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## Early Dynamic Assessment of Morphological Awareness and Early Literacy Achievement: A Feasibility Study

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Early Dynamic Assessment of Morphological Awareness and Early Literacy Achievement:

A Feasibility Study

Katherine Pike

Utah State University

2013

A Plan B project submitted in partial fulfillment

of the requirements for the degree

of

MASTER OF SCIENCE

in

Communicative Disorders and Deaf Education

Specialization in Speech and Language Pathology

Approved:

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Committee Member

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Wendy Holliday

Committee Member

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

### Abstract

**Purpose:** The purpose of this study was to determine the feasibility of studying whether a) a morphological awareness dynamic assessment task was sensitive to assessing emerging knowledge of morphological awareness and revealed a range of performance in typically developing children, and b) performance on a dynamic assessment of morphological awareness is related to other predictors of language and literacy success.

**Method:** Participants for this study included 15 typically developing children attending preschool in the Intermountain West with a mean age of 5 years, 2 months. The Early Dynamic Assessment of Morphological Awareness (EDAMA) was developed and administered, and a static morphological generation task and a language literacy battery were administered to each child. The EDAMA required children to use their knowledge of base words and suffixes to infer meaning of unfamiliar, morphologically complex words. The 17 stimulus items were administered with a series of increasingly helpful scaffolds to help facilitate morphological awareness knowledge.

**Results:** A measurement of the skew of the data revealed that the EDAMA is less likely to have a floor effect in 4-year-olds than a static morphological generation task, and a correlational analysis revealed that the dynamic assessment may be more significantly related to later literacy success than a static assessment.

**Implications:** The findings of this study indicated that dynamic assessment may be used as a sensitive test to discriminate a range of performance. The EDAMA appeared to be useful as a screening measure to provide assessment and treatment insights for young children.

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

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## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

Morphological awareness is the ability to understand and manipulate the smaller meaningful parts that build words such as prefixes (e.g., *re-*), base words/roots (e.g., *cycle*), and suffixes (e.g., *-ing*) to develop complex inflectional or derivational word forms (e.g., *recycle*, *cycling*, *recycling*) (Apel & Lawrence, 2011; Carlisle & Nomanbhoy, 1993; Jarmulowicz, Taran, & Hay, 2007; Kuo & Anderson, 2006; Nagy, Berninger, & Abbott, 2006). Researchers have shown that morphological awareness skills significantly contribute to literacy development (Apel & Lawrence, 2011; Carlisle, 1995, 2000; Nagy, Berninger, & Abbott 2006; Wolter, Wood, & D'zatko, 2009). Specific research has been conducted that links morphological awareness to the successful literacy abilities of sight word reading, decoding, reading comprehension, and spelling (Carlisle, 1995, 2000; Carlisle & Nomanbhoy, 1993; Jarmulowicz, Hay, Taran, & Ethington, 2008; Singson, Mahony, & Mann, 2000; Wolter et al., 2009). Thus, morphological awareness may prove to be a powerful tool in identifying children who are at risk for literacy failure. If at risk children can be identified as at risk in preschool, then appropriate intervention can be implemented to potentially prevent literacy failure in later grades.

Prefixes and suffixes can be categorized into two main sub-groups which include inflectional and derivational morphemes. Inflectional morphemes are suffixes that change tense, possession, and plurality. Knowledge and use of inflectional morphology generally develops earlier than derivational morphology. Derivational morphemes which are prefixes and suffixes that change word class (e.g., verb to noun as in *teach* to *teacher*) can be further categorized as transparent and opaque derivatives. Transparent derivatives are created when the base word and the derived word have no phonological (sound) or orthographic (spelling) changes (e.g., *swim* and *swimming*). Conversely an opaque derivative is formed when the base word and the derived word includes an orthographic and/or a phonological shift (e.g., *long* to *length*).

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### **Morphological Awareness, Language, & Literacy**

Morphological awareness has been linked to success in phonological awareness, vocabulary acquisition, decoding, spelling, and reading comprehension (Apel & Swank, 1999; Bauman, Edwards, & Kaneenui, 2003; Carlisle, 1995, 2000; Jarmulowicz, Hay, Taran, & Ethington, 2008; Kirby, Desrochers, Roth & Lai, 2008; McCutchen, Green & Abbott, 2008; Schwiebert, Green & McCutchen, 2002; Nagy et al., 2006; Nunes, Bryant, & Olsson, 2003; Jarmulowicz, Hay, Taran, & Ethington, 2008; Wolter & Green, in press). Once readers are aware of the suffixes and prefixes added to base words, readers learn to see words as the sum of these component parts and are more able to infer the meaning and pronunciation of unfamiliar words (Green, 2009). While phonological awareness is a well-established predictor of literacy, morphological awareness has been found to contribute unique variance to children's early literacy development (Apel & Lawrence, 2011; Deacon, 2011; Deacon & Kirby, 2004; Kirk & Gillon, 2009; Wolter et al., 2009). Specifically, Carlisle and Nomanbhoy (1993) and Wolter et al. (2009) reported that morphological awareness accounted for 4% and 9.6% respectively of the variance in single word reading among first grade children, above and beyond the contribution of phonological awareness.

Not only has morphological awareness been shown to be a unique contributor to literacy success, but other links to single word reading and spelling have been found. For example, Carlisle and Stone (2005) found that two-syllable words made up of two familiar morphemes (e.g., *shady*) were read more accurately and rapidly than two-syllable words made up of one morpheme (e.g., *lady*). Additionally, Wolter et al. (2009) found children as young as first grade integrated morphological knowledge in their spellings and more readily correctly spelled the "t" pronounced as /d/ in two-morpheme words (e.g., *dirty*), where the base word (e.g., *dirt*) provided

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clues to correct spelling, than in one-morpheme words (e.g., *city*), where morphological knowledge could not be applied. These findings suggest that reading and spelling performance is at least partially based on sensitivity to morphemic units.

Researchers have found that morphological awareness may be a valuable screening measure for predicting reading and spelling performance in children (Wolter et al., 2009; Deacon, in press; Kirby, Deacon, Bowers, Izenberg, Wade-woolley, & Parrila, 2012). Kirby et al. (2012) assessed morphological awareness using a word analogy task with a wide range of morphological transformations. The results of this task were then compared to five measures of reading in children from Grades 1 to 3. Results indicated that the word analogy measure had satisfactory reliability, and that morphological awareness was a significant predictor of word level reading accuracy and speed, text reading speed, pseudoword reading accuracy, and reading comprehension. Similarly, Deacon (in press) found that morphological awareness, along with phonological awareness and orthographic processing, made significant independent contributions to early word reading in children in grades 1 to 3. Both studies indicated that morphological awareness has an important role in word reading and comprehension and that morphological awareness tasks should be included more frequently in assessment and intervention.

Additionally, researchers have found that morphological awareness may be a valuable screening measure for predicting reading and spelling performance in children with speech and language impairments (Apel & Lawrence, 2011). For example, Apel and Lawrence (2011) compared the morphological awareness abilities of kindergarten children with a speech sound disorder (SSD) and typically developing children. Results indicated that children with SSD scored significantly lower on morphological awareness tasks than their typically developing



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peers. Morphological awareness also predicted significant unique variances in spelling for both groups and word-level reading in children with typical skills.

### **Morphological Awareness in Young Children**

Few morphological awareness measures for children as young as kindergarten or preschool have been developed and tested (Apel & Lawrence, 2011; Carlisle, 1995; Tyler, Lewis, Haskill, & Tolbert, 2002). A significant difficulty in assessing morphological awareness in preschool and kindergarten age children is that their morphological knowledge is often more implicit (Carlisle, 1995). In other words, young children cannot actively talk about or manipulate language, but they have some sensitivity or awareness of language and language structures. According to Valtin (1984), implicit awareness implies that children are “able to abstract the language from the action and the meaning context and to think about some properties of the form of the language” (p.214), but they are still unable to consciously manipulate individual morphemes.

Given some of the aforementioned limitations, the few measures used to assess early morphological awareness, such as the commonly used production task where children are given a root word (e.g., *farm*) and are asked to provide a derived word (e.g., *farmer*) to complete a sentence (“*My uncle is a \_\_\_\_\_*”) may be too difficult and not sensitive enough to measure young children’s ability to manipulate morphemes. One task, which was created by Carlisle (1995) as a way to measure emerging morphological awareness for kindergarteners was a judgment task, which included derived sentence contexts with morphological relationships (e.g., “A person who *teaches* is a *teacher*”) and sentence foils without morphological relationships (e.g., “A person who makes *dolls* is a *dollar*”). The task required children to state whether the sentence “made sense” or “was silly.” Despite the efforts to create a task appropriate for young

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children, Carlisle found this task to be unreliable in young children as she found high error rates and increased instances of guessing. This morphological awareness task, however, still appears for assessing metalinguistic skills such as morphological awareness as Carlisle concluded that the tasks used in the evaluation required the child to “examine and think about the language in ways they may not, if left to their own devices” (Carlisle, 1995, p.198). Since that initial research, more has been discovered regarding young children’s morphological development and the effects of word transparency and even imageability (i.e., how easily a word can be pictured in one’s mind) of words (Carlisle, 2003; Deacon & Kirby, 2004; Wolter & Hansen, 2007). Thus, subsequent research with Carlisle’s task, in which these types of linguistic factors are controlled, a focus of the present study, may prove to be more sensitive and reliable.

One standardized measure of morphological awareness was released in 2008 in the Test of Language Development Primary Fourth Edition (TOLD-P4) which includes a normed sample as young as four-years-old. Newcomer and Hammill (2008) the authors of this test assert that they have eliminated floor and ceiling effects in all of their subtests including the morphological completion subtest. The authors also claim that numerous validity studies were conducted to determine the test’s sensitivity and specificity. After administering this subtest to young children in both the research and clinical settings the researcher feels that the standardized nature of the instructions for this subtest prevent the examiner from properly explaining the task and so it is often misunderstood. For example the first stimulus item in this test asks the child “Yesterday, I found one penny. Today I found two more\_\_\_\_\_.” The child is expected to answer with the word “pennies” effectively showing their knowledge of the plural –s morpheme. When administering this task to young children they often do not understand that they are expected to use the same word that is in the first sentence to complete the second sentence. In their minds it

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is completely logically to complete the sentence with words such as “puppies,” “aliens,” or “dollars.” In this instance whether or not the child chose a word with a plural –s ending their answer is still wrong based on the guidelines given in the examiner’s manual of the TOLD-P4. Thus, available morphological awareness measures appear to be limited for young children and tasks need to be developed that are appropriate for this population.

### **Dynamic Assessment**

Dynamic assessment may provide an ideal medium for testing morphological awareness in young children. Dynamic assessment may refer to one of two methods. The first involves administering an assessment once, then teaching strategies to improve assessment performance, and then administering an assessment again in order to show learning. This method usually takes place over a period of days or weeks. An assessment is given and then intervention is implemented for a specified number of sessions before the assessment is readministered. Conversely, dynamic assessment can be more immediate where a test item is provided and prompts are given based on how the student performs on that task. Prompt levels can then be immediately assessed to determine how the child responded to scaffolding or support.

One benefit to using dynamic assessment is that it may provide a way to sensitively assess morphological awareness for young children. Current methods of assessing morphological assessment are not effective in assessing young children who show basal effects. A basal effect refers to when a child misses all of the stimulus items, giving the examiner no valuable information as to whether the child is stimuable for instruction or is emerging in his/her ability to complete the task.

In addition, dynamic assessment may be a successful early screening tool to determine the type of intervention appropriate for individual children under the Response to Intervention (RTI) model. RTI refers to the current method of academic intervention used in the United States

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to provide early, systematic assistance to children who are having difficulty learning. RTI seeks to prevent academic failure through early identification, and integrates multi-tiered or leveled instruction wherein students are instructed at varying levels of intensity based on individual need. In this model children can only be identified as having a learning disability or reading disability if they show inadequate response to classroom instruction (Tier 1). All children who participate in periodic universal screenings and “fail” are placed in short-term intervention programs (Tier 2). Ultimately if children are not responsive to that more intensive instruction, then they are likely qualified or placed in Tier 3 or special services where intensive therapy is provided based on the student’s individual needs. According to Petscher, Kim, and Foorman (2011) the key to appropriately placing a child into interventions are assessments that are brief, easy to use, and highly accurate at identifying students who are at risk for future failure. This is typically accomplished through static or traditional screeners who do not provide any prompts; however, Bridges and Catts (2011) found that adding a dynamic test, in this case, one which measured phonological awareness, significantly added to the predictive value of a static screening measure. Additionally, dynamic assessment has also been shown to be an effective method for both assessment and instruction in the areas of phonological awareness in children with complex communication needs (Gillam, Fargo, Foley & Olszewski, 2011), narrative development (Pena, Gillam, Malek, Ruiz-Felter, Resendiz, Fiestas, & Sabel, 2006), identification of gifted children (Calero, Belem, & Robles, 2011), appropriate instructional strategies (Schneider and Ganschow, 2000), and reading comprehension (Elleman, Compton, Fuchs, & Bouton, 2011).

When choosing screening assessments, it is ideal not to identify too many students for Tier 2 or Tier 3 intervention or to miss students who are in need of services. This ideal appears

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easy to achieve but is complicated by a multitude of factors. Due to resource allocation and changing priorities, educators must weigh trade-offs between providing intervention for those who do not need it and providing no intervention for those who do need it. This complicated issue may be partially resolved if dynamic screeners could increase the predictive validity of currently used literacy screeners (Bridges and Catts, 2011).

Finally, dynamic assessment is a potentially valuable tool for testing young children as it may be a more sensitive tool for determining the level of implicit or explicit knowledge of morphological awareness. This is important because an explicit knowledge of morphological awareness may be required in order for a child to be successful in literacy. Dynamic assessment tasks first allow the examiner to determine how well a child is able to perform independently, and whether the children can successfully complete the tasks when provided with a series of prompts. These prompts provide multiple opportunities for the examiner to ascertain how the child is thinking and responding to a task. This insight into the child's thought process can reveal how implicit or explicit the child's morphological knowledge is and determine whether the child is currently emerging into more focused or explicit manipulation of language. In other words, dynamic assessment may be able to provide insight into how responsive a child may be to intervention.

Dynamic assessment of morphological awareness has been briefly studied in older students and was introduced in a study by Larsen and Nippold (2007) for sixth grade children. These researchers based their dynamic task on Vygotsky's (1978) theory *zone of proximal development* (ZPD). This theory purports that while a child's independent performance may be limited, if an adult provides scaffolding in the form of various cues and prompts, the child's performance can be increased and potential for growth can be accessed by the examiner Larsen and Nippold

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developed a progressive series of scaffolds or prompts in a dynamic task for morphological awareness in sixth grade children. These researchers asked sixth grade children to define a series of 15 derived words. A series of prompts were presented based on the student's ability to define words correctly. In one testing session the tester was able to determine whether a child could complete a task, give immediate feedback, and determine whether that feedback allowed the student to successfully complete the task. These prompts were modified by Wolter & Pike (in preparation) and found to be successfully sensitive in identifying morphological awareness skills in third grade children. Researchers have not, however, established whether dynamic assessment may be an effective method for assessing morphological awareness in preschool and kindergarten age children, which is the aim of this study.

### **Purpose and Hypothesis**

Thus, the purpose of this study is to develop a dynamic assessment task for young children and then determine the feasibility of whether a) an early morphological awareness dynamic assessment task is sensitive to assessing emerging knowledge of morphological awareness and reveals a range of performance in typically developing preschoolers and kindergartners, and b) performance on a dynamic assessment of morphological awareness is related to other predictors of language and literacy success.

Based on our review of current available research, the researchers suspect that the Early Dynamic Assessment of Morphological Awareness (EDAMA) task used will reveal a range of performance in typically developing preschoolers and kindergartners. Furthermore, the researchers hypothesized that scores on the dynamic morphological awareness task would be significantly related to other measures of language and literacy.

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### Methods

#### Participants

The participants for this study included 15 typically developing children attending preschool and kindergarten in the Intermountain West with a mean age of 5 years, 2 months. Testing was administered during the spring semester. Parents and teachers reported no concerns regarding speech and language development. Language abilities were confirmed to be within typical limits based on scores on the *Test of Language Development Primary, fourth edition* (TOLD-P4; Newcomer & Hammill, 2008) sentence imitation subtest. Cognitive ability was within normal limits for all participants as determined by scores on the *Kaufmann Brief Intelligence Test—Second Edition* (KBIT-2; Kaufman, & Kaufman, 1990) matrices subtest. Hearing acuity was within normal limits for all participants.

#### Measures

**Language and Literacy test battery.** Each child completed a series of tasks in which phonological awareness, print knowledge, and expressive and receptive vocabulary were assessed. Phonological awareness skills, print knowledge, and expressive vocabulary were tested using the *Test of Preschool Early Literacy* (TOPEL; Lonnigan, Wagner, Torgeson & Rashotte, 2007). Receptive vocabulary was tested using the *Peabody Picture Vocabulary Test 4<sup>th</sup> edition* (PPVT-4; Dunn & Dunn, 2007).

**Adapted Early Dynamic Assessment of Morphological Awareness task.** The dynamic assessment of morphological awareness task originally developed for 6<sup>th</sup> graders by Larsen and Nippold (2007) was used as a model for the EDAMA task created for the present study. The challenge of the current researchers was to modify the task items and probes to be appropriate for preschool age children. This involved changing stimuli words, definitions, and

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sentences to be appropriate for young children as well as developing a receptive picture task to serve the purpose of the multiple choice prompt in the original protocol.

***Stimulus development.*** The purpose of the EDAMA was to ascertain whether young children could determine whether a base word and morphologically complex word were related based on their knowledge of familiar base words and suffixes. Words were selected to ensure that participants used their morphological knowledge to assist them in the task. This was accomplished by including familiar or high frequency base words and morphologically complex words with unrelated foils. An example of a stimulus item is the word *walk*, which is a high frequency base word, and the word *walked*, which is a high frequency morphologically complex word. An example of a foil is the word *car*, which is a high frequency base word, and the word *card*, which is a high frequency word that is not morphologically complex. These foil pairs were designed to mimic the spelling and sound changes that occur when adding inflectional morphemes to base words. For example, *card* mimics the sound change of adding the past tense –ed to the word *car*. Foils were included to provide a control to ensure students were making judgments of word pairs based only on the morphological relations between words.

The protocol included nine related base words and morphologically complex words and eight foil pairs (see Appendix A). Words were selected so that two examples of each inflectional suffix (plural –s, present progressive –ing, and past tense –ed) were represented along with the two earliest developing derivational suffixes (agentive –er, and –ly). Frequency ratings were controlled using *The Educator's Word Frequency Guide* (Zeno, Ivens, Millard, & Duvvuri, 1995). This book includes words rated for their frequency of occurrence in written language according to grade levels. Zeno et al. calculated logarithmic transformations which corresponded to word frequency. A value of 90 represents a word used once every 10 words of



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text and 50 represents a high frequency word that appears once every 100,000 words of text (Larsen & Nippold, 2007). Thus, in order for a word to be considered high frequency in our study it required a lexical frequency of 44 or greater. The mean lexical frequency of the included words was 58.1 (range 44.2 to 68.8).

Since the examiners decided to include a receptive picture task, it was also imperative that the words selected be highly imageable. Since highly imageable words are easily pictured, this allowed simple line drawings to be included as a scaffold for each of the stimulus items. Also, for young preschool- and kindergarten-age children, abstract thought associated with low imageable words is not a developmentally typical ability, so it was important that all of the stimulus items were highly imageable. Imageability was determined by nine undergraduate students who rated the words on a scale adapted from Paivio, Yuille, and Madigan (1968) where 1 is low imageability and 7 is high imageability. Only words that scored a 4 or higher were included in this study. The words included in this study had a mean imageability score of 5.62 (range 1 to 7).

Simple black and white drawings were created by an artist to represent each of the test items and compiled into a receptive vocabulary measure that was administered to both adults ( $n = 11$ ) and 4- and 5-year-old children ( $n = 15$ ) to ensure that each picture adequately described the word it represented. For each drawing, a 90% inter-rater agreement by adults and children was found.

### Procedures

The 17 finalized test items and practice items (see Appendix A) were presented to the children in one-on-one testing sessions. In the testing sessions, children were asked to determine whether the two target words used in a contextualized sentence were “silly” or “made sense”

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(e.g., If there is more than one *animal*, there are *animals*). A series of sample items were first administered to ensure the children understood the task. If a child was not able to correctly identify whether sentences made sense or not, then the dynamic portion of the task was administered. In order to dynamically ascertain the level of the child's morphological awareness functioning, a series of prompts were created by the authors and systematically administered to determine the required level of assistance needed by the participants. The prompts in this study followed the continuum of contexts for vocabulary learning by Beck, McKeown, and Kucan (2002). According to Beck et al. vocabulary contexts occur along a continuum of explicitness. Contexts can be misdirective, ones that offer no assistance in directing an individual to any meaning for a word. In the middle of the continuum are general contexts that provide enough information to place words in a general vocabulary category. At the end of the continuum are directive contexts that very explicit and lead individuals to a specific, correct meaning for a word. This is typically done using description and/or definitional phrases.

In the current dynamic task three potential prompts were provided and included varying levels of vocabulary context (see Appendix A for item-level prompts). Depending on the child's performance on the first prompt (Prompt 1) (e.g., Is this sentence silly or does it make sense – “If there is more than one *animal* there are *animals*) extra prompts were provided. If the child answered incorrectly then more specific prompt (Prompt 2) was provided (e.g., “*The lion, who is a zoo animal, was lonely so he asked four other zoo animals to play with him.*” – Now- Does the word *animal* have anything to do with the word *animals*?) The first and second prompts are examples of a general context because the targeted words were contextually explained. Prompt 1 allows the reader to place the word *animals* in at least a general category (i.e. there is more than one.) Prompt 2 allows the reader to place the word *animals* in slightly more specific, but still

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general, categories (i.e. an animal is something capable of both watching and playing and can show different emotions) (Beck, McKeown, & Kucan; 2002). If a child was unsuccessful in answering correctly with the 1<sup>st</sup> two prompts, the final prompt (Prompt 3) was provided and included pictures of both words and more explicit contexts in the sentences provided. In this prompt, the examiner stated a simple sentence while pointing to a picture of each word (e.g., “The lion is a zoo animal.” “These are four zoo animals.” The child was then asked one more time: “Does the word animal have anything to do with the word animals?”). This prompt level was considered a directive context in which a more explicit and specific meaning of the word was provided.

### **Scoring**

Each participant was scored based on a 0-3 point scale depending on the required level of prompting. A score of 3 was awarded if the participant could correctly identify the relationship between the words without scaffolding. A score of 2 was awarded if the sentence with a general context was needed, a score of 1 was awarded if a picture prompt with a directive context was required, and a score of 0 was awarded if the participant could not identify the relationship correctly with all levels of support. Two blinded scorers scored all protocols and inter-scorer point-to-point agreement was 99%.

### **Results**

Descriptive statistics and skewness for both the static and EDAMA tasks are presented in Table 1 and Table 2. Table 1 reflects the results of the aforementioned tests administered to 4-year-olds while Table 2 reflects results from the 5-year-old participants. Of particular note is the skewness statistic, which can provide information regarding the presence of floor effects in the data. As previously discussed, one of the primary difficulties with assessing morphological

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awareness in young children is the floor effect. In other words, young participants tend not to accurately answer any of the stimuli providing the examiner little to no useful information for further assessment or intervention. The farther the absolute value of the skewness statistic is from zero, the greater the skew of the distribution and the more likely the assessment is to have a floor effect. When calculated on the 4-year-old participants the EDAMA task had skewness closer to zero than the static task, however, this difference was small (i.e., 0.60). In the 5-year-old population the difference between the skewness of the dynamic and static tasks was even smaller with the static task having skewness closer to zero (i.e., 0.15). These results may indicate that the EDAMA task may slightly reduce the floor effect in 4-year-olds, but the static task may be marginally better at reducing floor effect in 5-year-old children.

In order to determine whether the EDAMA revealed a range of performance, we compared the means and standard deviations of the static and dynamic morphological awareness tasks. The standard deviations for both the four- and five-year-old sample groups ( $SD = 4.22$  and  $5.90$  respectively) were much higher than the standard deviations of the static morphological awareness task for both the four and five-year-old sample groups ( $SD = 1.97$  and  $2.54$  respectively). These results, found in Table 1 for the four-year-olds and Table 2 for the five-year-olds, may indicate an increased sensitivity to the range of performance levels seen in preschool and kindergarten age children for the dynamic task. Figure 1 and Figure 2 further demonstrate that the dynamic scaffolding included on the EDAMA aided participants in their ability to correctly answer more stimulus items. Figure 1 shows that no 4-year old participant was able to answer more than half of the stimulus items on the static assessment and most of the participants only scored 2 out of 15 points or 13.3% of the total possible points. Figure 2 shows the majority of participants earned 10 out of 48 points or 20.8% of the total possible points on

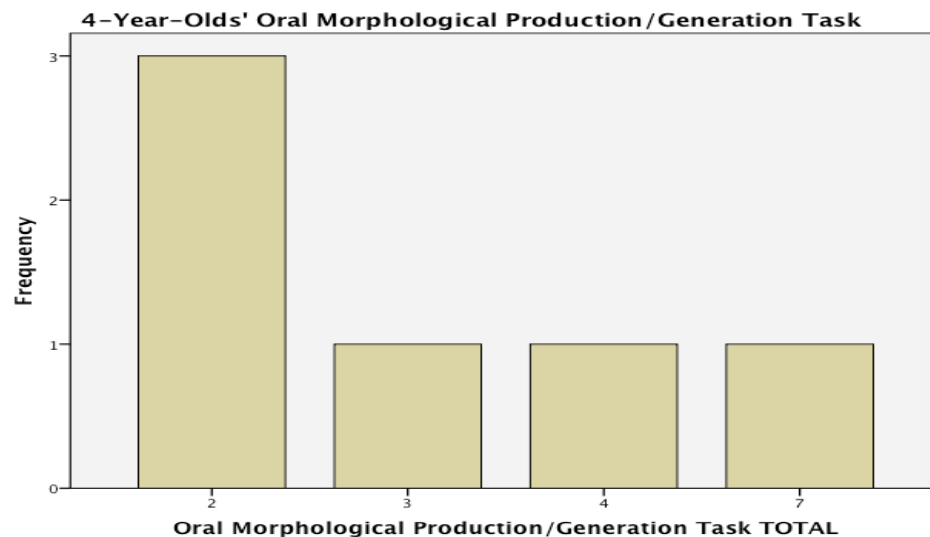
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the EDAMA. Figure 3 and Figure 4 show the distribution of scores on the static and dynamic morphological awareness tasks among 5-year old participants. The greater range of scores in Figure 4 as compared to Figure 3 visually illustrates the fact that the EDAMA reveals a greater range of performance among 5-year old children.

**Table 1.** Descriptive Statistics and Skewness for the Static Morphological Awareness and EDAMA Tasks to 4-year-olds

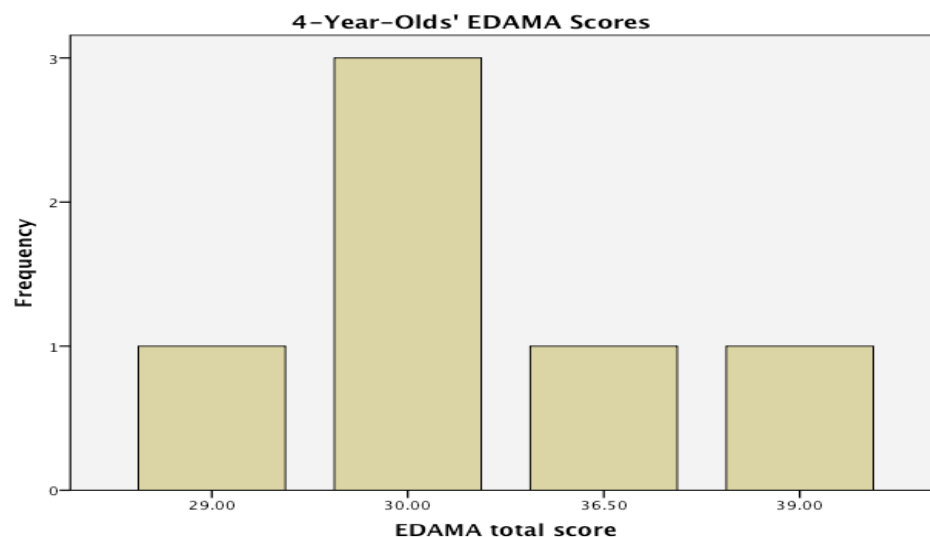
Test	M	SD	Range	Skew	Kurtosis
<b>Static</b> 15 Possible Points	3.33	1.97	2-7	1.68	2.66
<b>Dynamic</b> 48 Possible Points	32.42	4.22	29-39	1.08	-.98

Figure 1. Distribution of Scores Among 4-Year-Olds on the Oral Morphological Production /Generation Task



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**Figure 2:** Distribution of Scores Among 4-Year-Olds on the Early Dynamic Assessment Morphological Awareness Task

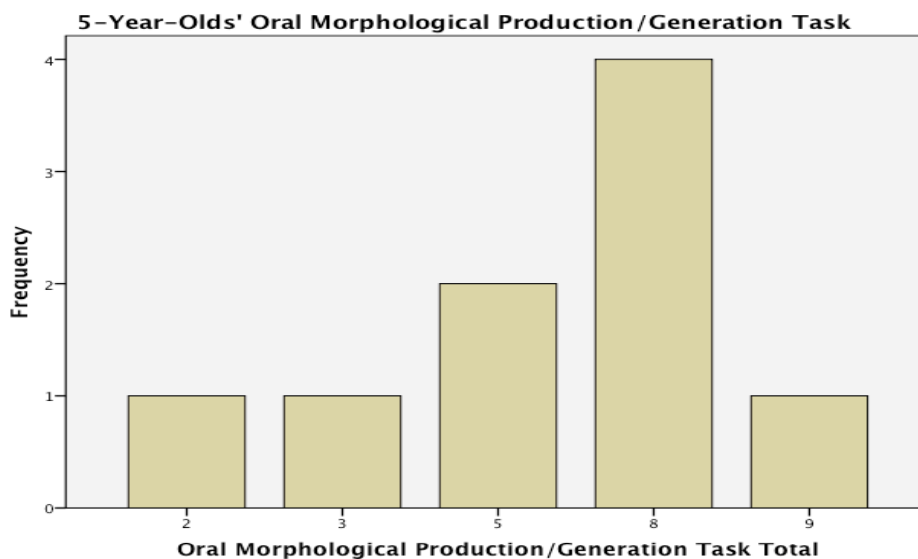


**Table 2.** Descriptive Statistics and Skewness for the Static Morphological Awareness and EDAMA Tasks Administered to 5-year-olds

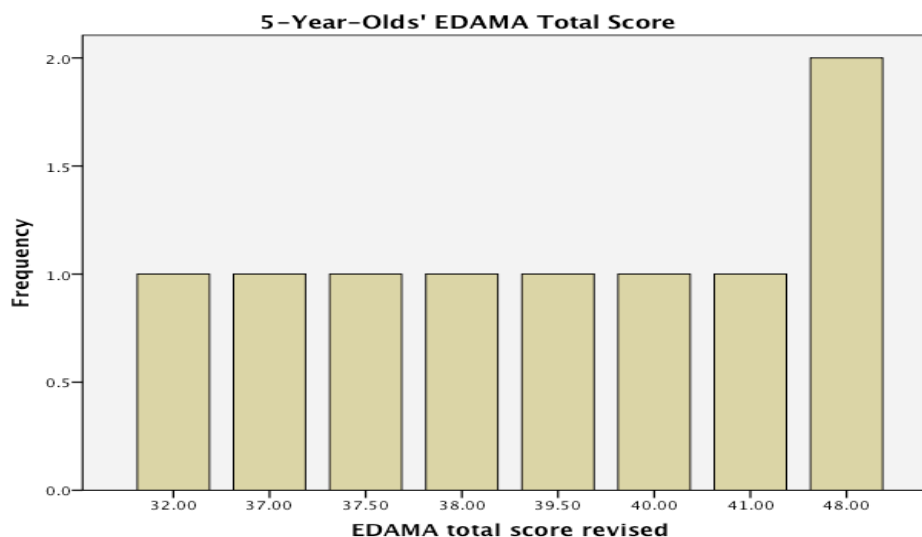
<b>Static</b>	6.22	2.54	2-9	-.67	-1.15
15 Possible Points					
<b>Dynamic</b>	40.5	5.90	32-49	.82	.58
48 Possible Points					

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**Figure 3:** Distribution of Scores Among 5-Year-Olds on the Oral Morphological Production /Generation Task



**Figure 4:** Distribution of Scores Among 5-Year-Olds on the Early Dynamic Assessment Morphological Awareness Task



Correlations between the static and dynamic tasks and tests of phonological awareness and literacy are presented in Table 3 and Table 4. Table 3 includes the correlations between tasks given to 4-year olds. In the 4-year-old population, the static morphological generation task was not significantly related with any of the tests administered. These tests included the EDAMA task, the PPVT-4, and the print knowledge, vocabulary, and phonological awareness

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subtest and total standard scores of the TOPEL. The EDAMA task was highly and significantly related to the phonological awareness subtest of the TOPEL ( $r = .87$ ) as well as the total standard score of the TOPEL ( $r = .85$ ). The dynamic task was also significantly related to the PPVT-4 at  $p < 0.01$ . In the 5-year-old population, the static morphological generation task was moderately and significantly related to print knowledge ( $r = .68$ ), a subtest of the TOPEL. The EDAMA task was significantly related to the TOPEL total standard score ( $r = .70$ ).

Table 3. Correlations Among Morphological Awareness Tasks, Phonological Awareness, and Literacy Measures Given to 4-year olds

Variable	1	2	3	4	5	6	7
1. EDAMA	-----						
2. Static Morphological Generation	.534	-----					
3. Peabody Picture Vocabulary	.941**	.546	-----				
4. Print Knowledge	.688	.163	.598	-----			
5. Expressive Vocabulary	.342	.339	.538	-.146	-----		
6. Phonological Awareness	.871*	.547	.943**	.363	.748	----	
7. TOPEL Total Standard Score	.846*	.476	.932**	.515	.746	.957**	-----

\*\* $p < .01$ , \* $p < .05$



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Table 4. Correlations Among Morphological Awareness Tasks, Phonological awareness, and Literacy Measures Given to 5-year olds

Variable	1	2	3	4	5	6	7
1. EDAMA	-----						
2. Static Morphological Generation	-.042	-----					
3. Peabody Picture Vocabulary	.643	.479	-----				
4. Print Knowledge	.494	.708*	.682*	-----			
5. Expressive Vocabulary	.592	-.014	.332	.398	-----		
6. Phonological Awareness	.647	.569	.832**	.706*	.492	----	
7. TOPEL Total Standard Score	.700*	.401	.669*	.778*	.856**	.819**	----

\*\* $p < .01$ , \* $p < .05$

### Discussion

The aims of this study were to determine the feasibility of whether a) an early morphological awareness dynamic assessment task was sensitive to assessing emerging knowledge of morphological awareness and revealed a range of performance in typically developing preschoolers and kindergartners, and b) performance on a dynamic assessment of morphological awareness was related to other predictors of language and literacy success. We developed the EDAMA and administered this to 4- and 5-year-old children. Despite the small sample, results revealed that the EDAMA appeared to be sensitive to a larger range of morphological awareness abilities in the young children who participated and was related to early literacy abilities.

#### Dynamic Assessment as an Assessment of Early Morphological Ability

As previously discussed, it is important to develop assessment tasks for young children that probe for emerging abilities and are sensitive to a wide range of performance. The absence

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of a floor effect helps to confirm that the measure is not too difficult and allows for the assessment of some emerging knowledge, in that participants are not missing all stimulus items. Additionally, when each stimulus item has prompts which systematically increase the amount of support the child is given in order to be successful, the examiner is provided with more information regarding a child's range of performance and learning potential. The results of this study indicated that the EDAMA task was successful at reducing the floor effect in 4- and 5-year-olds. The EDAMA task appeared to have less of a floor effect for the 5-year-old children than for 4-year-olds indicating that this task may be a more appropriate measure for older preschoolers or kindergarten children who have developed more awareness of morphology. Results of this study are consistent with previous research that has found dynamic assessments of phonological awareness and reading ability to be helpful in reducing floor effects in preschool and kindergarten age children (Bridges & Catts, 2011; Kantor, Wagner, Torgesen, & Rashotte, 2011; Fuchs, Compton, Fuchs, Bouton, & Caffrey, 2011).

Although the static assessment of morphological awareness appeared to also reduce a floor effect in the 5-year-old children, this measure did not provide information regarding the students' responses to scaffolding or intervention. Responsiveness to intervention is an important focus in the schools which requires educators to provide tiered or scaffolded intervention and document students' responses to that intervention (Petscher, Kim, & Foorman, 2011). The EDAMA task did provide more detailed information regarding students' response to prompting or intervention, and as such, may provide a vehicle for initially providing tiered intervention and documentation of students' abilities.

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### **Dynamic Assessment Related to Language and Literacy Performance**

The results of the correlational analysis of this study may suggest that the EDAMA task may be more significantly related to literacy measures than a static measure of morphological awareness. Of particular note is the fact that the total standard score of the TOPEL was significantly related to the EDAMA task in both the 4- and 5-year-old participants, but was not significantly related to the static assessment of morphological awareness. The EDAMA task was highly related and moderately related to the TOPEL in 4-year-old and 5-year-old children respectively. Further examination of the correlational analysis revealed that for 4-year-olds, the high correlation for the overall TOPEL score was likely due to a high correlation between the phonological awareness subtest of the TOPEL and the EDAMA. Whereas, for the 5-year-old children, it appeared that the correlation was no longer specific to phonological awareness but reflected an overall ability in print awareness, vocabulary, and phonological awareness. This is significant because the high correlation between morphological awareness and phonological awareness in 4-year old children may indicate that morphological awareness may not provide any unique predictive ability of literacy performance separate from already established predictors such as phonological awareness in early preschool-age populations. Conversely, morphological awareness was moderately correlated with a wide range of abilities in 5-year-old children, indicating that morphological awareness may provide unique predictive value of literacy success separate from phonological awareness in late preschool and kindergarten age children. A regression analysis performed on a larger sample size is needed to confirm these preliminary findings. These findings are consistent with previous research that revealed dynamic assessment as a significant predictor of literacy performance (Bridges & Catts, 2011; Elleman, et al., 2011; Fuchs, et al., 2011). Overall the results of this feasibility study appear promising and may

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indicate that the EDAMA may be a better indicator of overall literacy success than a static assessment.

It appears that if further testing on a larger population reveals similar results, the EDAMA task may be a promising screening tool to allow speech-language pathologists and educators to determine the level of morphological support required for a child to achieve optimal performance. The EDAMA has promise as a screening measure since it was successful in measuring a range of morphological awareness performance in young children. Before this task can be used as a screening measure, however, it must be replicated in a larger sample size so that the results of this study can be generalized to a larger population. In addition, the individual stimuli must be analyzed to determine which are the most related to other established predictors of literacy success and provide the greatest reduction in skew.

### **General Considerations**

Given that morphological awareness is an important aspect of literacy development as evidenced by research, it is important that those children with deficits in morphological awareness be given appropriate instruction (Carlisle, 2000; Mahoney et al., 2000; Nagy et al., 2006; Wolter et al., 2009). The EDAMA task may have potential as a tool to help determine an individualized instruction plan for children with deficits in morphological awareness. Since each successive prompt increased the amount of scaffolding that was given to a child, it could potentially help a clinician determine the level at which therapy tasks should initially implemented and how much instructional support needs to be provided. This can improve the efficiency of morphological assessment by eliminating tasks that are too hard or easy for the child, and also can serve to reduce the child's frustration with therapy tasks.

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### **Limitations and Future Research**

This study was truly a feasibility study and thus was completed with a small sample size in only one preschool. Thus, the results of our study cannot be generalized to children of other age and ability levels. Future research is needed to replicate and establish the results of this study with a larger and more diverse group of typically developing children. Once a larger sample size has been assessed a reliability analysis should be completed. An additional feasibility study would also help to determine the efficacy of using the EDAMA with children with language impairment, literacy deficits, and/or hearing loss. As previously mentioned, additional research should also be conducted to determine whether different stimulus items or instruction may help to reduce the skew of the data and further eliminate the floor effect.

### **Summary**

Research has established a significant link between morphological awareness skills and literacy development (Apel & Lawrence, 2011; Carlisle, 1995, 2000; Nagy et al., 2006; Wolter, Wood, & D'zatko, 2009). Thus, screening children for deficits in morphological awareness may prove to be a powerful tool in identifying children at risk for literacy failure. If at risk children can be identified as at risk in preschool, then appropriate intervention can be implemented to potentially prevent literacy failure in later grades. Dynamic assessment may provide an ideal medium for testing morphological awareness in young children (Calero et al., 2011; Gillam et al., 2011; Pena et al., 2006; Schneider and Ganschow, 2000). One benefit to using dynamic assessment is that it may provide a way to more sensitively assess a range of morphological awareness performance in young children and provide documentation for responsiveness to intervention. The systematic increase in scaffolding may also prove to be a valuable way to not only increase morphological awareness performance, but to provide insight as to the appropriate

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level to implement morphological awareness instruction. With further research, this EDAMA task may prove to be a valuable assessment and treatment tool.

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## Appendix A

## Stimuli for Dynamic Assessment of Morphological Awareness

**Inflectional Morphemes**

	Stimulus Items	Root Word Frequency	Derived Word Frequency	Foils	Root Word Frequency	Derived Word Frequency
<b>Plural –s</b>	Animal/Animals	62.3	65.5	Ten/Tennis	62.6	53.5
	Boy/Boys	64.7	62.9	Wall/Walrus	61.4	44.2
	Dress/Dresses	57.6	51			
<b>Present Progressive –ing</b>	Write/Writing	63.2	62.3	Win/Wing	57.5	53.4
<b>Past Tense –ed</b>	Reach/Reached	61	62.4	Car/Card	64.1	56.8
	Walk/Walked	61.7	62	Ball/Bald	61.9	48.5

**Derivational Morphemes**

	Stimulus Items	Root Word Frequency	Derived Word Frequency	Foils	Root Word Frequency	Derived Word Frequency
<b>Agentive –er</b>	Small/Smaller	68.8	60.9	Moth/Mother	47.2	67
<b>-ly</b>	Quiet/Quietly	59.8	56.7	Doll/Dollar	50	54
				Bell/Belly	57.7	49.4
<b>Practice Item –y</b>				Cloud/Cloudy	55.7	48.6

**Randomized Stimuli with Prompts**

*Cloud/Cloudy*

*General context 1: “If there are clouds it is cloudy.”*

*General context 2: “The boy played outside when there was one fluffy cloud in the sky, but he had to come inside when it became cloudy and rained.”*

*Directive context: “The cloud is in the sky.” “The weather is partly cloudy.”*

*Moth/Mother*

*General context 1: “A person who takes care of a moth is mother.”*

*General context 2: “While the moth flew around the room, the mother rocked her baby to sleep.”*

*Directive context: “The moth can fly.” “The mother is holding her baby.”*

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

*Animal/Animals*

*General context 1: "If there is more than one animal there are animals."*

*General context: "The lion, who is a zoo animal, was lonely so he asked four other zoo animals to play with him."*

*Directive context: "The lion is a zoo animal." "These are four zoo animals."*

*Ten/Tennis*

*General context 1: "If there is more than one ten there is tennis."*

*General context 2: "The girl earned ten points at the tennis match by hitting the ball into the other player's court."*

*Directive context: "This is the number ten." "This girl is playing tennis."*

*Boy/Boys*

*General context 1: "If there is more than one boy there are boys."*

*General context 2: "The boy couldn't play baseball by himself so he asked three more boys to join his game."*

*Directive context: "This is a boy." "These are three boys."*

*Wall/Walrus*

*General context 1: "If there is more than one wall there is a walrus."*

*General context 2: "The brick wall was built so high around the pool that no one could see the walrus swimming in the water."*

*Directive context: "This is a brick wall." "A walrus swims in the ocean."*

*Dress/Dresses*

*General context 1: "If there is more than one dress there are dresses."*

*General context 2: "The girl who wore the dress to the party liked the fancy dresses that the other girls wore to the party."*

*Directive context: "This is a dress." "These are three dresses."*

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

### *Reach/Reached*

*General context 1: "After you reach the cookies they are reached."*

*General context 2: "The boy knew he could reach the cookie jar when he stood on his toes because he had already reached inside and ate two cookies."*

*Directive context: "The boy will reach for the cookies." "The boy reached for the cookies."*

### *Walk/Walked*

*General context 1: "After you walk the dog he is walked."*

*General context 2: "The girl decided to walk the dog at night even though she had walked him in the morning, because the dog really wanted to go outside."*

*Directive context: "The girl will walk the dog." "The girl walked the dog."*

### *Car/Card*

*General context 1: "After you drive the car it is card."*

*General context 2: "The man drove in his car to deliver the thank you card he wrote for his friend."*

*Directive context: "They will drive the car." "Mom sent a thank you card."*

### *Ball/Bald*

*General context 1: "After you play ball it is bald."*

*General context 2: "The girl threw the ball to the man who had shaved his head bald."*

*Directive context: "This is a ball." "This man is bald."*

### *Quiet/Quietly*

*General context 1: "If you are quiet, you speak quietly."*

*General context 2: "The boy was told to be quiet so he wouldn't wake his baby sister, so he whispered quietly to his brother."*

*Directive context: "The boy is saying 'shh' be quiet." "The boys whispered quietly."*

### *Bell/Belly*

*General context 1: "If there is a bell it is belly."*

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

*General context 2: "The teddy bear rang the bell to say he was ready for food to fill his belly."*

*Directive context: "Ring the bell." "The teddy bear has a big belly."*

### *Write/Writing*

*General context 1: "When you write you are writing."*

*General context 2: "The teacher told the boy to write his name on the paper after he was finished writing his story."*

*Directive context: "The boy will write a letter." "The boy is writing a letter."*

### *Win/Wing*

*General context 1: "When you win you are a wing."*

*General context 2: "While the boy came in first to win the race, the bird flew into a tree and broke its wing."*

*Directive context: "The boy will win a race." "The bird has a wing."*

### *Small/Smaller*

*General context 1: "A boy who is small, is smaller than an elephant."*

*General context 2: "The short, small boy picked up the mouse who was even smaller and littler than him."*

*Directive context: "The mouse is small." "The boy is smaller than his sister."*

### *Doll/Dollar*

*General context 1: "A person who makes dolls is a dollar."*

*General context 2: "The girl wanted the toy baby doll so she saved one more dollar to buy it at the store?"*

*Directive context: "The girl likes to play with her doll." "The candy will cost one dollar."*

## EARLY DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS

**Appendix B**  
**LEVELS PROMPTS FOR**  
**DYNAMIC ASSESSMENT OF MORPHOLOGICAL AWARENESS**

Prompt # 1:

“Does this sentence make sense? Or is it silly?” Circle one: Silly/Not Silly

“General context sentence (e.g. If there are clouds it is cloudy)”

- If the child answers correctly, the examiner goes to prompt #1A.
- If the child does not respond or answers incorrectly, the examiner goes to prompt #2.

Prompt #1A

“How did you know that?”

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- Move to the next word

Prompt #2

“General Context (e.g. “The boy played outside when there was one fluffy cloud in the sky, but he had to come inside when it became cloudy and rained.”)

“Does the BASE WORD have anything to do with MORPHOLOGICALLY COMPLEX word?”

Circle one: Yes/No

- If the child answers correctly, the examiner goes to the next word.
- If the child does not respond or answers incorrectly, the examiner goes to Prompt #3.

Prompt #3

“Directive Contexts” (pictures with sentences are shown to the child)

- “Does the BASE word have anything to do with the MORPHOLOGICALLY COMPLEX word?”

Circle one: Yes/NO