Fall 12-11-2017

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Submitted to the Honors College
at Bowling Green State University in partial
fulfillment of the requirements for graduation with
University Honors

December 11, 2017

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Abstract

The present study explored the extent to which vocabulary instructional strategies are used in the children's educational television show *Word Girl*, and whether or not the occurrences of vocabulary instructional strategies changed over the time the show was aired. Instructional strategies included repetition of target words, labeling, defining/mislabeling, and onscreen print. A total of eighteen episodes between 2007 and 2015 were analyzed. The early time period included episodes aired from 2007-2009, the middle time period included episodes aired from 2010-2012, and the late time period included episodes aired from 2013-2015. Results revealed within episode variability for all vocabulary instructional strategies, with the exception of onscreen print, that was not used in any of the episodes. A decrease in the mean number of vocabulary instructional strategies over time was observed.

Exploring the Vocabulary Teaching Strategies Used in Children's Educational Television

Understanding and using new words is a complex process; however, most children undergo substantial vocabulary development in the first three years of life. Vocabulary development occurs both receptively and expressively. Receptive vocabulary words are understood by the child. One way children can demonstrate receptive vocabulary is by pointing to pictures representing objects or actions. Expressive vocabulary words are produced or defined. A way children demonstrate expressive vocabulary is by naming pictures or objects that are presented to them or occur in the environment. In most cases, children understand words prior to using them (Locke, 1993).

It is expected that most typically developing children produce first words around the first birthday. These words tend to be short, single syllable words, and tend to be nouns such as mama, dada, and ball. Children's vocabulary continues to increase steadily until, at approximately 18 months when many children experience a more dramatic increase in vocabulary (Benedict, 1979). Derbie (2014) examined word learning in a child between the ages of 20-37 months, and found the greatest peak of word learning between 33 and 37 months of age when the child learned 85 words in the span of four months. This increase in vocabulary continues throughout the first five years of life, until children learn an average of one new word every two hours they are awake (Tomasello, 2003).

Although most children learn vocabulary in similar ways, there may be variation in the length of time it takes to reach expected milestones. Typically, between the third and fourth birthday, children begin to use pronouns and question words. Another milestone is achieved when a child has acquired approximately 500 words. Of those words approximately ten percent are adjectives, twenty-five percent are verbs, and approximately fifty percent of the words are

nouns (Gleason & Ratner, 1993). One explanation for variation in vocabulary learning is the

wide range of experiences with and exposure to vocabulary in the environment in which the

child grows up. Word learning occurs through both explicit and implicit exposure (Beck, 2002;

Gillam, Olszewski, Fargo, & Gillam, 2014; Reiser, Tessmer, & Phelps, 1984). Explicit word

learning occurs through instruction and is direct and purposeful. For instance, when an adult says

the word *ball*, points to a *ball*, and then tells the child what a *ball* is used for, learning is explicit.

Implicit word learning is indirect and includes overhearing vocabulary from sources in the

environment such as adults, other children, and media.

Research has examined the effects of exposure (implicit and explicit) on vocabulary

outcomes in children (Gillam, 2014; Gipe, 1978). This work has offered insight into both word

learning processes employed by children, and the instructional strategies that are effective in

teaching new words to young children. Research shows that children who are exposed to higher

quality vocabulary instruction show greater gains in expressive and receptive vocabulary.

Vocabulary instruction that includes using the target vocabulary in context, providing extensive

definitions, and using previously known words to associate with the target words has been shown

to be effective (Beck, Perfetti, & McKeown 1982; Gipe, 1978; McKeown, Beck, & Omanson,

1985). The next sections will provide further explanation of these studies and the effectiveness of

specific vocabulary instruction strategies.

Gillam and colleagues (2014) examined explicit vocabulary instruction in children ages

6;6 to 7;4 ($N = 43$). Eight target words were introduced and defined in the classroom in relevant

contexts and reviewed repeatedly, and taught explicitly each week. Children were pre-tested on

target vocabulary words before instruction. Instruction was given to the experimental group for a

total of 30 minutes, three times a week, for six weeks. Instruction included introduction to the

words and providing definitions. Following instruction participants defined target vocabulary. Students in the control group were not instructed on vocabulary. Results showed that participants in the experimental group scored higher than controls on vocabulary measures.

Gipe (1978) compared four methods of teaching vocabulary to determine the vocabulary growth as a result of each method. Participants were 113 third graders and 108 fifth graders in eight classrooms. Vocabulary instruction included association, category, context, and dictionary methods. The association method paired the target word with a similar word or short definition. In the category method group participants were asked to compile a list of words fitting a general category with the target word. The context method used the target words in meaningful sentences. For the dictionary method, participants looked up the word and definition in a dictionary. Students were pre-tested, exposed to one method, and tested on the 24 words after the method was utilized. The context method resulted in higher vocabulary scores for participants at both grade levels. Participants in both grades received higher vocabulary scores when the association method was applied when compared with the dictionary and category methods.

In a similar study conducted by McKeown and colleagues (1985) results supported this finding that making associations with target vocabulary helps children learn vocabulary. The participants were fourth graders in four classrooms. Two classes received rich instruction which allowed children to explore the associations between the target word and other already known words. The remaining two classes received extended/rich instruction which promoted use of the word outside of class. Traditional instruction consisted of making associations between the word and its definition. All children were pre-tested and post-tested on target vocabulary using a multiple choice test of the 24 target words. Children in the rich instruction condition received the highest scores on the vocabulary test.

Beck and colleagues (1982) tested the effectiveness of using previously known words when providing definitions. Participants included 66 fourth graders in two classrooms. All participants were pre-tested on target vocabulary using the Iowa Test of Basic Skills. Participants in the control group were instructed in twelve 5-day cycles. In each 5-day cycle students were introduced to a set of eight to ten target words which were practiced in multiple ways. The instructional activities included defining, classifying, using known words, and making associations between the target words and other known words. All participants were tested using measures of a semantic decision task, a sentence verification task, and a story recall task about the target words. Participants who received vocabulary instruction showed higher vocabulary scores when compared with the control group. Overall, receiving instruction increased vocabulary scores with all measures including a semantic decision task, a sentence verification task, and a story recall task about the target words.

More recently the influence of media, specifically television, on word learning has become an area of research interest. This is likely due to the fact that media has become a growing influence in the lives of children. Linebarger and colleagues have conducted several studies examining relationships between educational television and child language and literacy outcomes (Linebarger & Walker, 2005), and strategies used in educational television to enhance children's literacy skills (Beck et al., 1982; McKeown, et al., 1985). Linebarger and Walker (2005) examined the relationship between minutes of television watched and children's vocabulary and expressive language. Data provided by parents of 51 children age 0;6 to 0;36 months about their children's television viewing patterns were examined. The relationship between the quantity of television viewing minutes and vocabulary and expressive language scores depended on the television show tested. A positive relationship was found between

viewing minutes and vocabulary and expressive language scores for the shows *Dora the Explorer* (Gifford, 2000), *Dragon Tales* (Coane, 1999), and *Clifford the Big Red Dog* (Over, 2000). There was a negative relationship between viewing minutes and vocabulary and expressive language scores for the show *Teletubbies* (Wood, 1997). There was also a negative relationship between viewing minutes of *Barney and Friends* (Leach, 1992) and receptive vocabulary scores, but a positive relationship between viewing minutes and expressive vocabulary scores. Children who watched more *Barney and Friends* had lower receptive vocabulary scores, but higher expressive language scores.

The development of literacy skills have been explored. Specifically, studies have been conducted to assess the vocabulary development strategies used in educational television (Linebarger, 2015; Linebarger, Kosanic, Greenwood, & Doku, 2004; Linebarger & Piotrowski, 2009; 2010). Linebarger and colleagues (2004) examined early literacy skills before and after viewing the program *Between the Lions* (Frith, 2000). The participants were 79 kindergarteners and 85 first graders. Children were classified as: not at-risk, at-risk, or moderately at-risk for literacy problems. Participants were pre-tested on target vocabulary and post-tested after watching a specific number of episodes of *Between the Lions*. One group watched eight episodes and the other group watched 17 episodes. Results indicated kindergarteners in the viewing group outperformed control group peers on word recognition. The moderately at risk kindergarten viewing group benefited the most from program content as indicated by higher scores on all emergent literacy measures with the exception of the measure of word meaning. No difference was observed in word meaning scores between the viewing group and the control group. Oetting and colleagues (1995) found vocabulary score gains after children ages 6;0 to 8;0 watched several episodes of television. The children were pre-tested, watched two television programs,

and were immediately tested again. Gain score is used to calculate a change in scores between pre-test and post-test. A negative gain score is calculated when the pre-test score is higher than the post-test score. Children who watched the program were observed to have an average gain score of 4.67 on the vocabulary test, while the control group had a gain score of -0.63. Overall, children in the experimental group scored higher on target vocabulary tests than children in the control group who were not exposed to the program.

One variable contributing to the variation in literacy skill development is the style of programs that children watch. Research has been conducted comparing differences in program styles (narrative vs. expository) and the development of vocabulary. Whereas narrative style programs use a single story that present prosocial messages within an episode with recurring characters, expository style programs are produced for the primary purpose of explaining, providing additional information, and describing a particular topic (Ball, Cook, & Pettigrew, 2007). Linebarger and Piotrowski (2009) observed 311 children age 3;0 to 5;0 in 31 classrooms who were at risk for literacy problems. Participants were recruited from childcare centers serving economically disadvantaged children. The program styles examined included expository, embedded narrative, and traditional narratives. The children watched one 11-minute television episode a day for 40 days in the classroom. The children were tested on literacy skills before viewing, after 20 episodes, and after 40 episodes. Measures included story knowledge, retelling of the story, implicit comprehension, and explicit comprehension. Children who watched the narrative style program programs received higher scores than children who watch expository style programs on tasks related to story knowledge, story retelling, implicit comprehension, and explicit comprehension.

A limited amount of research has focused on the difference in styles of programs when coding the frequency of vocabulary instructional strategies. Linebarger and colleagues investigated the content of various programs to determine the number of times specific vocabulary teaching strategies were used in different styles of educational television programs (Linebarger & Piotrowski, 2010). Linebarger and Piotrowski (2010) coded six 30-minute children's educational television programs for the strategies of: number of times a target word was repeated, percentage of Dolch words, number of words per sentence, and pace of aural narration. The styles included in this study were expository and narrative. The participants were tested on target vocabulary after viewing different styles of programs. Participants were 71 second and third graders. Children were pre-tested on target words before viewing. Children in the experimental group watched 12 episodes of either a narrative or expository style program and were tested on target vocabulary after each episode. Program specific vocabulary knowledge was assessed with reading of the word and providing a definition. Children were asked to read five target words from the episode and provide a definition immediately after viewing. Children who watched the narrative program scored higher on definition knowledge than the children who watched the expository program, while reading of the word was higher after watching the expository program. Overall, development of literacy skills was dependent on the style of the educational television show.

Vocabulary Teaching Strategies

Studies have been conducted to determine the specific strategies that best promote children's word learning (Beck et al., 1982; Gipe, 1978). Specifically, the use of onscreen print, labeling, and repeated exposure in children's educational television has been examined (Linebarger, 2015; Linebarger et al., 2004; Linebarger & Piotrowski, 2009; 2010). Research

conducted concerning the repetition of vocabulary teaching strategies has shown repeated

exposures help children learn vocabulary better (Linebarger & Piotrowski, 2010). Few studies

have calculated the frequency of vocabulary teaching strategies used in specific programs

(Linebarger et al., 2017; Linebarger & Piotrowski, 2010). Information collected has been limited

to a few vocabulary teaching strategies. The next sections will discuss the strategies of onscreen

print, labeling, defining and mislabeling, and repeated exposure.

Onscreen print

Studies examining specific strategies used in children's educational television shows

have shown that one way children learn words is through the use of onscreen print (Linebarger et

al., 2017). Onscreen print is displayed on visuals to add extra information about a target

vocabulary word. Linebarger and colleagues (2017) examined the content of multiple popular

children's educational television shows for use of vocabulary instructional strategies that helped

with cognition, language, and literacy skills. Fifteen shows were categorized as traditional or

interactive narrative, or expository. Two episodes from each of 15 shows selected were coded for

instructional strategies. One strategy coded was onscreen print when used to describe a target

vocabulary word. Onscreen print was present in 2.47% of scenes in expository style programs,

3.54% of scenes in traditional narrative style programs, and 0.39% of scenes in interactive

narrative style programs. The use of onscreen occurred rarely, but the narrative style programs

contained the most instances of the strategy of onscreen print.

Labeling

Another vocabulary teaching strategy used to promote word learning is labeling

(Linebarger et al., 2017). While labeling can help vocabulary learning, mislabeling objects after

providing a definition can lead to confusion for the child (Linebarger et al., 2017). Linebarger

and colleagues (2017) coded the use of defining and mislabeling of target vocabulary words in 15 popular children's educational television programs. Results showed large variation in the number of times a vocabulary strategy was used between programs. The occurrences of defining and mislabeling varied from 0.06 in *Between the Lions* (Frith, 2000) to 14.67 in the program *Martha Speaks* (Parker, 2008). Overall, the number of times target words were defined and/or mislabeled varied greatly by program.

Repeated Exposure

Repeated exposure is another supported vocabulary teaching strategy used in television. Repetition of target words provides multiple opportunities for exposure to the target vocabulary, making the vocabulary easier to learn (Hoff, 2006). Linebarger and Piotrowski (2010) examined the number of times a target word was repeated in one episode of *Arthur & Friends* (Brown, 1996), *Magic School Bus* (Jacobs, 1994), *Reading Rainbow* (Lancit, 1983), and *Kratts' Creatures* (Kratt, 1996). The study found that narrative programs repeated target words an average of 24 times, while expository programs repeated target words an average of 26 times. Participants were 71 second and third graders. Children were pre-tested for baseline literacy skills. Children watched one episode either once or twice, and were tested. Program specific vocabulary knowledge was assessed with word fluency and definition knowledge. Children were asked to read five target words from the episode and asked to provide a definition immediately after viewing. The children who watched the narrative style program scored higher on definition knowledge measures. Overall, children scored higher on expressive vocabulary tests after repeated exposure to target vocabulary.

Linebarger and colleagues (2013) compared the expressive vocabulary of children after watching an episode multiple times. Participants were 121 children ages 4;0 to 8;0. The

participants were pre-tested on target vocabulary. One group watched the program once and the other group watched the program three times. Expressive vocabulary was then tested by asking the child to verbally define all words introduced in the episode. Children in the repeated exposure group received higher expressive language scores than the controls who watched the show once. Overall results from these studies show that exposure to target words an average of 26 times in children's educational television shows has led to higher expressive language scores.

Research to date has offered insight into vocabulary teaching strategies used in educational television shows (Linebarger et al., 2017; Linebarger & Piotrowski, 2010) and the effects of television viewing on vocabulary learning (Linebarger & Walker, 2005; Oetting, Rice, & Swank, 1995); however, information is limited about the frequency of use of a few research-based vocabulary teaching strategies. More information is needed in order to understand differences between television programs' influence on word learning in young children. A better understanding of the number of times vocabulary teaching strategies are used in the episodes may guide decisions for selecting programs for children who may be at risk for delayed vocabulary development.

Purpose

A small number of studies have been conducted to examine the vocabulary teaching content of popular educational television shows (Linebarger et al., 2017; Linebarger & Piotrowski, 2009; 2010). Results of this work indicate a high variability across programs with a relation to type of program with expository programs containing a higher number of vocabulary teaching strategies, target repetitions, and more high frequency words. Narrative programs contained more comprehension strategies and defining/mislabeling. Multiple other studies have been conducted to examine effective vocabulary teaching techniques (Beck et al., 1982; Gillam,

2014; Gipe, 1978; McKeown et al., 1985). Although this work has offered insight into the content of children's educational television shows, research examining the frequency of use of research based vocabulary instructional strategies is limited to a few strategies. The present study aimed to examine vocabulary teaching strategies used in the popular children's television show *Word Girl* (Gillim, 2006). *Word Girl* is a traditional narrative style program that reportedly emphasizes language skills, specifically vocabulary. In the program, the main character, Word Girl, uses her superpowers to defeat enemies that threaten her city and teaches other characters vocabulary along the way. *Word Girl* was selected because defining and mislabeling reportedly occur in 9.44% of scenes, a high number when compared to other programs. Although other studies have examined the occurrences of vocabulary instructional strategies in the show *Word Girl,* research has focused on analyzing the vocabulary instructional strategies per scene which offers an incomplete picture of what is actually occurring (Linebarger et al., 2017). A better understanding of the frequency with which strategies occur will provide insight into whether or not some programs will offer children with different linguistic profiles maximal benefits. The frequency of strategy use in television shows is important because children with language disorders need a higher frequency of strategy use in order to learn vocabulary. This study examined the frequency of instructional strategies per episode, and the change of frequency of instructional strategies across time periods.

Method

Sample

Eighteen thirty-minute episodes previously aired on the Public Broadcasting Service (PBS) were selected for inclusion in this study.

Episode Selection

A summative list of aired *Word Girl* episodes was obtained from pbskids.org. Episodes over the nine years the show was produced were selected to determine differences following years of research of effective vocabulary teaching strategies. The nine years of production were divided into three time periods of airing; early, middle, and late. The early time period included episodes aired from 2007-2009. The middle time period included episodes aired from 2010-2012. The late time period included episodes aired in 2013-2015. Each year was examined and episodes that aired within that year were numbered based on the date the episode was aired. Two episodes per year of production were randomly selected using random.org. Target vocabulary words for each period were classified by lexical category to ensure each category was equally represented. Target vocabulary characteristics including lexical category of target vocabulary are described in Table 1.

Content Coding

The episodes were coded using frequency tallies for repetition of target words, onscreen print, labeling, and defining/mislabeling. A coding template was created using definitions modified from Linebarger & Piotrowski, 2010; Linebarger et al., 2017. Definitions of each strategy are presented in Table 2. Each episode was coded by minute for frequency of vocabulary instructional strategies. Each code was applied each time the strategy occurred according to the minute when it was featured.

Coding Reliability

Videos were coded by two trained student researchers. Reliability was determined for 20% of the episodes, one episode randomly selected from each time period aired. Inter-coder reliability was 95%. All coders had previously completed language coursework in communication sciences and disorders.

Results

Analyses were conducted to examine the frequency of vocabulary instructional strategies across episodes, and the change of frequency between time periods. Data from eighteen episodes were analyzed using the Statistical Package for the Social Sciences (SPSS) software. Frequencies across episodes are presented in Table 3. Results for differences across time periods are shown in Table 4. Results are organized according to the research questions.

Research Question 1

To examine how often vocabulary instructional strategies were used in *Word Girl* episodes, the frequency of each strategy was calculated. The number of times a single target word was repeated ranged from 2 to 28. The total number of repetitions per episode (five target words per episode), ranged from 36 to 72. No instances of onscreen print were found in any episodes. The number of times a target vocabulary word was labeled ranged from 5 to 8. Eight out of 18 episodes contained an instance of defining/mislabeling.

Research Question 2

To determine whether or not the number of times a vocabulary instructional strategy occurred changed over time, frequencies were calculated for each time period. The mean number of repetitions per target word in the early time period was 9.77 (*SD*=4.62). The mean increased to 11.77 (*SD*=6.46) in the middle time period. The mean then decreased to 9.47 (*SD*=4.64) during the late time period. As indicated previously, there were no instances of onscreen print. The mean number of labeling strategies in the early time period was 6.5 (*SD*=1.38). The mean decreased to 5.5 (*SD*=0.84) in the middle time period and then slightly increased in the late time period (*M*=5.83, *SD*=0.75). An overall decrease was seen in the mean for labeling from 6.5 in the early time period to 5.83 during the late time period. A decrease was also seen in a mean number

of occurrences of defining/mislabeling. The means for the early, middle, and late time period were 0.67 (*SD*= 0.52), 0.33 (*SD*=0.52), and 0.33 (*SD*=0.52), respectively. An overall decrease was seen in the mean number of all vocabulary instructional strategies across time periods, with the exception of onscreen print.

Discussion

The current study examined the use of vocabulary instructional strategies in the show *Word Girl*. To date, there have been no studies that examine how often vocabulary instructional strategies in children's educational television shows are used and whether the frequency of use changes over time. The results of this study offer insight into how vocabulary is taught in children's educational television shows.

All episodes used multiple vocabulary instructional techniques and used target vocabulary words that were from one of three classifications; verbs, nouns, and adjectives. As seen in Table 1, a higher proportion of target words were verbs than nouns. It may be the case that verbs were easier to tie into the central theme of episodes than a noun.

Research has found that typically developing children need to hear a word three times in order to learn the word, while children with language disorders may need to hear a word more than 10 times to learn a target vocabulary word (Rice, Oetting, Marquis, Bode, & Pae, 1994). Children with language disorders need more repetitions of target vocabulary words than the lowest number of repetitions of a target word in *Word Girl*. There were 49 target vocabulary words that were repeated less than 10 times. *Word Girl* repeats target words multiple times throughout the episode; however, the show may not repeat target words enough for children with language disorders. Children with language disorders may not benefit from watching *Word Girl* as a result of some target vocabulary being repeated a minimal number of times. The limited

number of repetitions per target word could be explained by some target words relating to the central theme of the show more than other target words.

Linebarger et al., 2017 found the occurrence of onscreen print in 1.02 scenes of *Word Girl* (Linebarger et al., 2017); however, this study aimed to look at the occurrences of onscreen print that supported vocabulary development. This may be explained by the nature of which the target words are labeled. In the show *Word Girl*, characters verbally define target words with no other referent. The results of this study concluded similar occurrences of labeling as in Linebarger et al., 2017. This study found labeling an average of 5.94 times (*SD*=1.06) and Linebarger et al., 2017 coded labeling in 4.72 scenes in *Word Girl*. Repetition of target words per episode ranged from 36 to 72. These findings support the results of Linebarger & Piotrowski, 2010, who found 11 to 36 repetitions of target words per episode.

In the current study the mean number of instructional strategies decreased from the early to late time periods; however, there is a difference in the pattern of changes from the early to late time period. The mean number of occurrences of repetition of target words increased from the early to middle time period, but a decrease was then found from the middle to the late time periods. The mean number of occurrences of defining/mislabeling decreased from the early to middle time periods, and remained low for the late time period.

In general, the results of this study corroborate findings of Linebarger et al., 2017; Linebarger & Piotrowski, 2010, who determined the occurrence of vocabulary instructional strategies in *Word Girl* when coding by scene. This may be explained by the focus of the program on language skills.

Limitations

The results of the current study provide a starting point for continuing research on how often vocabulary instructional strategies are used in children's educational television. As with all studies there are limitations to this work. The first limitation of the study was the sample size. Only one television show was included in this study. Additional television shows would allow for generalizations of the results of this study. A larger sample size would allow for additional comparisons and an examination of time differences. This led to the second limitation, which was the limited number of episodes included in the study. Only 18 episodes were selected in this study, and more episodes may have led to more consistent results across time periods.

Conclusion

While the results of this study may have limitations, the findings do offer a starting point for further research examining how often vocabulary instructional strategies are used in children's educational television. The results of this study provide a basis of information that may ultimately help to provide insight into the impacts of television viewing on vocabulary development. Further studies could help clinicians, researchers, and parents better select television shows that will offer the most benefit to the children viewing.

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Table 1

Target Vocabulary Word Characteristics

Season: Episode	Target Vocabulary Word	Number of Repetitions	Lexical Classification
S1: E3	Squint	5	Verb
	Bargain	9	Verb
	Stroll	7	Verb
	Glum	13	Adjective
	Transformation	18	Verb
S1: E4	Clumsy	8	Adjective
	Supreme	23	Adjective
	Devour	10	Verb
	Appetite	6	Noun
	Expand	6	Verb
S1: E10	Increase	9	Verb
	Decrease	5	Verb
	Dazed	6	Verb
	Malfunction	8	Noun
	Clever	9	Adjective
S1: E20	Rival	12	Noun
	Morale	5	Noun
	Scowl	5	Verb
	Compliment	8	Noun
	Lair	16	Verb
S1: E26	Ponder	9	Verb
	Mighty	22	Adjective
	Devour	10	Verb
	Outdo	9	Verb
	Unexpected	12	Adjective
S2: E16	Contrary	10	Adjective
	Exquisite	7	Adjective
	Crestfallen	8	Adjective
	Nemesis	8	Noun
	Badger	10	Verb
S3: E6	Trophy	24	Noun
	Boast	11	Verb
	Binoculars	2	Noun
	Frolic	15	Verb
	Procrastinate	16	Verb
S3: E7	Eliminate	18	Verb
	Entire	12	Adjective
	Perspire	5	Verb
	Vessel	8	Noun
	Publish	11	Verb
S3: E10	Cherish	6	Verb
	Flee	5	Verb

	Perspire	2	Verb
	Intuition	10	Noun
	Charming	13	Adjective
S4: E1	Precipitation	11	Noun
	Meteorologist	20	Noun
	Shatter	7	Verb
	Delay	18	Verb
	Captivated	8	Adjective
S4: E11	Monstrous	12	Adjective
	Guzzle	7	Verb
	Doze	6	Verb
	Haggle	12	Verb
	Defend	13	Verb
S5: E4	Divvy	10	Verb
	Repetitive	13	Adjective
	Console	6	Verb
	Brooch	21	Noun
	Woozy	25	Adjective
S5: E11	Interact	9	Verb
	Contraption	9	Noun
	Console	7	Verb
	Encounter	5	Noun
	Squabble	10	Verb
S6: E3	Bombard	9	Verb
	Emcee	28	Noun
	Fumble	8	Verb
	Mistaken	5	Adjective
	Fib	16	Noun
S6: E11	Command	10	Verb
	Location	11	Noun
	Cower	4	Verb
	Ornamental	9	Adjective
	Feline	11	Adjective
S7: E4	Rampage	8	Noun
	Sensitive	16	Adjective
	Doze	7	Verb
	Juvenile	10	Adjective
	Lack	7	Noun
S8: E2	Adhesive	9	Noun
	Precious	8	Adjective
	Scamper	6	Verb
	Volunteer	11	Verb
	Habitat	14	Noun
S8: E12	Ancient	6	Adjective
	Twist	9	Verb
	Discard	5	Verb
	Evasive	12	Adjective
	Linger	5	Verb

Note. S = Season; E = Episode Number.

Table 2

Definitions used for Coding

Vocabulary Instructional Strategy	Definition Used in Coding
Onscreen Print	Target word printed onscreen with verbal referent (character states target word out loud)
Labeling	Meaning of a word explicitly provided
Defining/mislabeling	1. Label and Image did not appear at the same time 2. Label offered was not a clear of what the image or action depicted
Repetition of Target Words	1.Number of times target words are repeated 2. Code was included when words were labeled

Table 3

Frequencies of Vocabulary Strategies Used

Season: Episode	Repetition of Target Words	Labeling	Defining/Mislabeling	Onscreen Print
S1:E3	53	6	1	0
S1:E4	54	8	1	0
S1:E10	37	5	0	0
S1:E20	46	5	1	0
S1:E26	62	8	0	0
S2:E16	43	7	1	0
S3:E6	68	5	0	0
S3:E7	54	5	0	0
S3:E10	36	5	0	0
S4:E1	64	7	0	0
S4:E11	50	5	1	0
S5:E4	72	6	1	0
S5:E11	40	5	1	0
S6:E3	66	6	1	0
S6:E11	45	5	0	0
S7:E4	50	6	0	0
S8:E2	48	6	0	0
S8:E12	37	7	0	0

Note. S = Season; E = Episode Number.

Table 4

Mean Number of Vocabulary Teaching Strategies Across Periods of Show Airing

Strategy	Early M (SD)	Middle M (SD)	Late M (SD)
Repetition of Target Words	9.77 (4.62)	11.77 (6.46)	9.47 (4.64)
Labeling	6.5 (1.38)	5.5 (0.84)	5.83 (0.75)
Defining/Mislabeling	0.67 (0.52)	0.33 (0.52)	0.33 (0.52)
Onscreen Print	0 (0)	0 (0)	0 (0)

Note. Early = episodes aired from 2007-2009; Middle = episodes aired from 2010-2012; Late = episodes aired from 2013-2015. SD = standard deviation.

Appendix

Coding Template

Season _____ Episode _____ Title _____ Target Words _____

	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
Onscreen Print Target word printed onscreen with verbal referent (character states target word out loud).														
Labeling Meaning of a word explicitly provided. Ex: Sensitive means quick to detect slight changes or signals.														
Defining/ Mislabeling 1.Label and Image did not appear at the same time. 2. Label offered was not a clear of what the image or action depicted.														
Repetition of Target Words Number of times target words are repeated. *Include code when words are labeled. *Do not count words when they are explained in the beginning of the episode														

Title _____ Target Words _____

	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Onscreen Print Target word printed onscreen with verbal referent (character states target word out loud).													
Labeling Meaning of a word explicitly provided. Ex: Sensitive means quick to detect slight changes or signals.													
Defining/ Mislabeling 1.Label and Image did not appear at the same time. 2. Label offered was not a clear of what the image or action depicted.													
Repetition of Target Words Number of times target words are repeated. *Include code when words are labeled. *Do not count words when they are explained in the beginning of the episode													