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How Parents Introduce New Words to Young Children: The Influence of Development and Developmental Disorders

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Abstract

This study documents how parents weave new words into on-going interactions with children who are just beginning to speak. Dyads with typically developing toddlers and with young children with autism spectrum disorder and Down syndrome ($n = 56, 23$, and 29) were observed using a Communication Play Protocol during which parents could use novel words to refer to novel objects. Parents readily introduced both labels and sound words even when their child did not respond expressively or produce the words. Results highlight both how parents act in ways that may facilitate their child's appreciation of the relation between a new word and its referent and how they subtly adjust their actions to suit their child's level of word learning and specific learning challenges.

Keywords

language development; vocabulary; parent-child interaction; autism spectrum disorder; Down syndrome

1. Introduction

The broad claim that parents can orchestrate interactions in ways that facilitate children's early word learning is well supported and widely accepted (Adamson, Bakeman, & Deckner, 2004; Hoff & Naigles, 2002; Pruden, Hirsh-Pasek, & Golinkoff, 2006). Of particular note are parents' actions that might help a child who is just on the brink of rapid vocabulary acquisition solve the fundamental problem of mapping words onto the world (Baldwin, 1995) by carefully placing a new word into the child's on-going stream of attention. For example, a parent might make the link between a novel word and referent more transparent by calling attention to an object (e.g., shaking a bell) and then, once attention is caught, emphatically stating its name ("That's a bell.") or producing a word for the sound it makes

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("Ding-a-ling!"). Or the parent might follow the child's lead and produce labels or sound words for objects only after they have entered the child's field of attention.

There is ample evidence that such strategies can help children learn new words. Most of the evidence comes from experiments that control when and how an experimenter introduces a novel word for an unfamiliar object. These studies verify that introducing a novel word when a child is already attending to an object is more effective than doing so after attempting to redirect a child's attention to the object (Dunham, Dunham, & Curwin, 1993; Tomasello & Farrar, 1986). In addition, systematic observations of parent-child interactions with both typically developing children (TD; Simpi & Huttenlocker, 2007; Smith, Adamson, & Bakeman, 1988; Tomasello & Farrar, 1986) and young children with autism spectrum disorder (ASD; McDuffie & Yoder, 2010) support the claim that vocabulary acquisition proceeds more quickly when parents use strategies that take the child's attention into account. Moreover, we know from Clark's (2007; 2010) detailed analyses of five children's conversations that parents will work very hard to ensure that their child is attending to a referent before they introduce a word and that, when they do so, children as young as two years often repeat the new words.

However, systematic observations of what parents do as they introduce new words to young children are surprisingly limited. This gap leaves unclear whether parents do indeed place new words into the child's stream of attention and how this placement might be influenced by developmental changes in language acquisition strategies and by language learning challenges associated with development disorders. To document what parents do during on-going social interactions, we observed how they spontaneously presented different types of novel words (labels and sounds) to children who were at different points of early word learning (pre- and post- 50 words) and who varied markedly in joint attention capacities and word learning skills (TD toddlers, young children with ASD, and young children with Down syndrome [DS]). Such observations can indicate whether parents attempt to align their supportive actions to suit developmental changes in word learning or atypical patterns of joint attention, and if so, how they adjust their actions.

To observe how parents introduce new words during on-going interactions, we needed to control for the child's prior experience with words and their referents. We did so by integrating the venerable experimental practice of using novel words for novel objects (Berko, 1958; see Ratner & Menn, 2000) into semi-naturalistic observations of parent-child communication. The use of novel words for novel objects has been used to probe children's use of various principles to map words to objects (Moore, Angelopoulos, & Bennett, 1999) and verbs (e.g., Golinkoff, Jacquet, Hirsh-Pasek, & Nandakumar, 1996), and the effects of an unfamiliar adult's actions (e.g., pragmatic cues, Tomasello & Akhtar, 1995; attention management strategies; Dunham, et al., 1993; and overhearing, Floor & Akhtar, 2006). But this procedure has rarely been used to reveal how parents present new words (cf., Hani, Gonzalez-Barrero, & Nadig, 2013, who explicitly ask the parent to teach two novel words). In the study reported here, we adapted the procedure by providing novel words for novel objects as one of several suggestions parents might pursue as they played with their child using the Communication Play Protocol (CPP; Adamson et al., 2004), which produces semi-

naturalistic playful parent-child interactions during activities which encourage social interacting, requesting, and shared commenting.

Of primary interest was what parents did to modulate their child's attention when they introduced a novel word. Thus each time a parent produced an utterance containing a novel word, we systematically coded what she did before, during, and immediately after this utterance. We expected that most parents would readily follow our suggestion to use the novel words, especially in communicative contexts, such as shared commenting, that afford the introduction of new words. Moreover, as has often been observed in studies of parent-child communication (e.g., Bornstein, Tamis-LeMonda, & Haynes, 1999), we expected that they would be quite consistent over time in how they interacted with their child. Moreover, we expected that parents would often act in ways that provided a communicative frame that scaffolded the child's attention to the word/object mapping. Overall, we expected that parents would often create a frame using strategies that sought to gain the child's attention *before* they produced the novel word (e.g., shaking the to be named object, pointing to it, saying "look here"), that might draw attention to the novel word *during* its presentation (e.g., emphasizing the word, showing the object), and that would prompt the child's use of the word *after* they produced it (e.g., asking what the object is called, eliciting a repetition).

We were also interested in how children's approach to word learning might influence how often and how parents introduce new words. One important variation is developmental. As children begin to amass a vocabulary, they become more rapid and skilled word learners (Hollich, Hirsh-Pasek, & Golinkoff, 2000). Thus we expected that during the beginning period of vocabulary acquisition (< 50 words), parents would provide more and possibly different input. More specifically, they might be more likely to repeat words when a child's expressive vocabulary was very small. They might also be more apt to present the novel sound word more often than the novel label when a child has a limited expressive vocabulary and to favor the label after the child's vocabulary has begun to expand. This developmental pattern would be consistent with Werner and Kaplan's (1963) intriguing discussion of how early in language development children and parents delight in repeating naturalistic onomatopoeic "nonstandard" words that translate perceived noises into patterns that are "linguistically and morphemically stabilized" (p. 103). Moreover, they might adjust the communicative frame to suit the child's word learning capacities. More specifically, we hypothesized that parents interacting with a child who was just at the cusp of building an expressive vocabulary would make more attempts to capture attention to the link between the novel word and object than when the child was already demonstrating the capacity to learn new words. Thus they might attempt to gain attention to the novel object before presenting the word, draw attention to the word as they present it, and repeat the word more often. In contrast, we anticipated that once a child was amassing a vocabulary, parents would be more likely to prompt the child to use the word after they introduced it.

In addition to documenting how the child's vocabulary level might influence parents' strategies for introducing new words, we studied what transpired when children had persistent problems with one or more aspects of the mapping problem. The challenge of optimizing word learning is more complex, and arguably more crucial, when a child has a developmental disorder that compromises joint attention skills or hampers the infusion of

symbols into interactions (Diesendruck, 2007). Our three-group design allowed us to examine differences between strategies parents used with typically-developing children and children with developmental disorders, but—perhaps more revealing—between strategies parents used when interacting with children with different developmental disorders.

Children with ASD present an especially complex constellation of early communication problems that contribute to difficulties in early language acquisition. Joint attention deficits that are evident before language emerges and predict language concurrently and longitudinally (Bopp & Mirenda, 2011; Charman et al., 2003; Toth, Munson, Meltzoff, & Dawson, 2006) may hamper a child's appreciation of the relation between a partner's speech and shared objects. Limited interest in new objects (Adamson Deckner, & Bakeman, 2010) may limit opportunities to engage a child long enough to present novel words. Yet, there is now substantial evidence that children with ASD can take advantage of adult scaffolds that support their attention to both words and shared objects. Observational studies of parent-child interactions suggest that language outcome is related to how often a child with ASD sustains periods of symbol-infused joint engagement during which a caregiver supports their shared focus (Adamson Bakeman, Deckner, & Ronski, 2009) and how often parents follow-in on the child's current focus of attention (McDuffie & Yoder, 2010). Moreover, a growing experimental literature indicates that children with ASD can take advantage of adult strategies that help overlay words and objects, for example, when an adult follows the child's focus of attention or provides several repetitions of the new word (Luyster & Lord, 2009; see also Hani et al., 2013; Gliga et al., 2012; Parish-Morris, Hennon, Hirsh-Pasek, Golinkoff, & Tager-Flusberg, 2007; Walton & Ingersold, 2013).

However, it is not yet clear if parents spontaneously provide such supports to children with ASD when presenting them with new words and if they do so more often or differently than parents who are interacting with children who do not have a comparable joint attention deficit. Previous studies suggest that parents of children with ASD provide social cues—such as looking at the relevant target and pointing while labeling an object—similar to those provided by parents interacting with typically developing children (Hani et al., 2013). But there are intriguing hints as well that parents of children with ASD may make subtle adjustments, such as making objects more perceptually salient as they bid for joint attention (Adamson, McArthur, Markov, Dunbar, & Bakeman, 2001) and continuing to use multiple cues to introduce a label even after a child has a substantial vocabulary, a pattern that is not evident in typically developing samples (Hani et al., 2013). In the current study, we anticipated parents might present fewer words to children with ASD, who tend to show less interest in new objects (Adamson et al., 2010) and more difficulty in sustaining joint engagement (Adamson et al., 2009). But we also expected that they would be more likely than parents in the other two groups to actively seek the child's attention to the novel object before introducing a word and to draw attention to the word as they presented it.

Parents of young children with DS may face a different constellation of challenges when they try to introduce new words. One common observation is that young children with DS seem to be less expressively verbal than one might expect given their relatively intact preverbal joint attention skills and joint engagement experiences (Adamson et al., 2009; Sigman & Ruskin, 1999) and their level of comprehension and nonverbal visual cognition

(Chapman, 2003). Several factors might account for their relative reticence include articulation problems that might make spontaneous speech unintelligible (Abbeduto & Murphy, 2004) and problems with auditory short term memory that might make learning new words difficult (see, e.g., Mosse & Jarrold, 2011). Given such problems, we anticipated that the attention modulation strategies used before and during the presentation of novel words by parents of children with DS would not differ from those of parents with TD children but they would be more likely to repeat the words to provide the child with additional experience hearing the word and to compensate for possible memory problems.

Finally, although our primary focus was on the parents, we were also interested in whether the parent's presentation of a word resulted in the child's attending to the word. This is difficult to reliably discern during an interaction since the child might take up a word receptively without producing the word. Thus we focused on indications that the child tried to use the new word during the interaction. We coded *responds expressively* when the child responded vocally with either the actual word or with a nonverbal vocalization right after the parent used the word. More restrictively, we coded *produces word* when the child actually said the novel word. Overall, we expected that as children became more advanced word learners, they would respond expressively more often and be more likely to produce the novel word, although we anticipated that many toddlers would not produce many of the novel words during our observations. Moreover, we anticipated that the child's responsiveness might be influenced by child diagnosis, parental strategies, and communicative context. More specifically, we hypothesized that responding expressively would be more likely in the TD and DS groups than in the ASD group, regardless of vocabulary level, and that producing the novel word would be less likely in the DS group than in the ASD or TD group. In terms of parental strategies, we hypothesized that children would be more likely to respond expressively when parents prompted for the novel word. Also, in line with the experimental studies cited above, we hypothesized that gaining a child's attention before presenting the word and presenting the word while the child was attending to the novel object would increase the probability of an expressive response. Finally, we hypothesized that communicative context may influence a child's response to new words such that children would produce new words, or at least respond expressively, more during activities like requesting and shared commenting that focus attention on their referents than during activities like social interacting that focus more on interpersonal dynamics.

2. Method

2.1. Participants and Design

The data for this report were derived from 104 children and parents (102 mothers) who were participating in a longitudinal study examining the development of joint engagement (see Adamson et al., 2009). Children belonged to one of three diagnostic groups: children with ASD, children with DS, or TD children. As in earlier reports (e.g., Adamson et al., 2009; 2010), we used a strategy that lets us examine the three diagnostic groups at comparable levels of expressive language proficiency. Specifically, we considered the visit when children were nearest 30 months of age for the ASD and DS groups and 18 months for the

TD group (referred to here as the *earlier visit*) because children in the TD group a year younger provide a better language-level match for the ASD and DS groups than the TD group at the same age. For the current study, we then categorized the children in each diagnostic group as having either a *beginning* vocabulary if the parent reported fewer than 50 words on the *MacArthur Communication Development Inventory* completed prior to the earlier visit (CDI; Fenson et al., 1993) or a rapidly *expanding* vocabulary otherwise (50 words or more). We selected this cut-off because it is often used to signal the beginning of rapid vocabulary acquisition, if not a veritable vocabulary “spurt” (Goldfield & Reznick 1990; Nazzi & Bertoncini 2003). Characteristics of this cross-sectional sample are given in Table 1.

Additionally, we constructed a longitudinal subsample that included only children whose vocabulary status changed from *beginning* to *expanding* over a year's time. The purpose was to check whether any between-group effects of vocabulary status in the cross-sectional sample would replicate within-subjects in the longitudinal sample. We considered the visit when children were nearest 42 months of age for the ASD and DS groups and 30 months for the TD group (referred to here as the *later visit*), selecting for the longitudinal sample children whose parent reported fewer than 50 words on the CDI at the earlier visit but 50 or more words at the later visit. Characteristics of the longitudinal sample are given in Table 2.

Most parents introduced novel words as we requested: of the 108 parents in our larger longitudinal study, only 4 at the earlier visit (1 in the DS and 3 in the TD group) and 2 at the later visit (both in the TD group) did not. Thus the cross-sectional sample for the present report includes the 104 parents who had introduced a novel word at least once and the longitudinal sample includes the 44 parents who had introduced a novel word at least once at both visits and whose children's vocabulary status was beginning at the earlier and expanding at the later visit.

2.2. Procedure

Observations were made using the Communication Play Protocol (CPP; Adamson et al., 2004; manual available upon request). The CPP's basic conceit is of a Play in which the child is the “star” and the parent is the “supporting actor.” Each CPP consisted of six 5-min semi-naturalistic scenes during which the parent was asked to perform a Communication Play with her child in a range of communicative contexts that probed social interacting, requesting, and commenting. Before the CPP began, we told parents we were interested in observing the child's current ways of communicating. Before each scene, we provided a cue card that specified the scene's plot (e.g., visiting an art gallery, help me, taking turns) and suitable props. Directorial suggestions were offered on the cue card but an explicit script was not provided. The stage for the CPP was our laboratory playroom; video records were made using two cameras that were situated behind one-way mirrored windows on its opposing walls; recordings were synchronized for subsequent coding. The three communicative contexts lasted on average 620 s each ($SD = 20$).

At each visit, three scenes, one each from the three communicative contexts, included two novel words, one a label for a novel object and the other for a sound associated with the object. The specific scene selected for each context was varied randomly across visits. The

novel object was included in the set of props appropriate for each scene; each novel object was used only once across a dyad's visits. The cue card provided before each scene informed the parent that one of the props was a novel object. It also listed among the directorial suggestions that if she wished she could refer to it using the *novel label* and the *novel sound* words that we provided (e.g., "This is a *zuped*. It goes *loppy-lah*."). Novel labels and novel sounds were selected randomly from a list of 15 novel label words and 15 novel sound words with the constraint that no novel words would be repeated during a dyad's 5 visits (see Table 3; pictures of the novel objects are available from the authors upon request).

The novel words were constructed with the goal of creating a set of labels and sounds that did not occur in English but followed the syllabic and phonetic constructs of the English language. They were selected in reference to lists of novel words available in the literature and were reviewed by several people who eliminated words that appeared to carry meaning. Novel labels were always 2 syllables; novel sounds were often contained more syllables, with a range from 2 to 4, to reflect the repetitious quality of many naturally occurring onomatopoeic sounds. MCWord, an online orthographic wordform database, was subsequently used to verify the uniqueness of the novel words by generating the frequency of the word form per million examples in the database (Medler & Binder, 2005); 29 of the novel words did not occur in the database and 1, "peri", occurred at a frequency of only 0.179 per million.

2.3. Coding and Agreement

CPPs were transcribed by pairs of trained transcribers (Adamson & Bakeman, 2006); novel words were transcribed using consensus spelling. Transcripts and their associated video records were subsequently reviewed, marking parental utterances that contained novel label or sound words. Trained observers—who were masked to vocabulary status and, to the extent possible, diagnostic group—coded each novel-word utterance using Mangold International's INTERACT (<http://www.mangold-international.com>) and a coding scheme that characterized what the parent did before, during, and after the novel-word utterance, whether this was the first time the parent had used the word in an utterance or whether it was a repetition, and how the child responded (our coding manual is available upon request.) Six binary codes were derived for this report. First, did the parent actively attempt to *gain the child's attention* before producing the novel word (e.g., the parent might draw attention to the object by shaking it, pointing at it, or speaking about it.) Second, when producing the novel word, did the parent try to *draw attention* to the word (e.g., the parent might emphasize the novel word perceptually or playfully produce the novel word by elongating it). Third, did the parent *prompt* the child to say the novel word by, for example, asking a question (What is this?), eliciting a repetition (Say X!), or providing a slot (This is a _____.) Fourth, had the parent used the novel word before (i.e., is this a *repeat*). Fifth, was there child *expressive response* (i.e., a vocal or verbal response to the parent's use of the novel word; this could include actually producing the word). Finally, in cases of child expressive response, did the child actually *produce* the novel word. Each of these six questions was coded yes or no.

To assess agreement, a second observer independently coded 15% of the corpus (794 utterances from 84 scenes of 16 TD, 8 ASD, and 8 DS dyads). Cohen's kappa, a statistic that corrects for chance agreement, was computed for the six codes (Cohen, 1960). Kappas for gains attention before, draws attention, prompts, repeats word, child expressive response, and child produces word were .65, .69, .79, .88, .67, and .83, respectively. With only two codes (yes or no) and highly variable frequencies, a kappa of .65 is expected when observers are 95% accurate (Bakeman & Quera, 2011).

2.5. Scoring and Statistical Analysis

The cross-sectional corpus contained 2764 parental utterances with a novel word; corresponding numbers for the longitudinal sample were 1257 and 1233 for the earlier and later visits, respectively. Dependent variables computed for each dyad were the number of parental utterances containing novel words, the percentage containing a novel sound word, the percentages coded for different parental strategies (gains attention before, draws attention, prompts for word, and repeats a word), and the percentage coded for child expressive response. Most of these variables were skewed (i.e., standardized skew > |2.58|); to reduce skew, extreme scores (i.e., those more than 1.5 times the interquartile range [IQR] above the 75th percentile or 1.5 times the IQR below the 25th percentile—the limit of the whisker in a box-and-whisker plot) were recoded to the whisker value (Tukey, 1977). Because about three-quarters of the children never actually produced the novel word, the eighth dependent variable was binary, coded 1 if the child produced a novel word at least once and 0 if the child did not.

In the cross-sectional sample, 61% in the ASD, 68% in the DS, and 49% in the TD group were categorized as only *beginning* to amass an expressive vocabulary. Thus vocabulary status and diagnostic group were somewhat, but not grossly, confounded. To control for this potential confound, we analyzed dependent variables with hierarchic multiple regression (HMR; Cohen & Cohen, 1983). Dependent variables were regressed first on a coded variable representing vocabulary status (0 = less than 50 words, 1 = 50 words or more), second (and so controlling for vocabulary status) on two contrast variables representing diagnostic group (first = 2 if TD, -1 if ASD or DS, second = 0 if TD, 1 if ASD, and -1 if DS), and third on two variables representing the vocabulary status by diagnostic group interaction—thus using HMR to effect a two-way analysis of variance (Cohen & Cohen, 1983). Reported are the variance accounted for by the first step (R^2) and the additional variance accounted for by subsequent steps (R^2). For consistency we report HMR results for the binary outcome, but verified that logistic regression gave essentially identical p -values and effect sizes using the Nagelkerke pseudo R^2 , which gauges the fit of a model, as an analogue for R^2 .

For the longitudinal sample, our interest was primarily whether parents would change their strategies when their children changed vocabulary status. Accordingly, dependent variables were analyzed with repeated measures t -tests, with the repeated measure of visit representing change in vocabulary status from fewer than 50 words to 50 or more words. For consistency we report t -test results for the binary variable, but verified that a McNemar test

gave essentially the same p -value. We did not include diagnostic group in the longitudinal analyses due to the small numbers in the groups.

3. Results

Parents' use of novel words in the cross-sectional sample varied little by vocabulary status or diagnostic group. The mean number of parental utterances containing a novel word was 26 and did not vary significantly by vocabulary status, diagnostic group controlling for vocabulary status, or their interaction (see Table 4 for means, effect sizes, and p -values). Parents were more likely to introduce novel words in the commenting than in the interacting or requesting contexts ($M = 10.6$ vs 8.0 and 8.1 words, difference $p < .05$ per Tukey post-hoc test; context main effect $\eta^2 = .050$, $p = .006$; group by context interaction $\eta^2 = .017$, $p = .47$).

Our expectation that parents would favor sound words when their children were just beginning to build a vocabulary was, in general, not supported. The mean percentage of parental utterances containing a novel word that referred to a sound was 48%. Main effects for vocabulary status and diagnostic group controlling for vocabulary status were not significant; however, their interaction was. Follow-up t -tests (see Table 5 for details) showed a significantly higher mean percentage of sound words for children in the DS group who were just beginning to build a vocabulary (58% vs. 36%), but no significant differences for the ASD and TD groups.

3.1. The Influence of Development and Diagnosis on Parents' Strategies

The evidence that parents tailored their strategies to their child's vocabulary status is suggestive, but somewhat equivocal: In the cross-sectional sample differences for the four strategies were in the expected direction, but weak: just two accounted for between 1% and 9% of the variance, an effect characterized by Cohen (1988) as small (see Table 4). Specifically, when children were just beginning to build a vocabulary, parents were more likely to attempt to gain attention before (35% vs. 30%, $p = .066$, marginal significance) and prompted less for the novel word (8% vs. 16%, $p = .033$). Additionally, the number of parents who prompted at least once was less (47% vs. 82% of parents in the beginning vs. expanding vocabulary groups; odds ratio = 5.1, [95% confidence interval 2.0, 12.8], $p < .001$). Draws attention and repeats words, however, were not significantly affected by diagnostic group.

After taking vocabulary status into account, two of four parental strategies differed significantly by diagnostic group and one marginally, all small effects (see Table 4). Specifically, parents of children with ASD were more likely to attempt gain attention before (albeit $p = .059$) and to draw attention than parents of typically developing children, and less likely to repeat the novel word than parents of children with Down syndrome. Prompting for the novel words, however, was not significantly affected by diagnostic group.

3.2. Children's Response and Production

Vocabulary status, but not diagnostic group, affected the likelihood of children's expressive response to the parent's production of a novel word (see Table 4). Specifically, an expressive

response was less likely when children were just beginning to speak (18% vs. 28%). However, the effect of vocabulary status was qualified by an interaction with diagnostic group. Follow-up *t*-tests (see Table 5 for details) showed a significantly higher mean percentage of responding vocally for children with an expanding vocabulary only in the ASD group (43% vs. 15%), but no significant differences for the DS and TD groups.

Similarly, vocabulary status, but not diagnostic group, affected the probability that children would actually produce a novel word at least once (see Table 4). Specifically, producing a novel word at least once was less likely when children were just beginning to amass a vocabulary (15% vs. 40%). However, the effect of vocabulary status was qualified by an interaction with diagnostic group. Follow-up tests (see Table 5 for details) showed that for the ASD group 6 of 9 or 67% with an expanding vocabulary but none of those who were just beginning to speak produced the novel word; there were no significant differences for the DS and TD groups.

We also examined how communicative context might affect children's response to parents' novel word use. As hypothesized, children were less likely to respond expressively in the interacting than the other two contexts, significantly so for all diagnostic groups (see Table 6). They were more likely to do so in the requesting context but not significantly so, and more likely to do so in the commenting context but significantly so only for the DS group (again, see Table 6).

Finally, we asked whether parents' strategies affected children's expressive response. *Prompts for word* was the only strategy with consistent effects: the odds of child expressive response were approximately 2 to 4 times greater, depending on the diagnostic group, when the parents' use of a novel word included a prompt (see Table 6). *Repeats word* increased the odds of child expressive response 84% for children with Down syndrome, a significant increase, but the increases of 40% and just 3% for children with ASD and TD children were not statistically significant. No effects of *gains attention before* or *draws attention* were statistically significant.

3.3. Longitudinal Replication of Parent and Child Use of Novel Words

Parents' use of novel words in the longitudinal sample, as in the cross-sectional sample, varied little by vocabulary status. The means for the two visits (children with beginning vocabularies at the earlier visit and an expanding vocabulary at the later one) were similar for both the number of parental utterances containing a novel word and the percentage that referred to sound words (see Table 7). Regarding parent's strategies, the marginal decrease in gain attention before and increase in prompts for word found when the expanding vocabulary group was compared to the beginning vocabulary groups in the cross-sectional sample did not replicate, but the decrease in repeats words, inconsequential and statistically insignificant in the cross-sectional sample, showed a medium, statistically significant effect in the longitudinal sample. However, in both samples, the number of parents who prompted at least once did differ. For the longitudinal- sample, 50% and 73% of parents in the beginning and expanding vocabulary groups prompted at least once (McNemar $p = .041$). Additionally, number of words and parents use of various strategies were relatively stable; correlations between the earlier and later visits for number, gain attention before, draws

attention, and prompts for word, and repeats word, were .70, .27, .43, .48, and .59; $p = <.001, .071, .003, .001, \text{ and } <.001$, respectively.

The pattern of findings for children's expressive response and word production in the longitudinal sample was similar to that found in the cross-sectional sample. Both responding expressively and producing a novel word at least once were less likely when children were just beginning to amass a vocabulary (19% vs. 38% and 20% vs. 73%, respectively; see Table 7).

4. Discussion

This observational study provides a nuanced view of how parents weave new words into on-going interactions with children who are just beginning to speak. Our findings indicate that parents are often eager to present new words, even if they are arbitrary nonsense ones, and that there is remarkable consistency in how they do so over time. Moreover, our findings highlight both how parents act in ways that may facilitate the child's appreciation of the relation between a new word and its referent and how they subtly adjust their actions to suit a child's level of word learning and specific learning challenges.

One of the strengths of our semi-naturalistic protocol is that it allowed us to control the new words the parents introduced without unduly influencing how they communicated with their child. The novel referents were but one of many props during play that involved a range of common activities related to social interacting, requesting, and shared commenting, and we did little to feature our interest in new word learning per se. Even without an emphasis on new word learning, the overwhelming majority of the parents we observed (104 of 108) introduced new words to their children, and they usually provided ample opportunities for their children to use each novel label and sound (on average, about 1.8 times per minute).

Parents' willingness to present novel words during social interactions even to children who had very limited vocabularies suggests that they consider weaving new words into interactions a suitable activity even when a child is not likely to demonstrate immediate learning. As others (e.g., Clark, 2007) have noted, many parents appear to anticipate the developmental trajectory of speech as they orchestrate early communication. Even ASD, which can severely disrupt communication, did not seem to diminish parents' attempt to introduce new words during the early phases of language development, a finding that is consistent with other studies that note their persistence in bidding for joint attention (Adamson et al., 2001) and providing language input (e.g., Hani et al., 2013). It is important to probe the generalizability of these findings, especially in light of compelling demonstrations that, unlike the middle-class parents in this study, parents rearing children in poverty may not as readily provide extensive and varied word input to toddlers, to the detrimental of early vocabulary skill (Hart & Risley, 1995; Rowe, 2008).

Although quantity of words introduced did not vary, we found, as expected, evidence that parents modulate how they introduced new words to suit a child's approach to word learning. Such nuanced alterations are crucial ingredients in explanations of why, although children hear many new words outside of a social interaction, the presentation of new words

within social interactions is more effective than presentations in other less individualized contexts such as the media (DeLoache et al, 2010; see also Akhtar, 2004) and why parent responsiveness predicts early vocabulary growth (McDuffie & Yoder, 2010). Thus, parents of children with ASD seemed more intent on attention modulation than parents of TD children; in particular, they were more likely to draw attention to the link between words and objects—a tendency that is consistent with other observations (e.g., Luyster & Lord, 2009) that heightened contextual supports and heightened social cues may facilitate children with ASD's novel word learning. In contrast, parents of children with Down syndrome were more apt to repeat novel words than parents of children with ASD—a finding that is in line with arguments that the process of repetition may play a particularly important role in addressing their specific word learning needs (e.g., Mosse & Jarrold, 2011). These findings that parental strategies varied related to diagnostic group suggest that it would be informative to look beyond how often parents use different strategies to consider diagnostic-specific modifications in the execution of the strategy.

In sum, our findings provide hints of fine-grained developmental tailoring. The most intriguing one is that parents of a child with DS were more apt to introduce sounds when their child was in the beginning stages of word learning and to introduce labels when their child had an emerging vocabulary. This result complements the recent report (de Falco, Venuti, Esposito, & Bornstein, 2011) that parents of just verbal children with DS used more affect-salient speech than parents of TD children, and it mirrors the shift from onomatopoeic words to conventional words described by Werner and Kaplan (1963). Further, it can be readily interpreted through the lens of the emergentist coalition model (Hollich et al., 2000) as an indication that parents are sensitive to a fundamental change in children's approach to word learning. However, before doing so with confidence, it is necessary to extend the current study, which compared children before and after they established 50 word expressive vocabularies, to even earlier phases of word learning.

One compelling question prompted by our findings is how parents know when a child is processing a new word when they introduce it. As Clark (2007) cogently notes and we found, a young child's uptake of new words is often tacit. Almost all children did respond at least once with a vocal indication that they were attending to the novel word and many did produce at least one of the novel words once their vocabularies were expanding. But children did not respond expressively, much less verbally, to most of the introductions, especially when the child was just beginning to acquire a vocabulary—and most notably when the child at this vocabulary level was diagnosed with ASD.

The sparseness of explicit child vocal responsiveness underscores that in the early period of language development, expressive language is more of an accessory than an essential focus of the child's communication (Nelson, 1996). Nonetheless, parents persistently offer new words and act in ways that draw attention to new words, even if these strategies do not result in an increase in the child's immediate expressive responses. At times, parents do attempt to establish the expectation through prompting that the child should signal their receipt of the new word. Not surprisingly, parents in general were more likely to prompt a child to say the novel word when their vocabularies were expanding than when they were just beginning to acquire words, but even then, they only rarely did so. Moreover, it is not surprising that

children, especially those with expanding vocabularies, were more likely to respond expressively when prompted.

These findings suggest that during playful exchanges, parents do not often direct the interaction toward explicit new word learning, and they do not often seek, much less receive, explicit acknowledgement that the child has acquired the word. Our findings on the effect of communicative context on both how often parents introduce novel words and how often children respond expressively to an introduction suggest that there are some activities, such as those that afford shared commenting, that are not explicitly set up for new word learning that may nonetheless be especially conducive to new word acquisition. Moreover, it may be relatively easy to turn playful scenes into word learning exercises; in pilot work using a similar protocol, we found that if the experimenter so much as simply probed the child's understanding of the novel word by asking the child after an activity to hand her the novel object, some parents reacted by focusing subsequent activities on explicit teaching of novel words.

5. Conclusions

In conclusion, this study provides a systematic view of what parents do as they introduce new words to a variety of early language learners. Methodologically, our findings indicate that our communication play protocol can help researchers gather observations of parents as they integrate novel words into a range of interactions. Substantively, our results demonstrate that parents often eagerly provide new words to children, even when children do not readily demonstrate immediate use of the new words. Moreover, they provide a start to detailing the intriguing variations in the strategies parents deploy before, during, and after offering new words. Here we found that children's vocabulary development and developmental disorders can affect parents' strategies. Future studies may profitably expand on these findings to explore how parents introduce words even earlier in the emergence of expressive speech and how early interventions can help parents tailor their strategies to encourage a child's acquisition of new words.

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Highlights

- We observed parents introduce novel words for novel objects during interactions
- Parents readily introduced novel words even when child did not use the words
- Parents used attention-related strategies before, during, and after offering words
- Parents altered some strategies as children became more verbal
- Autism spectrum disorder and Down syndrome affected parents' strategies

Table 1

Characteristics of the Cross-Sectional Sample by Diagnostic Group and Vocabulary Status

Variable	Diagnostic group		
	ASD	DS	TD
Total			
<i>N</i>	23	28	53
Age (months)	32.5	31.5	18.1
CDI (median)	23	22	51
# male	20	18	26
Beginning group			
<i>N</i>	14	19	26
Age (months)	31.6	31.1	18.0
CDI (median)	8.5	14	32.5
# male	13	12	14
Expanding group			
<i>N</i>	9	9	27
Age (months)	33.9	32.3	18.1
CDI (median)	241	98	72
# male	7	6	12

Note. *N* = 104. The CDI score was less than 50 for children in the *beginning* vocabulary status group (*n* = 59) and 50 or more for children in the *expanding* vocabulary status group (*n* = 45). Medians are given for CDI scores because their distributions were skewed.

Table 2

Characteristics of the Longitudinal Sample by Diagnostic Group

Variable	Earlier visit			Later visit		
	ASD	DS	TD	ASD	DS	TD
<i>N</i>	7	12	25	—	—	—
Age (months)	31.7	30.7	18.0	39.9	40.6	30.0
CDI (median)	17	19	31	137	148.5	443
# male	6	7	14	—	—	—

Note. $N = 44$. The longitudinal sample includes those children from the cross-sectional sample whose CDI score was less than 50 at the earlier visit and 50 or greater at the later visit.

Table 3

Novel Words

Label words		Sound words	
bremick	lunap	abba-abba	loppy-lah
clubob	nupa	blippity-blip	mooshen-moo
felly	peri	brockety-brock	naddle-nad
framble	sevik	camoosh-camoosh	ooga-ooga
girfus	trober	craggle-craggle	pleem-pleem
gobbish	wogger	goobly-goo	quappy-quap
hampent	zupud	huffaloo-huf	wakety-wak
hodfern		jib-wib, jib-wib	

Table 4

Analysis of Parent and Child Variables by Vocabulary Status and Diagnostic Group for the Cross-Sectional Sample

Variable	Total (SD) <i>N</i> = 104	Vocabulary status				Diagnostic group				Interaction			
		Beginning <i>n</i> = 59	Expanding <i>n</i> = 45	<i>R</i> ²	<i>p</i>	ASD <i>n</i> = 23	DS <i>n</i> = 28	TD <i>n</i> = 53	<i>R</i> ²	<i>p</i>	<i>R</i> ²	<i>p</i>	
Parent													
# novel word utterances	26 (17)	27	26	0.03	.85	21	31	27	4.5	.097	1.5	.46	
% novel sound words	48 (21)	50	47	0.6	.42	45	51	49	1.2	.55	7.5	.021	
% gain attention before	33 (13)	35	30	3.3	.066	38 _b	32 _{ab}	30 _a	5.3	.059	0.6	.71	
% draws attention	50 (18)	51	48	0.8	.37	58 _b	47 _{ab}	48 _a	5.8	.048	0.4	.82	
% prompts for word	12 (13)	8	16	8.3	.003	9	12	13	1.0	.57	2.6	.24	
% repeats word	57 (16)	58	56	0.6	.44	51 _a	63 _b	57 _{ab}	7.4	.021	2.0	.34	
Child													
% expressive response	22 (17)	18	28	7.9	.004	26	20	22	1.7	.40	7.0	.020	
Produces word (% of children)	26 (44)	15	40	7.8	.004	26	11	34	3.3	.16	7.3	.015	

Note. All scores are means, total and broken down first by vocabulary status and second by diagnostic group. Child produces word was scored 0 = no and 1 = yes, thus its means are proportion yes, expressed here as percentages for readability. The effect size statistics (R^2 and R^2) are likewise expressed as percentages for readability. The R^2 (from the first step of a hierarchical regression) indicates the proportion of variance accounted for by vocabulary status, the step 2 R^2 indicates the additional variance accounted for by diagnostic group controlling for vocabulary status, and the step 3 R^2 indicates the additional variance accounted for by their interaction, each with their *p*-values. For the three significant or marginal diagnostic group effects, means that do not differ, $p < .05$, per a Tukey HSD post-hoc test share a common subscript. Significant interaction effects are explicated in Table 5.

Table 5

Explication of Significant Vocabulary Status by Diagnostic Group Interactions

Variable	ASD				DS				TD			
	Begin <i>n</i> = 14	Expand <i>n</i> = 9	η^2	<i>p</i>	Begin <i>n</i> = 19	Expand <i>n</i> = 9	η^2	<i>p</i>	Begin <i>n</i> = 26	Expand <i>n</i> = 27	η^2	<i>p</i>
Parent												
% novel sound words	46	42	.010	.66	58	36	.28	.004	46	52	.021	.30
Child												
% expressive response	15	43	.47	<.001	19	23	.012	.58	19	24	.030	.22
Produces word (% of children)	0	67	.55	<.001	11	11	<.001	.96	27	41	.021	.30

Note. All scores are means. Child produces word was scored 0 = no and 1 = yes, thus its means are proportion yes, expressed here as percentages for readability. The effect size statistic, eta squared (η^2), and the *p*-value are from follow-up independent-samples *t*-tests, performed separately for each diagnostic group.

Table 6

Child Expressive Response Odds Ratios by Context and Parent Strategy

Context or parent strategy	ASD	DS	TD
Context			
Interacting	0.56 [0.32, 0.95]	0.38 [0.25, 0.59]	0.64 [0.47, 0.86]
Requesting	1.30 [0.85, 1.99]	1.15 [0.80, 1.67]	1.21 [0.92, 1.59]
Commenting	1.14 [0.76, 1.71]	1.94 [1.37, 2.75]	1.22 [0.94, 1.58]
Parent strategy			
Gain attention before	0.93 [0.61, 1.42]	0.67 [0.45, 1.01]	0.87 [0.64, 1.17]
Draws attention	0.85 [0.57, 1.27]	1.12 [0.79, 1.59]	0.96 [0.74, 1.25]
Prompts for word	3.56 [1.97, 6.41]	4.08 [2.67, 6.23]	2.21 [1.57, 3.09]
Repeats word	1.40 [0.93, 2.11]	1.84 [1.22, 2.79]	1.03 [0.79, 1.35]

Note. For context, each is compared with the other two. For parent strategy, its use is compared with its absence. Odds ratios greater than 1 indicate that child expressive response was more likely for a context compared to the others or for use of a strategy compared to its absence. Odds ratios less than 1 indicate that child expressive response was less likely. Values in brackets are 95% confidence intervals (CIs), thus the odds ratio is statistically significant $p < .05$ when the CIs do not include 1.

Table 7

Analysis of Parent and Child Variables by Vocabulary Status for the Longitudinal Sample

Variable	Beginning (earlier visit)	Expanding (later visit)	η^2_p	<i>p</i>
Parent				
# novel word utterances	28 (18)	27 (17)	.009	.54
% novel sound words	48 (20)	48 (15)	.001	.86
% gains attention before	32 (13)	34 (17)	.013	.46
% draws attention	49 (17)	49 (17)	.001	.86
% prompts for word	10 (13)	12 (13)	.024	.31
% repeats word	58 (17)	53 (20)	.10	.034
Child				
% expressive response	19 (15)	38 (19)	.47	<.001
Produces word (% of children)	20 (41)	73 (45)	.52	<.001

Note. $N = 44$. All scores are means (with standard deviations in parentheses). Child produces word was scored 0 = no and 1 = yes, thus its means are proportion yes, expressed here as percentages for readability. The effect size statistic, partial eta squared (η^2_p), and the *p*-value are from repeated-measures *t*-tests.