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Receptive and Expressive Single Word Vocabulary Errors of Preschool Children with Developmental Disabilities

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RECEPTIVE AND EXPRESSIVE SINGLE WORD VOCABULARY ERRORS
OF PRESCHOOL CHILDREN WITH DEVELOPMENTAL DISABILITIES

by

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For the thesis submitted in partial fulfillment of the requirements
for Honors in the Major Program in Communication Sciences and Disorders
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ABSTRACT

Vocabulary growth during the preschool years is critical for language development. Preschool children with developmental disabilities often have more difficulty with learning and developing language, therefore making more errors in vocabulary. It is important to recognize what type of errors children are demonstrating, especially as it relates to receptive and expressive language abilities. This study explores the error patterns preschool children with developmental disabilities make during receptive and expressive single word vocabulary tests. A secondary analysis of preexisting data was conducted from a sample of 68 preschool children with developmental disabilities ranging in severity. Based on a coding system developed by the author, errors were classified according to type. The majority of the errors children made were classified as No Response types of errors, with the second most common error being Semantic Perceptual errors of receptive and expressive picture naming tasks. Understanding the types of errors preschool children with disabilities make will help to enhance their language and therapy needed to thrive as a learner, especially as they begin elementary school.

Keywords: developmental disabilities, preschool children, language

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Introduction

Preschool children's ability to learn vocabulary is critical for their overall language development (Davidoff & Masterson, 1996; Dennis, 2016; Lahey & Edwards, 1999). Vocabulary words learned at a younger age help to increase later vocabulary skills, thus furthering their overall language development (Dennis, 2016). Preschool children with developmental disabilities are often at a disadvantage with their ability to acquire new vocabulary (Messer & Dockrell, 2006). Therefore, compared to their age-matched peers, children with developmental disabilities are at a greater risk of decreased vocabulary skills needed by the time they start kindergarten (McGregor & Waxman, 1998). It is important that children with vocabulary difficulties are provided with an intervention specific to the errors they make in order to avoid errors in vocabulary during picture naming tasks. This support will assist them to enter kindergarten with vocabulary skills similar to their same-aged peers.

A review of literature is presented to show the significance of the problem of children making errors in receptive and expressive single picture naming tasks. The importance of early childhood vocabulary is outlined, as well as the factors influencing children with developmental disabilities and vocabulary.

Importance of Early Childhood Vocabulary Skills for Children with Disabilities

As children are in the early stages of language development, it is vital that their vocabulary skills develop adequately (Marshall, 2013). Preschool aged children are considered to have an increased risk in early-literacy development if they have a developmental disability (Justice, Logan, İřitan, & Saçkes, 2016; van der Schuit, Peeters, Segers, van Balkom, & Verhoeven, 2009). Children who are at risk may face additional struggles with literacy, such as

reading achievement, vocabulary knowledge, and comprehension (Dennis, 2016). It is essential for preschoolers with disabilities to have vocabulary exposure in order to grow in the critical years of development. It is also important for them to have home literacy skills and book reading in order to increase their development and language skills.

Vocabulary Growth

Children's ability to acquire new vocabulary skills early in life will impact their later language and literacy skills (Dennis, 2016; McGregor, Newman, Reilly, & Capone, 2002). However, children with disabilities tend to have a disadvantage in their overall vocabulary growth. This can be due to several factors, including verb structure difficulty, and their ability to distinguish target words from similar words in picture naming tasks. Verbs can be especially challenging to children with naming errors due to the complexity of the concept presented (Messer & Dockrell, 2006). Verbs have a different function than nouns because they are more complex and change in state, whereas nouns remain in a constant shape over time, and are also learned more quickly compared to verbs (Andreu, Sanz-Torrent, Legaz & MacWhinney, 2012; Dennis, 2016; Sheng & McGregor, 2010). However, noun acquisition is more difficult for children, especially for those with specific language impairment, compared to learning verbs (Davidoff & Masterson, 1996). Preschool aged children have equal difficulty naming nouns and verbs (Davidoff & Masterson, 1996). Additionally, there are different forms of verbs, including auxiliary verbs or copula verbs and transitive and intransitive verbs (Andreu et al., 2012; Davidoff & Masterson, 1996). Learning verbs often comes after learning nouns because verbs are more difficult to acquire and are more demanding than nouns. Verbs have present, past, and future tense, which can be confusing to children with disabilities (Dennis, 2016; Sheng &

McGregor, 2010). Being exposed to words more often increases the likelihood of recognizing and understanding vocabulary (Andreu et al., 2012; Dennis, 2016). Children with disabilities benefit from reinforcement with vocabulary in order to enhance their overall understanding and expansion of language skills.

Home Literacy

Early vocabulary is crucial to the development of a child's language skills (Carlson, Bitterman & Jenkins, 2012; Justice et al., 2016; van der Schuit et al., 2009). Children start to develop their early vocabulary and literacy skills in their homes that play an important role in their language skill development (Justice et al., 2016; van der Schuit et al., 2009). Home literacy activities can impact children's ability to read and understand words, increase their interest in literacy and language, and improve social interactions (Justice et al., 2016).

Parents who read with their child and expose them to books at an early age are more likely to provide a home where literacy creates a positive influence on preschool vocabulary. The more frequently parents involve their children and use home literacy materials, the higher the language skills of children were reported to be in regards to developing their vocabulary (van der Schuit et al., 2009). However, parents who have a child with a disability tend to have fewer home literacy interactions, and read less frequently to their child. Decreased home literacy can significantly impact their overall literacy or language development (Justice et al., 2016; van der Schuit et al., 2009). Parents are known to adapt to the literacy skills of their child with a disability, which can hinder the child's ability to learn language, literacy and vocabulary in the home environment. This risk increases if the parent does not feel their child is capable of performing well in literacy activities, due to lower expectations for their child (van der Schuit et

al., 2009). However, limiting exposure to home literacy activities can hinder the child's vocabulary development and performance on learning new words.

Shared Book Reading

Book reading between parents and their children is an effective way to expose children to vocabulary (Dennis, 2016). Storytelling at home can significantly impact a child's home literacy skills (van der Schuit et al., 2009). For preschool aged children with developmental disabilities, having parents engage in storybook reading helps the child increase their language and emergent literacy skills at home (Justice et al., 2016; van der Schuit et al., 2009). Parents of children with disabilities may limit the literacy interactions needed for the child to develop in vocabulary as they tend to ask simple yes/no questions rather than questions that promote language development. They are also more likely to point to and label pictures, as opposed to engaging the child in discussion of what the pictures actually mean (van der Schuit et al., 2009). However, children with disabilities benefit from questions that involve critical thinking in order to improve their language and vocabulary (van der Schuit et al., 2009). Additionally, parents of children with developmental disabilities have reported reading less often with their child, which can also impact their child's language and literacy skills (Justice et al., 2016).

Engaging a child in shared book reading while using pictures as support will increase the child's literacy skills regarding vocabulary and creative thinking. A study conducted by van der Schuit and colleagues (2009) recognized that children with intellectual disabilities who were engaged in more activities of home literacy scored higher than their mental age peers on book activities. This study provided evidence that children were more engaged and had active participation in the storybook readings (van der Schuit et al., 2009). The more frequently

children were exposed to storytelling in the home environment, the more likely children with disabilities would increase their vocabulary and reading comprehension (Carlson, Bitterman & Jenkins, 2012).

Naming Errors of Children with Developmental Disabilities

Several factors may influence the language skills of children with developmental disabilities with either primary or secondary language impairment (Justice et al., 2016). Understanding there is a risk for future reading problems if a child is not diagnosed early supports the importance of early literacy development to improve their vocabulary skills.

Specific Language Impairment

Children with specific language impairments (SLI) tend to make more errors in naming tasks (Messer & Dockrell, 2006). They are usually slower at naming latency and accuracy compared to their aged-matched peers (Sheng & McGregor, 2010). Errors such as visual errors were more common in action naming compared to object naming (Sheng & McGregor, 2010). When given label recognition, children with SLI showed poorer learning for nouns and verbs (Sheng & McGregor, 2010). Referring to picture naming tasks, children with SLI tend to make less accurate errors than their typically developing peers (Marshall, 2013; Sheng & McGregor, 2010). Children with SLI name pictures more slowly, in addition to producing more phonological and semantic errors in picture naming tasks (Lahey & Edwards, 1999; Marshall, 2013).

Classification of Picture Naming Errors

Naming Errors

It is important to understand that naming difficulties exist among children with disabilities in order to help children in their vocabulary development (Messer & Dockrell, 2006). Naming errors are thought to be a result of less semantic representations and less accurate naming processes (Lahey & Edwards, 1999; Messer & Dockrell, 2006). Errors are classified by the category of the error made and determined by coding systems similar to the specific type of error the child has made (Lahey & Edwards, 1999; Sheng & McGregor, 2010). Errors are typically classified as General, Specific, Associated, Within-Category, Perceptual, Perseverative, Circumlocution, Phonological, or No Relation (Lahey & Edwards, 1999; Sheng & McGregor, 2010).

Semantic Errors

Children with language disorders make more errors in semantics compared to their age-matched peers (Lahey & Edwards, 1999). Semantic errors generally consist of unusual word choices along with word-finding difficulties (McGregor et al., 2002). Semantic errors are the most frequent type of naming errors (Messer & Dockrell, 2006; Sheng & McGregor, 2010). McGregor and Windsor (1996) also state that semantic representations are a cause of word finding errors. However, semantic errors in naming objects are not only common in children with word-finding difficulties, but also in children with typical development (Messer & Dockrell, 2006). Children with developmental disabilities have difficulty in deciding semantic generation tasks (Messer & Dockrell, 2006). Often, this creates errors on the semantic use of verbs and defining words (Messer & Dockrell, 2006).

Phonological Errors

When presented with picture naming tasks, children with developmental disabilities and SLI frequently make phonological errors, revealing difficulties with phonological processing (Lahey & Edwards, 1999). Phonological errors that occur from children with developmental disabilities range from mispronunciations to saying the first sound of a word but not completely finishing it. This may be attributed to difficulty understanding phonological representations or difficulties in accessing phonological forms of a word (Messer, Dockrell & Murphy, 2004). According to Messer & Dockrell (2006) problems with production of words can impact a child's comprehension of words. Children with disabilities make inadequate phonological representations that can result in difficulty in appropriately identifying the specific phonological form of a word (Messer & Dockrell, 2006). Phonological errors tend to occur for children with developmental disabilities when they are retrieving words. These phonological errors result in increased difficulty with naming and identifying tasks (Messer, Dockrell & Murphy, 2004).

Word Finding Difficulty Errors

Children with word finding difficulties often experience literacy difficulties, which can impact their vocabulary development (Messer, Dockrell & Murphy, 2004). These children often have problems within a variety of skills, including language, speech or fluency (McGregor & Waxman, 1998; Messer & Dockrell, 2006). Word finding difficulties may arise because the word is not in the child's vocabulary (McGregor & Windsor, 1996; Messer & Dockrell, 2006). It is thought that children with word finding difficulties tend to have issues with naming errors such as retrieving words, repetitions, circumlocutions, word substitutions, and time fillers or substitutions (Lahey & Edwards, 1999; McGregor & Waxman, 1998; McGregor & Windsor, 1996; Messer, Dockrell & Murphy, 2004). However, the use of priming to facilitate naming has

increased responses of children with word finding difficulties in picture naming tasks (McGregor & Windsor, 1996). Specifically, priming in picture naming tasks resulted in more accurate responses when shown target pictures of semantically related tasks (McGregor & Windsor, 1996).

Expressive and Receptive Language

Errors that children make can vary depending on their expressive and receptive language skills. The expressive and receptive language skills of children with developmental disabilities can determine with which area of language children struggle. Knowing which area of language children struggle with can impact their overall vocabulary acquisition. Deficits in both receptive and expressive vocabulary contribute to the difficulty of disability. Vocabulary acquisition needs to be addressed sooner rather than later, as not addressing the issues can cause immediate harm to vocabulary development.

Purpose

The prevalence of children making errors regarding picture naming tasks is a concern, particularly related to the types of errors made. It is critical to address deficits in vocabulary acquisition early on to ensure the best possible outcomes for later language and literacy development. In order to effectively address these deficits, one must understand the types of errors made. Lahey and Edwards (1999) developed a coding system that was referenced by Sheng & McGregor (2010). Sheng and McGregor (2010) noted many errors made during picture naming tasks often had a majority fall into an “other” category, suggesting a need for a more specific coding system.

Errors of children regarding picture naming tasks have been researched from numerous studies (Lahey & Edwards, 1999; Sheng & McGregor, 2010). However, the expressive and receptive language of children with disabilities has yet to be considering regarding picture naming tasks. More information is needed in how to understand the types of errors children with disabilities make on picture naming tasks. The purpose of this study was to determine what types of errors children with developmental disabilities make in both single word expressive and receptive vocabulary assessments. Thus, the following research questions explored were:

- What types of errors do preschool children with developmental disabilities make when presented with a single word expressive picture naming task?
- What types of errors do preschool children with developmental disabilities make when presented with a single word receptive picture identity task?
- Do preschool children with developmental disabilities make the same type of semantic errors in expressive and receptive single picture tests?

Methods

Participants

Participants for this study were 68 preschool children with developmental disabilities ranging in severity. Inclusionary criteria included: (1) education eligibility of significant developmental delay or developmental delay, (2) 3-5 years of age, (3) primary language of English, (4) Individual Education Plan (IEP) currently in place, and (5) enrollment in a public or charter preschool program, either self-contained or inclusive. Children were excluded from this study if they were non-verbal (defined by the teacher as having no true words) or if they were deaf and/or blind. All participants in the current analysis were taken from pretest data of two similar studies involving shared book reading.

Demographic data on the students were collected including classroom type, eligibility, gender, and race. Participants were primarily in a self-contained classroom (60.3%), with 37.9% receiving services in an inclusive classroom. The majority of participants (94.1%) had a primary eligibility of significant developmental delay (SDD) or developmental delay (DD), with 4.4% having Autism spectrum disorder (ASD), and 1.5% not reported. More than half of the participants (54.5%) also had a secondary eligibility of speech-language impairment according to state requirements. The mean age of the participants was 54.44 months ($SD=7.17$), with a range of 37 to 66 months. Of the participants, the majority were male (75%), with the remaining 25% female. Race/ethnicities identified were 64.7% Caucasian, 19.1% Hispanic/Latino, 10.3% African American, 1.5% biracial, and 2.0% who chose not to answer.

The average Total Language score on the Preschool Language Score – 5th Edition (Zimmerman, Steiner, & Pond, 2011; PLS-5) across participants was 75.41 ($SD = 13.04$), with a

minimum of 50 and a maximum of 98. The home language of children in this study was predominately English (82.4%), with nine other students described as also speaking a different language in the home (i.e., Spanish, Haitian-Creole, Swahili). Eighty-three percent of all participants were receiving speech-language therapy throughout this study. The most common medical diagnosis of children tested was ASD (8.8%); the second most dominant diagnosis was Down syndrome (4.4%).

Measures

Expressive One-Word Picture Vocabulary Test- 4th Edition (Brownell, 2010; EWOPVT-4). This test uses colored pictures to evaluate a person's ability to name common concepts (nouns, verbs, categories). The child is asked to verbally name single pictures of concepts typically encountered through home, school or media. This is a norm-referenced standardized test used with children ages 2 years to adults 80 years or older in the English language, (Brownell, 2010). This test is made up of 190 items total, with several items having arrows to point to specific parts of a picture to prompt the child on the targeted word being asked.

The Peabody Picture Vocabulary Test 4th Edition (Dunn & Dunn, 2007; PPVT-4). This norm-reference test measures the receptive single word vocabulary of people ages, from 2 years 6 months to 90 years or older (Dunn & Dunn, 2007). The PPVT-4 is made up of 228 testing items in total, each with four colored pictures as possible responses to each question. Children are required to point to one of four colored pictures presented to them indicating the target word. Of the two different testing forms available for use (A and B), the PPVT-4 Form A was used in this study to measure the accuracy and reliability of the children's scores (Dunn & Dunn, 2007).

Near-Transfer Tests (Towson, 2015). These tests were constructed to measure the single word expressive and receptive language of preschool aged children related to specific story books. Since data came from two separate studies, data was collected differently using the same Near-Transfer procedure. There were two different forms of both the receptive and expressive Near-Transfer tests analyzed. Data from the first study included 45 vocabulary words related directly to three storybooks (i.e., 15 words per book). Data from the second study included 30 vocabulary words related to six storybooks (i.e., 5 words per book). As not all 68 participants completed both receptive and expressive Near-Transfer tests, their results were recorded as “missing” for the Near-Transfer test they did not complete. Pictures for all target words were scanned from each book. For the expressive tests, the picture for each target word was presented in succession and the child was asked to name the picture, similar to the presentation for the EOWPVT-4. For certain pictures, black arrows were used to point to specific areas of the picture if it was unclear on the scanned image which aspect of the picture was to be named. For the receptive test, questions were set up in a choice of four words with four separate pictures per book as answer choices, with all images presented scanned from the same book from which the target word was taken. Directions were for the children to point to the picture showing the targeted word, with similar presentation to the PPVT-4.

Missing Data

There is a significant amount of missing data (13,846 items) in this study for various reasons. Missing data was recorded for the test questions if the experimenter did not write the answer the child uttered to or the experimenter wrote question marks (i.e., “???”), and were coded as “999” to skew the results of the missing data. For the Near-Transfer tests, missing data

was indicated due to two versions of the data sets used (as explained above). For example, 44 children received the 999 code for the Near-Transfer test they did not complete, and the remaining 24 children received 999 for the missing data for the Near-Transfer test they did not complete. For the EOWPVT and PPVT-4, missing data was indicated because of basil and ceiling rules, which is where an experimenter does not continue with a test if the child misses (chooses the incorrect answer choice) on a certain number of questions within a section of the exam test. Missing data was also noted for the remainder of the tests that children did not complete. For example, if a child completed one third of an exam but did not finish the rest, the remaining questions for that exam were marked as missing or no data.

Procedures

Data for this study was gathered from data of two independent similar research studies involving shared book reading. For each study, parental consent was obtained for the children prior to test administration. Only pretest data was used in this analysis as both studies were empirical studies of dialogic reading. A coding system was developed by the author based on prior research by Lahey and Edwards (1999) and Sheng & McGregor (2010) (see Table 1).

All participants' information was de-identified, assigned a number, and put into a SPSS (IBM Corp, 2013) database. Children's demographic information such as their medical diagnosis, if they received speech therapy, their PLS-5 score, home language, primary and secondary eligibility, race, and gender were entered into SPSS. Children's responses from the PPVT-4, EWOPVT-4, and researcher developed receptive and expressive Near-Transfer assessments were recorded in a Microsoft Excel database (Towson, 2015). Responses for all tests were coded by the author using the categories of the coding system created (e.g. Correct, Semantic Perceptual error, Phonological error, see Table 1). Error codes were entered into SPSS using a numeric system (see Table 1) and analyzed as indicated below.

Inter-Observer Agreement

Inter-Observer agreement (IOA) was conducted for 20% of the overall data (i.e., all 68 participants). Three research assistants (i.e., RA1, RA2, RA3) were trained to complete all aspects of IOA. IOA was determined by dividing the total number of agreements by the outside party by the total number of observations, multiplied by 100. Following initial entry of the results into the Excel database, 20% of the data for each subset of data was reviewed to ensure accurate entry. This was completed by RA1 and RA3. IOA was 98.8% and 100% respectively

for subsets one and two of the data. Once items were entered into SPSS, IOA was performed by RA2 and RA3 for 20% of each subset of data to ensure agreement on the coding system. Agreement was high at 93.6% and 99.56% for each subset of data respectively. Following the coding of the data, the author transferred the overall results of the number of errors per classification error noted into a Microsoft Excel spreadsheet. IOA was performed by RA3 with 99.40% agreement.

Data Analysis

A secondary analysis of preexisting quantitative data was completed from single word receptive and expressive vocabulary tests for 68 children. Data analysis was completed using SPSS and Microsoft Excel. Prior to the SPSS entry, data was entered into a Microsoft Excel spreadsheet with the children's answers to the four tests. Children's answers were then classified using a coding system (see Table 1) and entered into SPSS. To answer all three research questions, statistical analysis was conducted through SPSS using a frequency procedure to determine the amount of receptive and expressive errors made for each of the specific types of errors. Data was then entered into a separate Microsoft Excel spreadsheet with the total amount of errors. Data was entered numerically by frequencies for each of the receptive and expressive errors, then converted to percentages. The total percentages were used to determine the frequency of the types of errors that occur the most often across all items.

To answer research question one, the expressive tests were analyzed (i.e., EOWPVT-4 and expressive Near-Transfer tests). The responses were entered into a Microsoft Excel spreadsheet, then classified and coded into SPSS, with final numerical results entered into a separate Excel spreadsheet. This information was then converted from frequency to percentages

to determine the most common expressive errors of this study. For expressive errors, a total of 12,986 errors (with 7214 items of expressive missing) were coded and analyzed.

To answer research question two, results of children's answers from the PPVT-4 and Near-Transfer receptive tests were entered into a Microsoft Excel spreadsheet. Items were then classified by a coding system and entered into SPSS where a frequency procedure was completed. The frequency results were numerically entered into a Microsoft Excel spreadsheet, transferring the frequencies into percentages. A total of 11,833 expressive errors (6632 missing) were coded in this study.

To answer research question three, all expressive and receptive responses were totaled in the Microsoft Excel spreadsheet. Percentages were calculated to identify the total errors children made to for each specific category. A total of 24,819 responses were coded and analyzed (with 12,986 receptive, 11,833 expressive, and 13,846 items with No Data).

Results

Three research questions were presented for this study aiming to determine what types of errors preschool children with developmental disabilities make when presented with single word receptive and expressive vocabulary tasks. Each question related to the types of errors made and the frequency of which errors were represented across expressive, receptive, or combining both. All research questions were analyzed in SPSS using the frequency procedure.

Research question 1. Errors on single word expressive vocabulary tests (i.e., *EWOPVT-4*, *expressive Near-Transfer tests*) were analyzed as indicated above. For the expressive results, the most frequent error coded was No Response (21%), showing that children chose to not respond when presented with a picture to label. The second most common error code was Non-Informative (11%), which is where children would respond with “I don’t know”, “this”, “that”, or “something”. The third most common errors made (10%) were between Semantic Perceptual and Visual Error/Misinterpretation. The least common expressive errors made were Phonological; No Relation, Perseverative; Gestured; Unintelligible; and Incorrect, each representing 1% of the total expressive errors. Across all participants, the EOWPVT-4 mean score was 85.71 ($SD = 22.55$), with a minimum score of 0 and a maximum score of 128. There were a total of 3011 expressive errors, almost doubling the amount of receptive errors. Expressive errors also had 2761 correct responses (see Table 2).

Research question 2. Receptive language errors were analyzed based on responses to the PPVT-4 and the receptive Near-Transfer tests. Across all participants, the PPVT-4 mean score was 84.65 ($SD = 19.28$), with a minimum of 39 and a maximum of 121. When looking at the receptive errors that children make, errors most commonly coded were No Relation, representing

19% of the total errors coded. The next most common receptive errors coded were Semantic Associated and Semantic Within-Category (both at 18%). Additionally, children made more Incorrect responses (12%) receptively as compared to the expressive tasks. There were a total of 1654 receptive errors. Receptive task responses had the highest amount of correct responses (3547).

Research question 3. When examining total errors across receptive and expressive single word vocabulary tasks, there were a total of 24,819 possible responses within the data coded for this study. Incorrect responses made up 18.80% of the data, 25.42% were correct responses, and 54.57% was missing data. Similar to the expressive errors children with developmental disabilities made in picture naming tasks, No Response represented the highest amount of errors (14%). Similar instances of the results between expressive and receptive errors made by children with disabilities were Semantic Perceptual; Semantic Perseverative; Phonological; Non-Semantic Perceptual; No Relation- Perseverative; Gestured; and Unintelligible, respectively. Overall, children with developmental disabilities made 12% Semantic Perceptual errors, 11% No Relation errors, and 10% of errors were made in both Semantic Associated and Semantic Within-Category categories.

Summary of Results

In summary, more errors were made on expressive tasks than receptive tasks. Children tended to not respond (14 %) when presented with single word vocabulary tasks. The second two most common areas in this study were Semantic Perceptual (12%) and No Relation (11%) errors. The remaining 13 categories only made up 63% of the errors children with developmental disabilities make when presented with single word vocabulary tasks.

Discussion

The purpose of this study was to examine the type of semantic errors preschool children with developmental disabilities make in single word receptive and expressive vocabulary tasks. The present study adds to the current literature by describing the types of errors commonly made in single word tasks which could translate into difficulties in general oral language abilities. Preschool aged children often have difficulty with words such as nouns and verbs, both of which have a higher likelihood for errors to occur (Davidoff & Masterson, 1996). Results of this study indicated that preschool children with developmental disabilities make the most errors by having No Response (14%). The next most common errors made were Semantic Perceptual errors (12%), along with Semantic Associated and Semantic Within-Category (both at 10%).

Research Question 1

When looking at expressive errors, results indicated that children most often chose to not respond instead of attempting to answer a question. This can be impacted by the fact that young children with developmental disabilities will tend to shut down if they feel they are consistently getting answers incorrect or cannot provide the correct answer, thus resulting in No Response (Messer & Dockrell, 2006). This finding may suggest that children are waiting for the testing administrator to continue with the test or skip the question or they may need more time to respond. By not responding the children will be able to avoid feeling mistakenly wrong for saying an answer they may actually know the response to or to avoid producing an incorrect response.

Non-Informative response was the next most common error children with developmental disabilities made in expressive tests. This can relate to the No Response error, as children will

say something along the lines of “I don’t know” and make a Non-Informative response to the targeted word. This trend may be attributed to word finding difficulties as children had 11% Non-Informative response errors for expressive tests. It could be assumed that these children did not know the vocabulary word being asked due to the fact that the targeted word is not in their vocabulary, thus resulting in responses such as “I don’t know” (McGregor & Windsor, 1996; Messer & Dockrell, 2006). In addition, 10% of the expressive errors were Visual Error/Misinterpretation of the target word, which could be related to the fact that children may misinterpret what the question is indicating or, if there was an arrow, what the arrow was pointing at in the picture was flawed.

It should be noted that young children may experience word finding difficulties if they have never been exposed to the words being tested, as it is possible that children will try to say the next best thing that comes to mind (McGregor & Windsor, 1996; Messer & Dockrell, 2006). Although this may seem like a positive strategy, it ends up hurting the child in assessments because they may make Semantic Perseverative errors. However, in this study, Semantic Perseverative errors only accounted for a small number (2%) of expressive errors observed. While representing a small percentage of errors (1%), phonological errors of expressive vocabulary words might indicate difficulty in retrieving words or accessing the full phonological forms of the word, in addition to pronunciation errors (Messer & Dockrell, 2006; Messer, Dockrell & Murphy, 2004).

For expressive tasks, it is interesting to note that for each of the categories of Phonological; No Relation, Perseverative; Gestured; Unintelligible; and Incorrect errors, only 1% of errors were attributed to each. This suggests that errors made by children with

developmental disabilities on expressive single word tasks are more often semantically related errors (Messer & Dockrell, 2006; Sheng & McGregor, 2010). This is an important finding because it suggests that interventionists should focus on semantic specificity of expressive vocabulary words for this population.

Research Question 2

When analyzing the results of the receptive errors children made, children made less errors in receptive task (35%) than compared to expressive (65%). The most common receptive errors were No Relation (19%), Semantic Association (18%), and Semantic Within-Category (18%), respectively. The finding that children with developmental disabilities are more likely to make a receptive error involving one of the categories listed above instead of not responding indicates that children will try to make a response, regardless if it is correct or not, in order to answer the questions being asked in the assessments given. This also may be because pointing is easier than generating a response. However, these receptive errors could also be due to the fact that the tests administered are inherently impacting the children's results. For example, the top three results for receptive errors after No Relation were Semantic Association, Semantic Within-Category, and Semantic Perceptual, respectively. Since the receptive tasks had four pictures for the child to choose from, the remaining three incorrect choices may be similar to the target word, thus resulting in any incorrect response being coded as semantically related (Justice et al., 2016).

Although this study did not explore correlations, it is interesting to note that for the receptive tests, two students gestured. This is important to recognize because the speech-language pathologists who administered the tests labeled their response as "gestured", however,

the directions of the receptive tests such as the PPVT-4 and Near-Transfer receptive tests have the children point to the specific picture.

As the results indicate, children often made expressive Semantic Perceptual errors, where the target objects look similar to the label they provided. It is interesting to note that 16% of errors for receptive tasks were due to Semantic Perceptual errors. Research by McGregor & Windsor (1996) suggests that priming children to facilitate naming in their responses has increased children's responses to being more accurate in their results. However, by priming, children could be making errors in their responses, specifically Semantic Perceptual errors, when they are shown semantically related tasks (McGregor & Windsor, 1996). For this study, results in receptive errors indicate that Semantic Perceptual errors were more commonly known when seeing four possible similar pictures of the targeted word being asked.

Research Question 3

When prompted with a single picture, the most common semantic errors children with developmental disabilities made were No Response, regardless if it was an expressive or receptive error. It is interesting to note that errors such as Semantic Perseverative; Phonological; No Relation, Perseverative; Semantic Circumlocution; Gestured; and Unintelligible occurred 3% or less of the total responses. These response errors were thought to be more common with the age group of the children studied, as shown in previous research of children with developmental disabilities with decreased vocabulary skills (McGregor & Waxman, 1998). However, the results from this study contradict those findings. According to Justice and colleagues (2016), practicing vocabulary words at home through literacy activities translates to language use for children in

social settings; thus, the receptive results indicate that children with disabilities have the potential to successfully describe, say, and act out the target vocabulary word.

When comparing expressive and receptive errors, more errors occurred in expressive tasks, with more correct responses occurring with the receptive tasks. Expressive words may be harder for children to differentiate due to different verb structures, such as different tenses of the words (past, present, future) which can be supported by expressive tests having 65% of errors (Messer & Dockrell, 2006). In expressive tasks, children are not given an option of their choices unlike receptive tasks. This suggests that children have more freedom in acknowledging what a particular word means, as words often can have multiple meanings or various names used.

Although the coding system was applied in the same way for both receptive and expressive errors, it is important to highlight the results coded as Non-Informative represented 11% of the total expressive errors and less than 1% of the total receptive errors. This information suggests that each child interprets vocabulary words and specific expressive errors made similarly when they do not recognize a word, such as by responding “I don’t know” or “this” or “that”, thus resulting in a Non-Informative response. Overall, preschool children made more semantic errors in this study than non-responses or non-informative responses, although the types varied between receptive and expressive. Naming difficulties within the semantic category were the second most common errors children made (Semantic Perceptual at 12%), which supports the fact that children with developmental disabilities tend to make more semantically related errors (Lahey & Edwards, 1999; Messer & Dockrell, 2006) and is supported by other studies (Sheng & McGregor, 2010). However, this research study adds to the research base by showing that children make the same type of semantic errors in the categories of Semantic

Associated (10%), Semantic Within-Category (10%), and Visual Error/Misinterpretation (8%) across both receptive and expressive vocabulary tasks.

Implications

Learning vocabulary words at a young age helps with later language development (Dennis, 2016). Being exposed to vocabulary words throughout childhood and the critical period of learning is essential for children to understand the meanings of those words (Andreu et al., 2012; Dennis, 2016). Allowing children to be increasingly exposed to vocabulary words will help with their understanding of those words, which also aids in their practice and usage of vocabulary words learned. Knowing the types of errors children with developmental disabilities make will help therapists in the planning of interventions in teaching children new vocabulary words in order to foster growth in the overall oral language skills. Furthermore, parents, clinicians and educators of preschool aged children alike should expose children with developmental disabilities to more vocabulary words in order to increase recognition and understand vocabulary (Andreu et al., 2012; Dennis, 2016; van der Schuit et al., 2009).

The current study describes the types of errors children with developmental disabilities make when responding to receptive and expressive single word tasks. Several implications are offered. As the most common error noted was No Response, it should be noted that when working with preschool children, especially children with developmental disabilities, it is important for parents, teachers, and clinicians alike to provide an opportunity for the children to respond. Additionally, when given a vocabulary word or picture, implementing a prompt for the child to respond may be necessary for helping the child produce the appropriate response, thus allowing them to demonstrate their knowledge of the vocabulary words presented. Knowing the

errors that children with developmental disabilities make will help speech-language pathologists in understanding the next step of therapy by using a specific type of prompting, such as time delay, phonological, or simply provided more time, and encouraging children to respond to vocabulary words. For example, when a child makes an expressive error of Semantic General, the therapist will know to provide a prompt of asking the child to be more specific (e.g., asking the child to say what kind of fruit if the child responds with “fruit” for “pear”). Educating others to make note of children’s struggles, which may result in errors of single word vocabulary tasks, will help children who are at risk of developmental disabilities decrease in the errors they make (Dennis, 2016).

Although parents who have a child with a disability tend to have fewer interactions around vocabulary and literacy, parents should continue to read to their children in order to increase the language and vocabulary skills of their child, (van der Schuit et al., 2009). Exposing their child to more vocabulary words will help with the child’s development, and therefore, increase their vocabulary resulting in fewer errors being made in vocabulary tasks. Parents should engage their child in more discussions of words they see while reading, not only to improve their child’s vocabulary language and development, but also because reading with their child can impact and increase their literacy skills (Carlson, Bitterman & Jenkins, 2012; Justice et al., 2016; van der Schuit et al., 2009).

Limitations

There were several limitations to this study that should be noted. The children’s rate of response was not recorded, nor was it relevant to this study. Although other studies have

mentioned the importance of timing in picture naming tasks, this study was not focused on speed. Because the results examined standardized testing situations, no prompts were provided for the children. Therefore, it could not be determined if providing a specific type of prompt may have facilitated a correct response. Additionally, the results did not test the amount of time or latency children took when presented with a picture to respond. Any previous literature regarding timed responses were not able to be compared to since there was no length of time recorded for the results in the present study.

Conclusion

In summary, this study provided information related to the types of errors made by preschool children with developmental disabilities during expressive and receptive single word vocabulary tasks. Overall, children with developmental disabilities chose not to respond (14%), with the other most common errors occurring being Semantic Perceptual, Semantic Associated, and Semantic Within-Category. These results suggest that preschool children with disabilities may need to be prompted and given more time when completing standardized and researcher developed assessments of receptive and expressive vocabulary, as well as during every day routine interactions in across settings. Results of this study provide evidence for the need to increase child response time and specifically prompting the child to allow for a response when teaching new vocabulary words. This study adds to the limited research on the types of errors children with developmental disabilities make in regards to single word vocabulary tasks with their expressive and receptive language.

Table 1

Table of classification of the coding systems used

Reference Number	Coding Label	Coding Description
1	Semantic General*	Saying fruit for pear
2	Semantic Specific*	Saying chicken for bird, individually naming grouped items
3	Semantic Associated*	Saying key when shown a picture of a lock
4	Semantic Within-Category*	The child said something within the category but answer was incorrect (e.g., bread for cake)
5	Semantic Perceptual*	Related and looks the same
6	Semantic Perseverative*	Named an object semantically related to the target and object had been previously shown in the same session during this or another task
7	Phonological* ⁺	Phonologically similar to the object (e.g., /elle/ for /elephant/)
8	Non-Semantic Perceptual*	Named an object not semantically related to target but looks similar
9	No Relation* ⁺	Not a real word or related in any way
10	No Relation, Perseverative*	Named a previously seen object or object with no relation to the target word
11	Semantic Circumlocution* ⁺	Describing items (e.g., horseback riding thing/saddle, laying on the water/floating)
12	Non-Informative*	Saying “I don’t know” or “this” or “that”
13	No Response ⁺	Did not respond
14	Visual Error/Misinterpretation ⁺	Misperception of the target that resulted in a visual error

15	Gestured [^]	The experimenters noted that the child made a gesture but did not fully speak
16	Unintelligible [^]	The experimenters heard a response from the child but could not decipher what the child said
17	Correct [^]	Child answered question correctly according to the test
18	Incorrect [^]	Test was marked incorrect but their answer was not recorded or type of error couldn't be identified
999	No data [^]	Not all children were administered all aspects of a test due to basils and ceilings, the experimenters didn't write what the child uttered, or wrote "???"

Note: * Refers to codes taken from Lahey & Edwards, 1999; + Refers to codes taken from Sheng and McGregor, 2010; ^ Refers to codes developed by the author

Table 2

Results of Expressive and Receptive Errors by Coding System

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Expressive	199	262	196	171	291	63	29	54	191	40	155	328	638	302	20	35	37	3011
Receptive	0	2	291	302	262	10	0	125	312	31	0	3	28	89	2	0	197	1654
TOTAL	199	264	487	473	553	73	29	179	503	71	155	331	666	391	22	35	234	4665
Percentage Expressive	7%	9%	7%	6%	10%	2%	1%	2%	6%	1%	5%	11%	21%	10%	1%	1%	1%	
Percentage Receptive	0%	0%	18%	18%	16%	1%	0%	8%	19%	2%	0%	0%	2%	5%	0%	0%	12%	
Percentage TOTAL	4%	6%	10%	10%	12%	2%	1%	4%	11%	2%	3%	7%	14%	8%	0%	1%	5%	

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