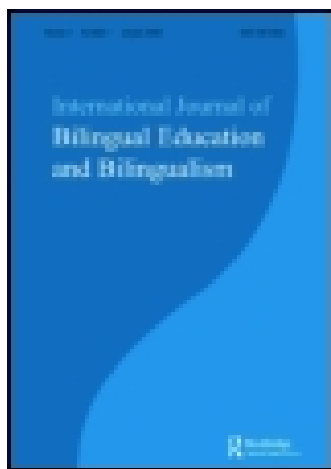


This article was downloaded by: [TELUQ]

On: 07 October 2014, At: 11:51

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



International Journal of Bilingual Education and Bilingualism

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rbeb20>

Songs vs. stories: impact of input sources on ESL vocabulary acquisition by preliterate children

Justyna Leśniewska^a & François Pichette^b

^a Instytut Filologii Angielskiej, Uniwersytet Jagielloński, Kraków, Poland

^b Sciences Humaines, Lettres et Communication, Université du Québec/Téluq, Quebec, QC, Canada

Published online: 30 Sep 2014.

To cite this article: Justyna Leśniewska & François Pichette (2014): Songs vs. stories: impact of input sources on ESL vocabulary acquisition by preliterate children, International Journal of Bilingual Education and Bilingualism, DOI: [10.1080/13670050.2014.960360](https://doi.org/10.1080/13670050.2014.960360)

To link to this article: <http://dx.doi.org/10.1080/13670050.2014.960360>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

Songs vs. stories: impact of input sources on ESL vocabulary acquisition by preliterate children

Justyna Leśniewska^{a*} and François Pichette^b

^a*Institut Filologii Angielskiej, Uniwersytet Jagielloński, Kraków, Poland;* ^b*Sciences Humaines, Lettres et Communication, Université du Québec/Téluq, Québec, QC, Canada*

(Received 15 December 2013; accepted 16 August 2014)

Research in second language acquisition has paid little attention to preliterate children learning a language which is absent from their environment outside the language class. This study examines the acquisition of English words by 24 French-speaking children aged 35–59 months, who were introduced to 57 words, embedded in stories and songs. Four stories and four songs were randomly spread across four consecutive weekly workshops consisting of play-based pedagogical activities. The impact of the input source, number of encounters with each lexical item, animacy as a feature of the lexical items, and first language (L1) lexicon size was examined. Recall of target words was assessed through the selection between four images after hearing the word, and L1 lexicon was assessed through the Peabody test. Results show significantly higher recall for animate concepts, while no difference in recall was found in relation to input source (words in songs vs. stories) or L1 lexicon size. Results also stress the need for a possibly higher number of encounters than that normally found for adults in order to achieve significant recall.

Keywords: preliteracy; vocabulary acquisition; child SLA; animacy; ESL

Introduction

Recent years have seen an increase of interest in teaching English as a second language (L2) to children at a very young age on the part of both parents and educators in many countries (Linares García 2007; Nikolov 2009; Rokita-Jaskow 2012). While many preschools and childcare facilities offer introductory activities to an L2, relatively little is known about the acquisition of L2 vocabulary by children under the age of six, living in first language (L1) environments and learning, in an educational setting such as a nursery or a preschool, a language that is absent from the social environment.

A cursory glance at second language acquisition (SLA) literature may give the impression that vocabulary acquisition in young learners is well-researched. However, a closer inspection reveals that, of some 2200 papers on SLA published over 25 years, less than 1% involve children who do not know yet how to read and write (Pichette 2012). Among these scarce studies, only a handful measure vocabulary acquisition from tasks. Thus, preliterate children acquiring an L2 in educational settings appear to be an understudied population in the field of SLA. This paucity of studies cannot be compensated for by using data from other learners, for reasons outlined below.

*Corresponding author. Email: justyna.lesniewska@uj.edu.pl

First, conclusions and recommendations from studies with older bilingual children may not always be applicable to preliterate children. Any search for empirical data concerning vocabulary acquisition in preliterate children is hampered by the widespread use of the umbrella term ‘young learner,’ which is applied to children of practically any age until the beginning of adolescence. It is widely recognized that SLA in young children develops differently from older children and adults (see Demagny and Paprocka-Piotrowska 2004; Paradis 2004; Pearson 2000) both quantitatively and qualitatively, due to factors related to cognitive development. Schoolchildren, like adults, are impacted by already knowing how to read and write before the first contact with the L2. Literacy, in turn, feeds into the metalinguistic competence of the learners. Nicholas and Lightbown admit that researchers should be ‘cautious about assuming that data from learners over age seven is “child-like” in the same way as data from younger learners,’ because the development of literacy brings on a ‘pivotal change in the potential for language acquisition as well as in the strategies that learners use in approaching a new language’ (Nicholas and Lightbown 2008, 39).

Second, even though studies on first-language development may be of relevance to child SLA, they do not provide complete information on how an L2 will be acquired. Researchers argue that child SLA is fundamentally different from L1 acquisition (Sarkar 2001; Unsworth 2009). There are important differences not only in the sheer amount of exposure to language and the characteristics of the input, but also there is no doubt that the dynamics of language acquisition is bound to be different when there is another language system already functioning (even if still not fully developed).

Third, our target population differs from simultaneous bilinguals, who receive dual language input from birth, and who are the best-researched group so far (there is a number of studies investigating the acquisition of vocabulary by young bilingual children, see e.g. Bialystok et al. 2010; De Houwer 2009a, 2009b; Thordardottir 2011). It is true that bilingual development is rarely entirely symmetrical and usually features various patterns of language dominance which change over time (Aronin and Singleton 2012). The weaker of a bilingual’s two languages may resemble an L2 in some aspects; nevertheless, even the weaker language is present in the bilingual’s environment from birth, which makes it radically different from an L2 learnt at kindergarten or preschool, when the command of the L1 is already quite developed.

Fourth, the learners who are of interest to us differ from those toddlers and preschoolers who are also learning the L2 in an instructional setting, but in immigrant/minority contexts. Though the latter are also sequential bilinguals, and speak the L1 at home, an important difference is that they have contact with English outside the place where it is taught. In fact, most research on child SLA (e.g. Schwartz, Moin, and Leikin 2012; Winsler, Diaz, Espinosa, and Rodriguez 1999) is conducted in social settings where the target language is dominant in the environment. Typical studies involve immigrant children learning English in the USA. With no means of assessing the exact amount (i.e. the precise number of encounters) and nature of input, such studies are thus unable to reliably correlate recall scores with input characteristics. Another consideration is that minority children are sometimes of a low-socioeconomic status, which is known to influence learning performance (Hoff-Ginsberg 1998; Letts et al. 2013; Sirin 2005).

Having established that preliterate children learning an L2 in an instructional setting outside target language-speaking countries are indeed an understudied population in SLA research, we will now look at SLA literature to see what factors are likely to have an impact on the acquisition of vocabulary by such children.

Literature review

Whether or not a particular lexical item present in the learner's input will be learnt depends on a vast number of interrelated factors which are by no means easy to tease apart. The factors may be related to the lexical item itself (see Laufer 1997; cf. the notion of 'learning burden' in Nation 2001), the context in which it appears in the input, the way in which the learner processes the input, as well as by certain learner characteristics. Also, retention is likely to depend on the number of occurrences of the given item in the input directed at the learner. We examined some of the most influential variables, as suggested by research on other populations, which have received very little attention as far as preliterate learners are concerned.

Input source

It is widely recognized that preschool children should be taught an L2 by means of engaging, fun activities which are suited to their short attention spans and their lack of metacognition (Muñoz 2007). A well-established procedure is that of using storybooks, songs, and games in language classes with this age group. Storybooks have been investigated as a vocabulary teaching tool, with studies typically reporting a 20–30% retention rate for words taught (Biemiller and Boote 2006). It has been shown that adding explanations to stories tends to improve the retention rate by another 10% (Biemiller and Boote 2006; Collins 2006; Otterby 2009), and the relative impact of various types of explanations has also been investigated (Park 2006). Multisensory modes of presentation have been suggested as highly efficient for enhancing vocabulary acquisition among children (Ellis et al. 1999; Rojas 1997; Silverman 2005, Verhallen and Bus 2010; Verhallen, Bus, and de Jong 2006). From a theoretical perspective, the use of multisensory modes of presentation finds support in the Additivity Hypothesis in Paivio's (1986) Dual Coding theory, according to which items encountered in more than one sensory modality will leave a deeper memory trace, thus increasing its chances for acquisition. This hypothesis underscores the importance of stimulating children's multiple senses through the combined use of auditory and visual stimuli.

Studies have also shown benefits of including songs and, more generally, music in L2 teaching (Balcom and Sallis 2004; Coyle and Gracia 2014; Medina 1993, 2003; Paquette and Rieg 2008). The use of songs as a useful teaching resource is widespread and well-established (see e.g. Forster 2006; Murphey 1992), but this results mostly from pedagogical practice and classroom observations, rather than from any quantitative data analysis and theoretical underpinnings. Songs are widely recognized as helpful because the melody, the presence of rhyme, and the frequent repetition of items seem to facilitate the memorization of new elements of language. In the case of young learners, additional benefits from using songs in the classroom are that they raise motivation, as they are often accompanied by actions and gestures, and engage the learners emotionally. In an experimental study on adult learners, the learners who were taught through music and songs made greater progress than those whose classes did not involve music at all (Li and Brand 2009). Schön et al. (2008) found that music appears to help adult learners to develop word segmentation skills at the beginning stages of learning a new language.

Lexical categories and animacy

When investigating lexical acquisition in children, one should bear in mind the fact that in L1 contexts, children acquire nouns earlier and faster than verbs and adjectives

(see e.g. Sandhofer and Smith 2007 for an overview). This ‘noun advantage,’ as it is called, is usually explained in terms of the child’s cognitive development: nouns as a category have greater perceptual and conceptual coherence; moreover, they refer to whole entities, as opposed to adjectives, which, in referring only to selected properties of entities, may be less perceptually salient (Sandhofer and Smith 2007; Smith, Gasser, and Sandhofer 1997).

Within the category of nouns, in the case of young children, another factor that may be of relevance is animacy. There seem to be no SLA studies investigating animacy as a feature which may affect the retention and retrieval of nouns, but from a vast body of research on human cognition, animacy emerges as central to the categorization and acquisition of concepts. Developmentally, human beings begin to distinguish between animate and inanimate entities from a very young age (Opfer and Gelman 2011; Piaget 1923, 1937). Research shows that infants begin to associate some animate properties with people by the age of six months (Rakison and Poulin-Dubois 2001), to discriminate animate from inanimate objects on the basis of motion cues by nine months (Poulin-Dubois, Lepage, and Ferland 1996), and that an understanding of the broad category of animates and inanimates develops during the second year of life (Rakison and Poulin-Dubois 2001), with important consequences for word learning (Childers and Echols 2004). There is strong support from psycholinguistics and brain research for the claim that animacy plays a crucial role in linguistic behavior. Animate and inanimate conceptual categories appear to be subserved by distinct neural mechanisms (Caramazza and Shelton 1998); neuroimaging suggests that there may be distinct neural systems involved in agency and animacy detection (Gobbini et al. 2011), and that semantic features of living and nonliving objects are represented in distinct brain areas (Leube et al. 2001).

Concreteness

A variable related to animacy that may affect the acquisition of lexical items in young children is word concreteness. Words whose meaning can be inferred cognitively, with minimal linguistic experience, i.e., words which, in Gentner’s terms, follow the cognitive-perceptual dominance (Gentner and Boroditsky 2001), are acquired first because their referents are easy for a child to conceptualize. In adults, concrete words are easier to process (see McFalls, Schwanenflugel, and Stahl 1996 and Schwanenflugel 1991 for an overview) and have been shown to yield higher scores than abstract ones as far as recall is concerned (see Pichette, de Serres, and Lafontaine 2012). The processing advantage for concrete words has been explained in terms of easier access to imagery (Paivio 1968, 1986; Paivio, Yuille, and Madigan 1968) or to the relative ease of retrieval of associated information from prior knowledge for such words (the Context Availability Hypothesis, Schwanenflugel 1991). Unfortunately, demonstrating this in the case of preliterate learners presents a challenge. Even in the case of adults, concreteness proves challenging in terms of the operationalization of the construct, raising the issue of whether it is an intrinsic feature of lexical items, or varies across individuals. For preliterate learners, an additional major difficulty is that concreteness and imagery measurement requires metacognition, absent in very young children, with whom the only possibility of reliably assessing recall is through visual images, which cannot depict abstract items (e.g. *again*, *tomorrow*) adequately.

Lexicon

Another potential factor which may affect the learning of new words in L2 is the size of the learner's L1 mental lexicon, in light of Cummins' (1980) interdependence hypothesis. It is well established that there is a strong, positive relationship between existing L1 vocabulary knowledge and facility in learning new L1 words by young (under six) monolingual children (see Kan and Kohnert 2012 for an overview of research findings). This relationship is, interestingly, more robust in younger monolingual children than in older ones. The association between existing vocabulary and novel word learning is explained by the fact that children with broader vocabulary may show greater efficiency in processing phonological representations, which frees up some resources for the processing of semantic properties of new words (Gathercole 2006; Gupta and Tisdale 2009). Another possibility is that children who have a larger lexicon have already developed a more sophisticated system of semantic organization (as strategies for categorizing words change gradually), which enables them to incorporate new words into the existing structure more efficiently (Borovsky and Elman 2006; Peña, Bedore, and Zlatic-Giunta 2002). It stands to reason that, by analogy, such skills and existing vocabulary in one language could facilitate the acquisition of vocabulary in another. Indeed, the data from Kan and Kohnert's (2012) study with three- to five-year-old sequential bilinguals in Hmong and English show a positive cross-language association between existing vocabulary in L1 and novel word learning in L2.

Method

Goal and research questions

This study reports on an investigation into vocabulary acquisition in English as an L2 in preschool children, aiming to fill a gap in the current state of knowledge about vocabulary acquisition of a language that is absent from the learners' environment. Based on our review of the literature, we conducted a study whose goal is to investigate the impact of the following variables on the recall of English words by monolingual preliterate children: input source: stories vs. songs, number of encounters with the lexical items, animacy, and L1 lexicon.

Our research questions are as follows:

Question 1: Are words presented in songs better recalled than those presented in stories?

Question 2: Do combined input sources (stories and songs) yield better recall than a single source of input?

Question 3: Are words for animate concepts better recalled than those for inanimate concepts?

Question 4: Do children who are above average in L1 lexicon tend to be better at learning L2 words?

In light of our review of the literature, we expect a positive answer to all the four research questions.

Participants

The participants were 24 children (14 boys and 10 girls) between three and five years of age. The exact age range was 35–59 months, with a mean of 48.4. These children were taking part in English language classes in the day care they were attending in Quebec, Canada. Background information on the participants was established by means of a questionnaire, in which the parents were asked what words the child already knew in English, if the child knew any other language, and what kind of prior contact with English was experienced, if any. Importantly, the questionnaire was also used to assess possible exposure to English outside the day care although it was deemed rather unlikely. The parents were also asked to sign a consent form allowing their child to participate in the study. Only those children were included in the study whose first and only language was French and who had had either very minimal or no exposure to English outside the day care.

Procedure

All the sessions were conducted by a research assistant to this project. The procedure involved four weekly group meetings consisting of one storytelling and one song, separated by a short activity or game. Between four and eight children participated in each workshop. Both storybooks and songs are very common language-learning activities for children of that age, the efficacy of which has found wide support over the years. Both stories and songs were preceded and accompanied by explanations in French. Given that they spoke no English at the onset, some use of the L1 was deemed necessary. However, most information in French was very brief and simply consisted of providing the French word for concepts that were less transparent (e.g. *daddy*), when the assistant noticed that a target word was apparently not being understood despite gestures. The use of children's L1 in activities aimed at L2-learning is deemed efficient (Altarriba and Knickerbocker 2011; Tonzar et al. 2009) and appears crucial for absolute beginners (Kersten et al. 2010), like the children targeted by this project. Comprehension was also facilitated by semantic clues such as gestures, small objects, and images, which is in keeping with the recommendations for conducting such activities in day care centers (Lalonde-Graton 2003; MSA 2007; Post and Hahmann 2000). Images or visual aids were used consistently for all the vocabulary items under investigation, to ensure that any possible gains from dual coding would apply equally to all the items. Group tasks have also been suggested as more effective than individual tasks for young children (Ellis and Heimbach 1997) and are the ones typically used in day care centers due to toddlers' lack of autonomy and the child–educator ratio.

All the workshops were conducted by the same person. That assistant had extensive experience with teaching young children and received additional training on how to tell stories for the purpose of this study. She was given recordings of sample sessions to watch before she started. The four consecutive weekly meetings were video recorded, and the number of encounters with each lexical item was counted for each child using the recordings. The figure used in the presentation of the results is the total number of encounters each child had with each target word for all activities combined. It proved to be a time-consuming procedure (it necessitated careful watching of the recordings to keep track of the whereabouts of all the participants during the class, as it was possible for a child to go away for a couple of minutes and miss an occurrence of a particular lexical item). A sample of data compilation is provided in the [Appendix](#) to provide examples of when and how the items were encountered.

The words present in the input occurred in three different conditions: some in songs only, some in stories only, and some in both stories and songs. For words that were presented in both conditions, the two input sources tended not to occur during the same workshop; however, there were some minor exceptions to this rule, as for example when a song from a previous workshop was sung again during the next workshop at a special request from the children.

Instruments

Starting with a large selection of age-appropriate entertaining books and songs, we narrowed them down to four book–song pairs that showed some overlap in the target vocabulary, based on their theme. The following stories and songs were selected:

Songs: Go away big green monster, Five monkeys jumping on the bed, Head shoulders knees and toes, The wheels on the bus.

Stories: The monster under my bed, Curious George goes to the hospital, The little engine that could, Mouse paint

Next, we identified suitable vocabulary items which occurred in one of the three conditions: in songs only, in stories only, and in both conditions (the vocabulary that overlapped). Initially, 57 lexical items were identified in the input, of which some were discarded at two different stages. Designing the recall task leads to the elimination of 13 items: 6 because they were not easy to represent visually and unequivocally (*help, look, wait, under, faster, quiet*), 2 others because they were phrases which were taught as chunks (*don't move, what's your name?*), and 5 more because they were numbers from 1 to 5, and there was the possibility that some of the younger children may provide incorrect answers due to improper calculations. This elimination process left 44 lexical items suitable for the assessment of recall, of which 7 were eliminated during the analyses because they were French–English cognates: *baby, blue, bus, mommy, monster, orange, train*. There were two other borrowings from French among the target words (*cat, purple*), but that fact was in no way obvious or recognizable in the oral form. These 37 remaining items consisted of nouns (24), adjectives (12), and verb (1). The inclusion of lexical categories other than nouns was meant to allow us to see if the superiority for nouns still holds in L2 acquisition for children whose cognitive development is more advanced than that at the age at which the first hundreds of nouns and adjectives are learned in L1. Of those target items, 15 were encountered through both modalities, while 11 were encountered only in stories and 11 others only in songs. [Table 1](#) shows the details of the target items.

The recall of vocabulary items was tested by using the age-appropriate standard method of selecting one of four images on a flashcard after hearing a target word (e.g. Dunn and Dunn 2007). The participants were asked to point to the correct picture in response to an oral prompt. [Figure 1](#) presents a sample flashcard for the lexical item *ghost*. Such flashcards were not taken from any existing test but were created for the purpose of testing L2 recall, using the same technique on which Peabody tests are based. Recall was tested seven days after the last workshop.

Information about the participants' L1 lexical knowledge was obtained by means of the Peabody Picture Vocabulary Test in the French version (Dunn, Thériault-Whalen, and Dunn 1993). The only modification introduced was the substitution of two lexical items

Table 1. Target items.

Items	Category	Animacy	Read	Sung
bed	noun	animate	x	x
big	adj		x	x
black	adj		x	x
box	noun	inanimate	x	
bump	noun	inanimate		x
cat	noun	animate	x	x
children	noun	animate	x	
daddy	noun	animate	x	
dog	noun	animate	x	
door	noun	inanimate		x
ears	noun	inanimate		x
eyes	noun	inanimate	x	x
ghost	noun	animate	x	x
green	adj		x	x
happy	adj		x	
head	noun	inanimate	x	x
jump	verb			x
knee	noun	inanimate	x	x
little	adj		x	x
monkey	noun	animate	x	x
mouse	noun	animate	x	
mouth	noun	inanimate		x
night	noun	inanimate	x	
nose	noun	inanimate		x
open	adj			x
people	noun	animate		x
purple	adj		x	
red	adj		x	
shoulder	noun	inanimate	x	x
shut	adj			x
tired	adj		x	
toe	noun	inanimate	x	x
wheel	noun	inanimate		x
white	adj		x	x
wipers	noun	inanimate		x
witch	noun	animate	x	x
yellow	adj		x	

with their equivalents used in North American French. The Peabody test, apart from giving absolute scores, also provides an ability estimate by ranking each score in percentiles according to the child's age. For example, for two of our participants whose raw Peabody score was 38, the percentile score was higher for MM (=61), who was 46 months old, than for ZL (=47), who was 48 months old.

Results

Our recall scores and analyses are presented for each of our four research questions. On the L2 recall test, one point was awarded when the child identified the correct image for a

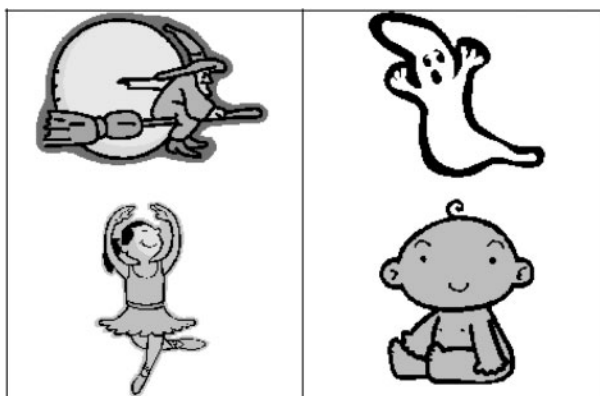


Figure 1. Sample flashcard used in the L2 recall test.

target word, and zero when an incorrect image was chosen. The mean recall for each lexical item is therefore between zero and one. There was practically no missing data (far less than 1%) because there was only one instance of a child not choosing any of the four options for one of the items.

Our analyses were performed on the data from 23 of the 24 participants. After compiling the data, the suspiciously low scores for one of the participants on all tests, despite apparent normal intelligence, led us and her parents to discover that her hearing was severely impaired. For obvious reasons, her data were excluded from the analyses.

Question 1: Are words presented in songs better recalled than those presented in stories?

The average number of times a target word was encountered by a participant is 21.3 (SD = 17.7), with a range of 1–75. There was no significant difference in the number of word encounters between both sources of input ($t(745) = .42, p = .68$).

The mean recall for the 11 lexical items embedded exclusively in stories and not in songs was 0.39 (SD = .49), whereas for the 11 words which appeared only in songs, the mean was 0.25 (SD = .43). A t -test shows a significant difference between words introduced in songs and those introduced in stories, the latter yielding higher recall scores: $t = 3.456$ (df = 503, $p < .001$). As can be seen in Table 1, words that were in stories include six nouns (two animates) and five adjectives; words that were in songs include seven nouns (one animate), two adjectives, and one verb.

Question 2: Do combined input sources (stories and songs) yield better recall than a single source of input?

Better recall was expected for items that the children encountered in both stories and songs, compared to items encountered in only one condition (see Pichette 2002; Sydor-enko 2010). This proved not to be the case: mean recall for items encountered through both input sources was 0.36 (SD = .48) while for those in one input source it was 0.31 (SD = .46). A t -test shows this difference not to be significant ($p = 0.13$). The data-sets show a comparable profile: for one input source, we find 12 nouns (five animates) and 8 adjectives; for two input sources, we find 15 nouns (seven animates) and 9 adjectives.

Question 3: Are words for animate concepts better recalled than those for inanimate concepts?

As has been mentioned earlier, we first investigated whether the superiority of nouns over adjectives holds in L2 for our population. The mean recall for nouns was 0.30 (SD = .48), whereas for adjectives it was 0.36 (SD = .46). A *t*-test shows no significant difference between both the means ($t(43) = 1.73$; $p = .08$).

Focusing on the nouns allowed us to explore the impact of animacy on recall. Nouns that represent animate objects or entities (e.g. *cat*, *ghost*) were compared for recall to nouns that represented inanimate objects or entities (e.g. *bed*, *ear*). Mean recall for animate concepts ($n = 9$) was .45 (SD = .50), while for the inanimate concepts ($n = 15$) it was .23 (SD = .42). A *t*-test shows both the means to be significantly different, $t = 5.71$ ($df = 548$; $p < .00001$).

Question 4: Do children who are above average in L1 lexicon tend to be better at learning L2 words?

Since recall was in a dichotomous form (0 or 1), performing a linear regression or finding correlations was not possible. A logistic regression was carried out instead. The mean number of occurrences of a given lexical item per child was 21.4 ($N = 745$), SD = 18.0. The logistic regression yielded a chi-square of 6.45 ($p = .01$). The *p*-value associated with our chi-square suggests that the regression coefficient is different from zero and that our model can be used with confidence.

In addition, our range of encounters of 1–75 allowed us to split our recall data into five equal slices of 15. Figure 2 shows the mean recall for each of the five slices of the range of encounters, depicting a very clear and straightforward improvement in recall with the growing number of encounters. Figure 2 also highlights the fact that more than 60 encounters with a new word are generally needed for the word to be recalled at the 0.5 level.

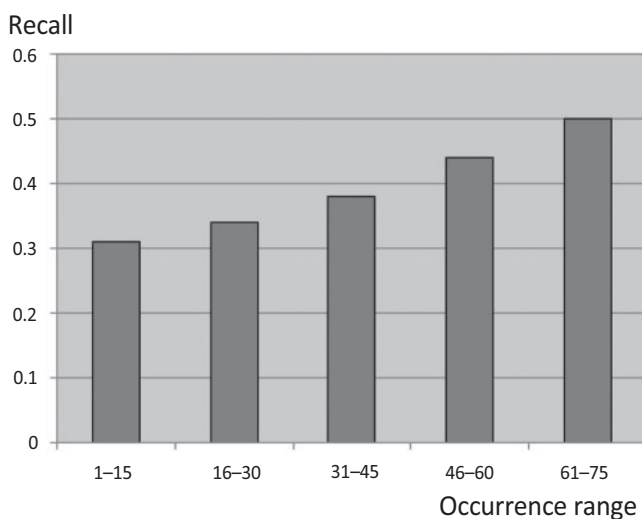


Figure 2. L2 vocabulary recall vs. number of encounters.

L1 lexicon

Based on our review of the literature, we examined possible relationships between L1 vocabulary size and the acquisition of L2 words. To yield correlations with L2 recall, we computed raw L1 vocabulary Peabody scores, before they were normalized or converted into percentiles. No significant correlation was found between L1 lexicon and L2 recall although the p -value is near the .05 alpha level ($r = .39$; $p = .07$).

Discussion and conclusion

Contrary to our expectations, our data only suggest a positive answer to one of our four research questions, namely that on animacy (Question 3). To that effect, our results confirm several studies on language development by suggesting that animacy may be an important variable in child L2 acquisition: inanimate concepts require more emphasis (a higher number of encounters) than animate ones. Our data show that animate items were remembered about twice as well as inanimate ones.

Our first question concerned the relative efficiency of singing and storytelling for the learning of new L2 words. While we expected recall for words embedded in songs to be higher than those embedded in stories, we observed a significantly higher recall for words in stories, about 50% higher than words in songs. This may seem counterintuitive, given the widely recognized benefits of using songs in language teaching, which we mentioned in the literature review. This result could be related to the fact that listening to stories encourages a greater focus on the meaning of words and therefore a different/deeper kind of processing of the lexical items, than when listening to songs. However, another explanation could be that animacy is such a powerful variable that it annulled the effect of the presentation mode. In the study by Coyle and Gracia (2014), the authors make a very interesting observation which may be of some relevance to the interpretation of our results. They noticed that in their study, the aspects of songs which make them so attractive to children, namely the ludic elements, the use of actions, gestures, and onomatopoeias, seemed to actually detract the children's attention from the song's lexical content. This effect is in direct contrast to the studies on adult learners, reviewed earlier in this study, in which the use of songs was found to help with the memorization of new lexical items.

Presentation modes were also the subject of our second question, which concerned the possible effect of additivity on recall. Our data showed that words that were presented both through songs and stories were not recalled significantly better than those presented in either mode. Animacy is not hypothesized to have played a role since the percentage of animate items in both groups is similar (dual mode: 4 out of 15 items; single mode: 5 out of 22 items).

Our last research question was based on the assumption that L2-learning ability would be related to the level of lexical development in the L1. In the case of our learners, children with a higher level of lexical development in French would then prove more apt at acquiring new vocabulary in English. The absence of a significant correlation between the L1 lexicon and the ability to learn L2 words may be seen as surprising. However, a likely explanation could be simply that the breadth of the L1 lexicon does not necessarily reflect the child's ability to learn words. Children who know more words than other children of the same age may not necessarily be better learners; the differences may be due to socio-environmental factors such as better quality of language input, greater exposure to vocabulary, more stimulation to learn new word forms, or they may reflect differences in the age at which individual children reach a certain level of linguistic

development. Another explanation may reside in our sample size. It has long been argued (e.g. Skipper, Guenther and Nass 1967) that it is by pure convention that the alpha level was set at .05 in human and social sciences (i.e. a 5% chance that the results occurred by chance) and that the alpha level could well have been fixed at a slightly higher or lower level. With this in mind, there remains the possibility that the marginally significant correlation we obtained – which indicates a 7% chance that our correlation occurred by chance – could have fallen below the .05 level with a larger sample size.

Our findings also show that, in the case of our preliterate learners, new lexical items require a high number of encounters in order to be acquired: over 60 encounters with a new word are needed to achieve a 50% chance for recall. This figure is much higher than those normally suggested for incidental acquisition by older children and adults; for example, around 10 encounters with a new word are said to be needed for a good chance of the word being remembered (Nation and Wang Ming-tzu 1999). Our participants' recall performance is also about half of that obtained by Pigada and Schmitt (2003), who saw a 60% pickup rate after 20 encounters with a new word, while ours is slightly above 30%, as evidenced in Figure 2. Lack of metacognition or other cognitive factors could explain the young learners' need for a higher number of encounters. Comparing the acquisition rate of preliterate learners with that of older learners on similar tasks could help shed light on possible differences and the reasons behind them. It needs to be remembered that in our study vocabulary acquisition was tested using a measure of passive recognition (the children pointed to one of four images to show that they understand a word's meaning). Obviously, we would expect the recall rates to be lower in the case of a vocabulary elicitation test. While this does not affect the validity of the comparisons we made involving word class, animacy, or source of input (since *all* the words in our study were tested in the same way), for any discussion of the number of encounters needed to acquire a word, it is important to bear in mind that even more encounters would likely be needed for the lexical item to be produced, not just recognized, by the learner.

It needs to be stressed that this study was intended as an exploratory, data-driven investigation of a hitherto unexplored topic, and as a result shows several limitations, the most important one being its small scope. It must be noted that the number of all lexical items used in the study was rather low, which was due to the fact that only a certain number of words could be accommodated in four workshops designed for absolute beginners. Because of that, the number of words belonging to each word class, as well as to the animate and inanimate categories, was limited, and the words were not ideally distributed between the categories. Since the higher number of animate concepts in songs might have played a role in the better recall for that input source, further studies with an equivalent proportion of animate concepts would help disentangle those two variables by determining the relative weight of each one. We are convinced that this is a promising direction for future research, and a study conducted along the same lines, investigating a larger sample of lexical items over a longer period of time, would constitute a worthwhile endeavor. Our findings indicate that in any such study, animacy is likely to come out as a key feature among the characteristics of lexical items that affect their uptake by young learners.

References

- Altarriba, Jeanette, and Hugh Knickerbocker. 2011. "Acquiring L2 Vocabulary through the Use of Images and Words." In *Applying Priming Methods to L2 Learning, Teaching and Research*, edited by Pavel Trofimovich and Kim McDonough, 21–48 (ch. 2). New York: Benjamins.

- Aronin, Larissa, and David Singleton. 2012. *Multilingualism*. Amsterdam: John Benjamins.
- Balcom, Patricia, and Friedemann Sallis. 2004. "Towards a Model of Learning in a Multi-media Environment: Language and Music Cognition." Paper presented at the Arts Netlantic International Conference on New Media Research Networks, Charlottetown, Prince Edward Island, March.
- Bialystok, Ellen, Gigi Luk, Kathleen F. Peets, and Sujin Yang. 2010. "Receptive Vocabulary Differences in Monolingual and Bilingual Children." *Bilingualism: Language and Cognition* 13 (4): 525–531. doi:10.1017/S1366728909990423.
- Biemiller, Andrew, and Catherine Boote. 2006. "An Effective Method for Building Meaning: Vocabulary in Primary Grades." *Journal of Educational Psychology* 98 (1): 44–62. doi:10.1037/0022-0663.98.1.44.
- Borovsky, Arielle, and Jeff Elman. 2006. "Language Input and Semantic Categories: A Relation between Cognition and Early Word Learning." *Journal of Child Language* 33 (4): 759–790. doi:10.1017/S0305000906007574.
- Caramazza, Alfonso, and Jennifer R. Shelton. 1998. "Domain-specific Knowledge Systems in the Brain: The Animate-inanimate Distinction." *Journal of Cognitive Neuroscience* 10 (1): 1–34. doi:10.1162/089892998563752.
- Childers, Jane B., and Catharine H. Echols. 2004. "2 1/2-year-old Children Use Animacy and Syntax to Learn a New Noun." *Infancy* 5(1): 109–125. doi:10.1207/s15327078in0501_5.
- Collins, Molly F. 2006. "ELL Preschoolers' Rare Vocabulary Learning: The Effect of Storybook Reading on Word Classes." *Proceedings of the Annual Boston University Conference on Language Development* 30 (1): 84–95.
- Coyle, Yvette, and Remei Gómez Gracia. 2014. "Using Songs to Enhance L2 Vocabulary Acquisition in Preschool Children." *ELT Journal* 68 (3): 276–285. doi:10.1093/elt/ccu015.
- Cummins, Jim. 1980. "The Cross-lingual Dimensions of Language Proficiency: Implications for Bilingual Education and the Optimal Age Issue." *TESOL Quarterly* 14 (2): 175–187. doi:10.2307/3586312.
- De Houwer, Annick. 2009a. *An Introduction to Bilingual Development*. Bristol: Multilingual Matters.
- De Houwer, Annick. 2009b. *Bilingual First Language Acquisition*. Bristol: Multilingual Matters.
- Demagney, Annie-Claude, and Urszula Paprocka-Piotrowska. 2004. "The Acquisition of the Verbs and Adverbs Lexicon in French L1 and L2." *Langages* 155 (3): 52–75. doi:10.3917/lang.155.0052.
- Dunn, Lloyd M., and Douglas M. Dunn. 2007. *Peabody Picture Vocabulary Test*. 4th ed. Minneapolis, MN: Pearson.
- Dunn, Lloyd M., Claudia M. Thériault-Whalen, and Douglas M. Dunn. 1993. *Échelle de vocabulaire en images Peabody* [Peabody Picture Vocabulary Scale]. Toronto: Psychan.
- Ellis, Rod, and Rick Heimbach. 1997. "Bugs and Birds: Children's Acquisition of Second Language Vocabulary through Interaction." *System* 25 (2): 247–259. doi:10.1016/S0346-251X(97)00012-2.
- Ellis, Rod, Rick Heimbach, Yoshihiro Tanaka, and Atsuko Yamazaki. 1999. "Modified Input and the Acquisition of Word Meanings by Children and Adults." In *Learning a Second Language through Interaction*, edited by Rod Ellis, 63–114. Amsterdam: John Benjamins.
- Forster, Elizabeth. 2006. "The Value of Songs and Chants for Young Learners." *Encuentro* 16: 63–68.
- Gathercole, Susan E. 2006. "Nonword Repetition and Word Learning: The Nature of the Relationship." *Applied Psycholinguistics* 27: 513–543.
- Gentner, Dedre, and Lera D. Boroditsky. 2001. "Individuation, Relativity and Early Word Learning." In *Language Acquisition and Conceptual Development*, edited by Melissa Bowerman and Stephen Levinson, 215–256. Cambridge: Cambridge University Press.
- Gobbini, Maria Ida, Claudio Gentili, Emiliano Ricciardi, Claudia Bellucci, Pericle Salvini, Cecilia Laschi, Mario Guazzelli, and Pietro Pietrini. 2011. "Distinct Neural Systems Involved in Agency and Animacy Detection." *Journal of Cognitive Neuroscience* 23 (8): 1911–1920. doi:10.1162/jocn.2010.21574.
- Gupta, Prahlad, and Jamie Tisdale. 2009. "Word Learning, Phonological Short-term Memory, Phonotactic Probability and Long-term Memory: Towards an Integrated Framework." *Philosophical Transactions of the Royal Society Series B* 364: 3755–3771. doi:10.1098/rstb.2009.0132.

- Hoff-Ginsberg, Erika. 1998. "The Relation of Birth Order and Socioeconomic Status to Children's Language Experience and Language Development." *Applied Psycholinguistics* 19 (4): 603–629. doi:10.1017/S0142716400010389.
- Kan, Pui Fong, and Kathryn Kohnert. 2012. "A Growth Curve Analysis of Novel Word Learning by Sequential Bilingual Preschool Children." *Bilingualism: Language and Cognition* 15 (3): 452–469. doi:10.1017/S1366728911000356.
- Kersten, Kristin, Andreas Rohde, Christine Schelleter, and Anja K. Steinlen. 2010. "Guidelines for Language Use in Bilingual Preschools." In *Bilingual Preschools: Best practices*, edited by Kristin Kersten, Andreas Rohde, Christine Schelleter, and Anja K. Steinlen, 103–116. Trier: WVT.
- Lalonde-Graton, Micheline. 2003. *Fondements et pratiques de l'éducation à la petite enfance* [Fundamentals and Practices in Early Childhood Education]. Ste-Foy: Presses de l'Université du Québec.
- Laufer, Batia. 1997. "What's in a Word that Makes It Hard or Easy: Some Intralexical Factors that Affect the Learning of Words." In *Vocabulary: Description, Acquisition and Pedagogy*, edited by Norbert Schmitt and Michael McCarthy, 140–155. Cambridge: Cambridge University Press.
- Letts, Carolyn, Susan Edwards, Indra Sinka, Blanca Schaefer, and Wendy Gibbons. 2013. "Socio-economic Status and Language Acquisition: Children's Performance on the New Reynell Developmental Language Scales." *International Journal of Language and Communication Disorders* 48 (2): 131–143. doi:10.1111/1460-6984.12004.
- Leube, Dirk T., Michael Erb, Wolfgang Grodd, Mathias Bartels, and Tilo J. Kircher. 2001. "Activation of Right Fronto-temporal Cortex Characterizes the 'Living' Category in Semantic Processing." *Cognitive Brain Research* 12 (3): 425–430. doi:10.1016/S0926-6410(01)00068-4.
- Li, Xiangming and Manny Brand. 2009. "Effectiveness of Music on Vocabulary Acquisition, Language Usage, and Meaning for Mainland Chinese ESL Learners." *Contributions to Music Education* 36, 73–84.
- Llinares García, Ana. 2007. "Young Learners' Functional Use of the L2 in a Low-immersion EFL Context." *ELT Journal* 61 (1): 39–45. doi:10.1093/elt/cc1043.
- McFalls, Elisabeth L., Paula J. Schwanenflugel, and Steven A. Stahl. 1996. "Influence of Word Meaning on the Acquisition of a Reading Vocabulary in Second-grade Children." *Reading and Writing* 8 (3): 235–250. doi:10.1007/BF00420277.
- Medina, Suzanne. 1993. "The Effect of Music on Second Language Vocabulary Acquisition." *FEES News (National Network for Early Language Learning)*, 6 (3), 1–8.
- Medina, Suzanne. 2003. "Acquiring Vocabulary through Story-songs." *MEXTESOL Journal* 26 (1): 13–18.
- MSA/Ministère de la famille et des aînés. 2007. *Accueillir la petite enfance: Le programme éducatif des services de garde du Québec. Mise à jour* [Welcoming Early Childhood: The Education Program of Quebec's Daycare Centers]. Gouvernement du Québec: Ministère de la famille et des aînés.
- Muñoz, Carmen. 2007. "Age-related Differences and Second Language Learning Practice." In *Practice in a Second Language*, edited by Robert M. DeKeyser, 229–255. Cambridge: Cambridge University Press.
- Murphey, Tim. 1992. *Music and Song*. Oxford: Oxford University Press.
- Nation, Paul. 2001. *Learning Vocabulary in another Language*. Cambridge: Cambridge University Press.
- Nation, Paul, and Karen Wang Ming-tzu. 1999. "Graded Readers and Vocabulary." *Reading in a Foreign Language* 12: 355–379.
- Nicholas, Howard, and Patsy M. Lightbown. 2008. "Defining Child Second Language Acquisition, Defining Roles for L2 Instruction." In *Second Language Acquisition and the Younger Learner: Child's Play?* edited by Jenefer Philp, Rhonda Oliver, and Alison Mackey, 27–51. Amsterdam, Philadelphia: John Benjamins.
- Nikolov, Marianne, ed. 2009. *Early Learning of Modern Foreign Languages: Processes and Outcomes*. Bristol: Multilingual Matters.
- Opfer, John E., and Susan A. Gelman. 2011. "Development of the Animate-inanimate Distinction." In *The Wiley-Blackwell Handbook of Childhood Cognitive Development* 2nd ed., edited by Usha Goswami, 213–238. Oxford: Wiley-Blackwell.

- Otterby, Debra L. 2009. "Instructional Strategies to Enhance English Language Learners' Vocabulary Acquisition." *Dissertation Abstracts International, A: The Humanities and Social Sciences*, 70, 04, 1217.
- Paivio, Allan. 1968. "A Factor-analytic Study of Word Attributes and Verbal Learning." *Journal of Verbal Learning and Verbal Behavior* 7 (1): 41–49. doi:10.1016/S0022-5371(68)80161-6.
- Paivio, Allan. 1986. *Mental Representations: A Dual Coding Approach*. Oxford: Oxford University Press.
- Paivio, Allan, John C. Yuille, and Stephen A. Madigan. 1968. "Concreteness, Imagery, and Meaningfulness Values for 925 Nouns." *Journal of Experimental Psychology* 76(1, Pt.2): 1–25. doi:10.1037/h0025327.
- Paquette, Kelli R., and Sue A. Rieg. 2008. "Using Music to Support the Literacy Development of Young English Language Learners." *Early Childhood Education Journal* 36 (3): 227–232. doi:10.1007/s10643-008-0277-9.
- Paradis, Michel. 2004. *A Neurolinguistic Theory of Bilingualism*. Amsterdam: John Benjamins.
- Park, Jin Young Kim. 2006. "Facilitating Young Children's Second Language Development through Picture Book Sharing." *Dissertation Abstracts International, A: The Humanities and Social Sciences*, 67, 01, July, 64.
- Pearson, Christen Marie. 2000. "Vocabulary Learning in ESL Preschool Children: Accounting for Individual Differences." *Dissertation Abstracts International, B: Sciences and Engineering*, 61, 3, Sept, 1368-B.
- Peña, Elizabeth D., Lisa M. Bedore, and Rebecca Zlatic-Giunta. 2002. "Category-generation Performance of Bilingual Children the Influence of Condition, Category, and Language." *Journal of Speech, Language, and Hearing Research* 45 (5): 938–947. doi:10.1044/1092-4388(2002/076).
- Piaget, Jean. 1923. *Langage et pensée chez L'Enfant* [The Language and Thought of the Child]. Neuchâtel: Delachaux et Niestlé.
- Piaget, Jean. 1937. *La construction du réel chez L'Enfant* [The Construction of Reality in the Child]. Neuchâtel: Delachaux et Niestlé.
- Pichette, François. 2002. Second-language Vocabulary Learning and the Additivity Hypothesis. *Canadian Journal of Applied Linguistics* 5 (1): 117–130.
- Pichette, François. 2012. *Animacy and Concreteness in Young Children's Second Language Vocabulary Acquisition*. Paper presented at the Second Language Research Forum, Pittsburgh, October.
- Pichette, François, Linda de Serres, and Marc Lafontaine. 2012. "Sentence Reading and Writing for Incidental Second Language Vocabulary Acquisition." *Applied Linguistics* 33 (1): 66–82. doi:10.1093/applin/amr037.
- Pigada, Maria, and Norbert Schmitt. 2003. "Vocabulary Acquisition from Extensive Reading: A Case Study." *Reading in a Foreign Language* 18 (1): 1–28.
- Post, Jacalyn, and Mary Hahmann. 2000. *Tender care and early learning: Supporting infants and toddlers in child care settings*. Ypsilanti, MI: High/Scope Press.
- Poulin-Dubois, Diane, Anouk Lepage, and Doreen Ferland. 1996. "Infants' Concept of Animacy." *Cognitive Development* 11 (1): 19–36. doi:10.1016/S0885-2014(96)90026-X.
- Rakison, David H., and Diane Poulin-Dubois. 2001. "Developmental Origin of the Animate–inanimate Distinction." *Psychological Bulletin* 127 (2): 209–228. doi:10.1037/0033-2909.127.2.209.
- Rojas, Leyla María. 1997. "Children's Stories: A Pedagogical Strategy in Foreign-language Instruction." *Forma y Función* 10: 113–130.
- Rokita-Jaśkow, Joanna. 2012. "Motives for Early Foreign Language Learning and Parental Educational Aspirations in the era of Globalization." In *Languages, Literatures and Cultures in Contact: English and American Studies in the Age of Global Communication*, edited by Marta Dąbrowska, Justyna Leśniewska, and Beata Piątek, 393–406. Kraków: Tertium.
- Sandhofer, Catherine, and Linda Smith. 2007. "Learning Adjectives in the Real World: How Learning Nouns Impedes Learning Adjectives." *Language Learning and Development* 3 (3): 233–267. doi:10.1080/15475440701360465.
- Sarkar, Mela. 2001. "Saute ça: The Acquisition of the Faire Faire Causative by First and Second Language Learners of French." *Dissertation Abstracts International, A: The Humanities and Social Sciences*, 61, 12, June, 4753-A.

- Schön, Daniele, Maud Boyer, Sylvain Moreno, Mireille Besson, Isabelle Peretz and Régine Kolinsky. 2008. "Songs as an Aid for Language Acquisition." *Cognition* 106 (2): 975–983. doi:10.1016/j.cognition.2007.03.005.
- Schwanenflugel, Paula J. 1991. "Why are Abstract Concepts Hard to Understand?" In *The Psychology of Word Meaning*, edited by Paula J. Schwanenflugel, 223–250. Hillsdale, NJ: Erlbaum.
- Schwartz, Mila, Victor Moin, and Mark Leikin. 2012. "Lexical Knowledge Development in the First and Second Languages among Language-minority Children: The Role of Bilingual Versus Monolingual Preschool Education." *International Journal of Bilingual Education and Bilingualism*, 15 (5): 549–571. doi:10.1080/13670050.2011.650332.
- Silverman, Rebecca Deffes. 2005. "Teaching Words to Young Children: Investigating the Effectiveness of Early Vocabulary Instruction during Read-alouds." *Dissertation Abstracts International, A: The Humanities and Social Sciences*, 66, 5, Nov, 1695-A.
- Sirin, Selcuk R. 2005. "Socioeconomic Status and Academic Achievement: A Meta-analytic Review of Research." *Review of Educational Research* 75 (3): 417–453. doi:10.3102/00346543075003417.
- Skipper, J. K. Jr., Anthony L. Guenther, and Gilbert Nass. 1967. "The Sacredness of .05: A Note Concerning the Uses of Statistical Levels of Significance in Social Science." *The American Sociologist* 2 (1): 16–18.
- Smith, Linda B., Michael Gasser, and Catherine M. Sandhofer. 1997. "Learning to Talk About the Properties of Objects: A Network Model of the Development of Dimensions." In *Perceptual Learning, the Psychology of Learning and Motivation*, 36, edited by Robert L. Goldstone, Douglas L. Medin and Philippe G. Schyns, 219–255. San Diego, CA: Academic Press.
- Sydorenko, Tetyana. 2010. "Modality of Input and Vocabulary Acquisition." *Language Learning & Technology* 14 (2): 50–73.
- Thordardottir, Elin. 2011. "The Relationship between Bilingual Exposure and Vocabulary Development." *International Journal of Bilingualism* 15 (4): 426–445. doi:10.1177/1367006911403202.
- Tonzar, Claudio, Lorella Lotto, and Remo Job. 2009. "L2 Vocabulary Acquisition in Children: Effects of Learning Method and Cognate Status." *Language Learning* 59 (3): 623–646. doi:10.1111/j.1467-9922.2009.00519.x.
- Unsworth, Sharon. 2009. "First and Second language development from a UG perspective." In *Language Development over the Lifespan*, edited by Kees de Bot, Sinfree Makoni and Robert W. Schrauf, 19–39. Mahwah, NJ: Erlbaum.
- Verhallen, Marian J. A. J., and Adriana G. Bus. 2010. "Low-income Immigrant Pupils Learning Vocabulary through Digital Picture Storybooks." *Journal of Educational Psychology* 102 (1): 54–61. doi:10.1037/a0017133.
- Verhallen, Marian J. A. J., Adriana G. Bus, and Maria T. de Jong. 2006. "The Promise of Multimedia Stories for Kindergarten Children at Risk." *Journal of Educational Psychology* 98 (2): 410–419. doi:10.1037/0022-0663.98.2.410.
- Winsler, Adam, Rafael Diaz, Linda Espinosa, and James Rodriguez. 1999. "When Learning a Second Language Does Not Mean Losing the First Language: Bilingual Language Development in Low Income Spanish-speaking Children Attending Bilingual Preschool." *Child Development* 70 (2): 349–362. doi:10.1111/1467-8624.t01-1-00026.

Appendix. Sample of words and occurrences

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	S babies	R bed	S bed	R big	S big	R Black	S black	R blue	R box	S bus	R cat	S cat	R children	R daddy	R dog
2	ZL	4	12	22	13+12+1	14	1	16	18+11		30	14+6	15	14	4	4
3	LB	4	12	22+7	13+12+1	14	1	16	18+11	8	30	14+6	15	14	4	4
4	MM	4	12	22+7	13+12+1	14	1	16	18+11	8	30	14+6	15	14	4	4
5	EP	4	12	22+7	13+12+1	14	1	16	18+11	8	30	14+6	15	14	4	4
6	FB	4	12	22	13+12+1	14	1	16	18+11		30	14+6	15	14	4	4
7	LD	6	10+9	20+10	3+3	16+11+5+5		16+10+5	10	6	42	9+8	16+10	3	5	
8	MA	6	10	20+10	3+3	0+5		0+5	10		42	9+8	0+5	3	5	
9	HT	4	10+9	20+10	3+3	11+5+5+5		11+5+5+	10	6	28	9+8	11+5+	3	5	
10	AA	7	10+9	20+10	3+3	16+11+5		16+10+5	10	6	43	9+8	16+10	3	5	
11	EL	3	10+9	10		3	16+5	16+5		6	15		9	16+5	3	5
12	LM	7	10+9	20+10	3+3	16+5+5		16+5+5	10	6	43	9+8	16+5+	3	5	
13	VB	7	10	20+10	3+3	16+5		16+5	10		43	9+8	16+5	3	5	
14	SP	5	10+9	20+10	3+3	16+11+5+5		16+10+5	10	6	29	9+8	16+10	3	5	
15	EE		9	20		3	11+5	10+5	10	6			8	10+5		
16	Adrien	4	14+4		31	3+2	15+15+5	15+16+5	11+6	3	28	7+5	15+16	4	2	
17	MA	6	14+4	10+10	3+2	15+15+10+5	15+16+1	11+6		3	42	7+5	15+16	4	2	
18	JJ	8	14+4	21+20	3+2	15+15+5+10	15+16+5	11+6	3	56	7+5	15+16	4	2		
19	VD	6	14+4	21+20	3+2	15+15+10	15+16+1	11+6	3	42	7+5	15+16	4	2		
20	AC	6	14+4	20+10	3+2	15+15+15+15	15+16+1	11+6	3	42	7+5	15+16	4	2		
21	IC	8	14+4	31+20	3+2	15+15+15+15	15+16+1	11+6	3	56	7+5	15+16	4	2		
22	AF	2	14+4		21	3+2	15+15+10	15+16+1	11+6	3	14	7+5	15+16	4	2	
23	EM	2	14+4	31+20	3+2	15+15+15+15	15+16+1	11+6	3	14	7+5	15+16	4	2		
24	PS	8	4+4	31+20	3+2	15+15+15+15	15+16+1	11+6	3	56	6+5	15+16	4	0		
25	ER	6	14+4	31+10	3+2	15+15+15+5	15+16+1	11+6	3	42	7+5	15+16	4	2		
26																
27	cognates	(eliminated)		R= read S= song			black = 1st activity		yellow = 2nd	purple=3rd activity		red=4th activity				