, F=filler, N=novel)

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