Socio-economic status affects sentence repetition, but not non-word repetition, in Chilean pre-schoolers

Balladares, J., Marshall, C. R., & Griffiths, Y.

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Abstract

Sentence repetition and non-word repetition tests are widely-used measures of language processing which are sensitive to language ability. Surprisingly little previous work has investigated whether children's socio-economic status (SES) affects their sentence and non-word repetition accuracy. This study investigates sentence and non-word repetition using an adaptation of the Grammar and Phonology Screening (GAPS) test. The sample comprised 126 typically-developing Spanish-monolingual Chilean children aged 5;6 from low (n=65) and high (n=61) socioeconomic status (SES) families. The results revealed that the high SES group scored significantly higher than the low SES group in the sentence repetition task, but there was no group difference for non-word repetition. The high SES group also scored significantly higher on a measure of vocabulary comprehension, and when vocabulary comprehension was taken into account, the group difference in sentence repetition was no longer significant. We discuss how the differential effect of SES on sentence and non-word repetition might be explained by differences in the language and cognitive mechanisms involved in the two tasks, and we discuss the clinical implications of our findings.

Keywords

Sentence repetition, non-word repetition, vocabulary, socioeconomic status

Introduction

It is well-documented that children from low socio-economic status (SES) families tend to have delayed language development compared to those from higher SES families (Arriaga, Fenson, Cronan, & Pethick, 1999; Fernald, Marchman, & Weisleder, 2013; Gullo, 1982; Hoff & Naigles, 2002; Nelson et al., 2011; Ramey & Ramey, 2004; Ravid & Schiff, 2006; *inter alia*). The effects of SES are detectable even in very young children (Farrant & Zubrick, 2012; Lacroix, Pomerleau, & Malcuit, 2002; Oller, Eilers, Basinger, Steffens, & Urbano, 1995). SES therefore cannot be ignored in studies of language development. The bulk of the research on SES, however, has focused just on vocabulary. It has revealed that children from low SES families are at risk of receiving reduced quantity and variety of language input, and that this that in turn appears to be the main driver of their risk for delayed vocabulary development (Hart & Risley, 1995; Hoff, 2003; Hoff & Naigles, 2002). The effects of SES on phonological and syntactic development have been less well-studied. Amongst the few studies that do exist, Schiff and Ravid (2012) found effects for inflectional

morphology, and Huttenlocher, Vasilyeva, Cymerman and Levine (2002) found them for syntactic complexity. In contrast, Dodd, Holm, Hua and Crosbie (2003) did not find them for phonological development.

In this paper we investigate the impact of SES on two particular language tasks that tap grammar and phonology: sentence repetition and non-word repetition. These two repetition tests are widely-used measures of language processing which are sensitive to language ability. A very robust finding in the research literature is that children with language difficulties due to, for example, specific language impairment (SLI), autism, Down Syndrome and Fragile X Syndrome, repeat sentences and non-words less accurately than their age-matched peers (Chiat & Roy, 2007; Conti-Ramsden, Botting, & Faragher, 2001; Marcel, Ridgeway, Sewell, & Whelan, 1995; Munir, Cornish & Wilding, 2000; Riches, Loucas, Baird, Charman, & Simonoff, 2010). These findings hold for a variety of languages and not just for English (e.g., Devescovi & Caselli, 2007 (Italian); Girbau & Schwartz, 2007 (Spanish); Leclerq, Quémart, Magis, & Maillart, 2014 (French); Marshall, Mason, Rowley, Herman, Atkinson, Woll, & Morgan, 2015 (British Sign Language); Sahlén, Reuterskiöd-Wagner, Nettelbadt, & Radeborg, 1999 (Swedish); Stokes, Wong, Fletcher & Leonard, 2006 (Cantonese)). As a consequence, sentence and/or non-word repetition tests (and particularly the former, Dockrell & Marshall, 2015) are widely incorporated into language assessment batteries.

To date, little research has compared how children from different SES groups repeat sentences and non-words. The existing evidence is contradictory, with studies either reporting an absence of SES differences (for English, Gardner, Froud, McCelland, & van der Lely, 2006) or, alternatively, better performance by children from higher SES backgrounds (also for English, Roy, Chiat, & Dodd, 2014). It is important to understand the effects of SES (if any) on these measures, in order that language impairments be identified accurately in children from low SES backgrounds and the appropriate intervention offered (Roy et al., 2014). Furthermore, given the lack of clarity over the causal pathways by which SES influences language and cognitive development (Thomas, Forrester, & Ronald, 2013), comparing related sets of tasks (e.g. repetition tasks) might offer an insight into the different cognitive

mechanisms that underlie those tasks and the mechanisms by which SES might exert its effects.

In this study we examined the impact of SES on sentence and non-word repetition in a sample of typically-developing Spanish-speaking children from Chile, mean age 5;6. We chose Chile because it is a country with one of the highest SES dipsarities in the world (Aguirre, 2009), our reasoning being that if differences between high and low SES groups did not emerge in Chilean children, then the effect of SES on these tasks more generally is likely to be negligible. Furthermore, the impact of SES on the language development of children in developing countries is considerably less well-researched than in children who are growing up in developed nations (Schady et al, 2015). We aim to contribute to this small but growing literature.

In the remainder of this introduction we discuss what sentence and non-word repetition tasks involve, which components of language knowledge and processing that they are thought to tap, and the little research to date that has investigated repetition tasks in groups from different SES backgrounds.

Listening to a sentence such as *the cats drink the milk* and repeating it verbatim is trivial for adult native speakers of English. It is more difficult for less able language users, including young children. While it is arguably possible to repeat short sentences exclusively by means of phonological short-term memory, longer and/or more syntactically complex sentences require the support of linguistic representations (Klem, Melby-Lervåg, Hagtvet, Lyster, Gustafsson, & Hulme, 2015; Lust, Flynn, & Foley, 1996; Riches, 2012; Slobin & Welsh, 1968). Different components of long-term knowledge are involved, with morphosyntax and lexical phonology being particularly important, but semantics and prosody also play a role (Polišenská, Chiat, & Roy, 2015). Furthermore, Alloway, Gathercole, Willis, and Adams (2004) have argued that the episodic buffer is involved during sentence repetition because information from phonological short-term memory needs to be integrated with the products of semantic and syntactic analysis. Consequently, sentence repetition tasks are a good proxy for language processing and development.

With respect to non-words, every word that we now know and can express was once unknown to us. Non-word repetition can therefore be considered one of

the most basic and important language skills (Gathercole, 2006). The repetition of a non-word immediately after hearing it requires a range of different skills including speech perception, phonological encoding, phonological short-term memory, and articulation (Coady & Evans, 2008). Furthermore, repetition accuracy is affected by both lexical and sublexical properties of the non-word, such as its word-likeness, phonotactic frequency, and syllable and prosodic structure (Coady & Evans, 2008; Marshall & van der Lely, 2009; Sundström, Samuelsson, & Lyxell, 2014). Indeed, it is precisely because sentence and non-word repetition tasks tap so many different underlying skills that they are such useful diagnostic tools (Chiat, Armon-Lotem, Marinis, Polišenská, Roy, & Seeff-Gabriel, 2013; Coady & Evans, 2008).

What sentence and non-word repetition tasks measure depends to some extent, not surprisingly, on how they are constructed. One obvious manipulation is length, and the longer the sentence or the non-word, the harder it is to repeat accurately (Chiat et al., 2013; Coady & Evans, 2008). Another manipulation is to the linguistic structure. Even within sentences that contain the same number of words or syllables, linguistic complexity afffects repetition accuracy. For example, sentences containing a subject relative clause (e.g., *The policeman who chased the thief wore a hat*) are easier to repeat than those with an object relative (e.g., *The thief who the policeman chased wore a hat*) (Riches, Loucas, Biard, Charman, & Simonoff, 2010). Similarly, even within non-words that contain the same number of syllables and phonemes, the location of consonant clusters within the non-word, can affect repetition accuracy (Marshall & van der Lely, 2009).

In the current study, we adapted into Spanish the Grammar and Phonology Screening (GAPS) Test (van der Lely, Gardner, McClelland & Froud, 2007) which was originally created for English and which contains separate sentence and non-word repetition subtests. Van der Lely et al. (2007) devised sentences which contain syntactic structures that are particularly challenging for children with language impairments to repeat, including reversible passives (e.g., *The dog is pushed by the cat*), reflexive pronouns (e.g., *The cat washes himself*), phrasal embedding (e.g., *The cat with the bell is happy*), regular past tense verbs (e.g. *The cat wanted some milk*) and the dative double object construction (e.g., *The dog gives the cat the milk*). They selected non-words to be relatively short (3 syllables or shorter) and to contain a

variety of consonant clusters and less frequent stress patterns (e.g., dɪ'fɪmp, pə'drɛpə), again because such structures are challenging for children with language impairments (Gardner et al., 2006).

There has been little previous research comparing how children from different SES backgrounds perform on sentence and non-word repetition tasks. The few findings to date are mainly on English and are contradictory. Roy et al. (2014) conducted one of the few studies using both types of repetition task in a sample of two different socioeconomic groups, which they defined as Low and Mid-High. They tested 376 British English-speaking children aged 3;6 to 5;0 years old. Children from the low SES group repeated sentences significantly less accurately than those from the mid-high group, and they had particular difficulties with function words. The effects of SES on non-word repetition accuracy are harder to interpret because Roy et al.'s (2014) task contained both real words and non-words, and the data for words and non-words are not presented separately. Again, the children from the low SES group found the task more challenging. However, given the strong relationship between vocabulary and SES, children from the low SES group would be predicted to repeat words less accurately than children from the mid-high SES, but there might not necessarily be group differences for non-words. Roy et al.'s (2014) data, at least as they are currently presented, cannot be used to test this hypothesis.

In their standardization of the GAPS test, Gardner et al. (2006) investigated whether SES explained any variance in non-word and sentence repetition scores in their large group of 668 children (although they only had SES data for just under 75% of that sample). Unlike Roy et al. (2014) they found no effect of SES on either sentence repetition or non-word repetition. There are several possible explanations for these contrasting results, beyond the aforementioned inclusion of words alongside non-words in Roy et al.'s (2014) study. Roy et al. (2014) purposefully over-sampled from low SES groups (n=208 in the low group versus n=168 in the mid-high group), whereas Gardner et al.'s (2006) standardization sample was designed to be more demographically representative. Whereas Gardner et al. (2006) used just parental occupation as their proxy for SES (and they do not specify whether it was maternal or paternal occupation that was recorded), Roy et al. (2014) collected data on both the occupation and the education level of the primary carer, although they

allocated children to SES groups based solely on the basis of where they lived. Roy et al. (2014) reported a significant association between children's repetition scores and both the occupation and education level of the primary carer, but only for the low SES group. It is possible that differences in how SES is measured and in sampling might affect results.

A different study has investigated the impact of SES on just non-word repetition, and in a much smaller sample of children. Engel, Santos, and Gathercole (2008) tested 40 Portuguese-speaking Brazilian children (20 from low and 20 from high SES families) aged 6 and 7. They found no significant group differences in non-word repetition accuracy, and so concluded that non-word repetition can provide a way of 'identifying children with potential learning difficulties that are unlikely to be distorted by differences in wealth or other significant environmental factors that impact on language learning opportunities' (Engel et al., 2008, p.1585).

In summary, it has been suggested that because non-word repetition draws less on existing language knowledge and previous language experience, it should be less affected by SES compared to sentence repetition (Roy & Chiat, 2004; Dollaghan & Campbell, 1998; Campbell, Dollaghan, Needleman, & Janosky, 1997). However, more studies are required in order to test this hypothesis directly, and this is the aim of the current study. We evaluated sentence and non-word repetition in a sample of 126 Spanish-speaking pre-schoolers from Chile, from two different SES groups (low and high). Furthermore, given the well-established relationship between vocabulary and SES, and in line with Engel et al.'s (2008) study, we also included a measure of receptive vocabulary.

Method

Participants

One-hundred and twenty-six monolingual Spanish-speaking Chilean children (58 girls and 68 boys) aged 3;10 to 6;3 (mean age 5;6) participated. Children were recruited from five different preschools in the city of Linares, Chile. In Chile, children start preschool around the age of 4 years and primary school two years later. All our participants were attending a preschool attached to the primary school that they would be attending in due course. The sample was divided into two different socio-

economic groups according to which school they attended. The Chilean educational system uses school vouchers in both schools and preschools, whereby the government provides a monthly payment directly to schools depending on the attendance of each child. Thus, Chilean education has three different types of schools: those that just receive the monthly voucher (public schools), those that receive the voucher plus a fee paid by parents (public/private schools) and those that just receive the parents' fees (private schools).

The result is a highly segregated education system, with children from low income families attending public schools and children from high income families attending private schools. In this study, children from two public schools were allocated to the low SES group, and children from one public/private and two private schools (i.e. the three schools where parents have to pay fees) were allocated to the high SES group (low SES, n=65; high SES, n=61). The mean age of children in the low SES group was 59.2 months (SD = 5) and in the high SES group was 61.8 (SD = 4), and the two groups differ significantly on age, $t_{124} = 3.15$, $p = .002$. We therefore control for age in the analyses that follow.

In order characterise each participant's family background, we administered the Encuesta Sobre Ambiente Familiar Preescolar – EAF-P (*Family Environment Survey - Preschooler*) (Romero Contreras, 2006). This survey has been designed and administered to parents of young Latin American children. It considers different proxies for measuring socioeconomic status, and also asks parents about some of the learning activities that take place in the home (Romero Contreras, Arias, & Chavarría, 2007). Surveys were collected in a meeting between the lead researcher (first author) and parents in each school. This survey was not compulsory and it took between 40 and 50 minutes to complete. Ninety seven parents responded, representing a response rate was 77%, although not all parents were willing to provide information about family income or educational level. Despite these missing data, we present in Table 1 data on family monthly income as a proxy for the SES of the families. In Chile, the minimum wage is $421. As can be seen in Table 1, income in all families in the low SES group is below $631, and for many it is below the minimum wage. In contrast, income in all families in the high SES group is above $947.

Table 1. Family monthly income.

Ranges of monthly income ($ *USD)	**Socioeconomic Status**	
	Low (%) n=48	High (%) n=44
0 to $330	46.2	0
$331 to $631	26.2	0
$632 to $946	0	0
$947 to $2525	0	36.1
> $2526	0	32.8
Missing	27.6	31.1
Total	100	100

* 100 USD = €80 = £65

With respect to parental education, 72% of mothers and 70% of fathers who responded in the high SES group reported having been educated at undergraduate or postgraduate level, while only one mother in the low SES group reached undergraduate study (although she did not finish her degree). Finally, 71% of mothers and 69% of fathers who responded in the high SES group were employed in professional occupations (including education, medicine, management and law), in contrast to none of the parents in the low SES group. Hence, although children were allocated to SES group according to which type of preschool they attended, that division also reflected clear differences in family income, parental education and parental occupation, at least in the families from whom we were able to collect data.

Measures

a) Sentence and non-word repetition

A translated and adapted version from English to Spanish of the Grammar and Phonology Screening (GAPS) test (van der Lely et al., 2007) was administered. This task contained 11 sentences, with a variety of syntactic and morphological structures, and 8 bisyllabic and trisyllabic non-words which conformed to the phonotactic patterns of Chilean Spanish and contained a variety of stress patterns and syllable structures. For example, for non-words we used the typical Spanish

syllable patterns CV, CVC and CCV. In Spanish the most common stress occurs on the penultimate syllable of words, then on the last syllable and less frequently on the antepenult. Of our non-words, five were stressed on the penultimate syllable, two on the last syllable and one on the antepenult. Table 2 presents the stimuli for this Spanish version of the GAPS.

Table 2. Sentence and non-word stimuli for the Spanish adaptation of the GAPS test.

Sentences	
1. El gato con el lazo es gris.	*(The cat with the bow is grey.)*
2. Los gatos se han comido al pez.	*(The cats have eaten the fish.)*
3. La leche es arrastrada por el perro.	*(The milk is pulled by the dog.)*
4. ¿Qué ha bebido el perro?	*(What has the dog drunk?)*
5. El perro que los gatos empujan es azul.	*(The dog that the cats push is blue.)*
6. El gato lo lava.	*(The cat washes it.)*
7. Los gatos beben la leche.	*(The cats drink the milk.)*
8. El gato se lava.	*(The cat washes himself.)*
9. El perro es tocado por el gato.	*(The dog is touched by the cat.)*
10. El perro rojo le da la leche.	*(The red dog gives him the milk.)*
11. ¿A quién están lavando los gatos?	*(Who are the cats washing?)*
Non-words (stress is underlined)	
1. Cu<u>ton</u>	
2. <u>Mal</u>te	
3. <u>Go</u>bla	
4. Tri<u>du</u>ta	
5. Sibe<u>rol</u>	
6. Glu<u>mi</u>ta	
7. Mo<u>fre</u>lo	
8. <u>Pu</u>rramo	

Scoring was at the whole item level. A sentence or non-word that was repeated entirely correctly was awarded one point. In sentences, lexical, morphological and syntactic errors resulted in a score of 0 being awarded. In non-words, segmental, syllabic and prosodic errors resulted in a score of 0.

b) Receptive vocabulary

We also included a measure of receptive vocabulary, the Test de Vocabulario en Imágenes Peabody (TVIP, the Spanish adaptation of the Peabody Picture

Vocabulary Test; Dunn, Lugo, Padilla, & Dunn, 1986). This test has previously been used in Chile and has been shown to be a valid and reliable measure of receptive vocabulary (Strasser, Larrain, López de Lérida, & Lissi, 2010). A recent study of children in Chile and in four other Latin American countries (Schady et al., 2015) reported strong SES effects on TVIP score for children with an overlapping age range to those in our sample (3;0 – 5;10). Furthermore, those effects were robust to different ways of defining SES (maternal education, family expenditure, ownership of assets such as a washing machine, mobile phone and personal computer).

The test was administered and scored according to the manual.

Procedure. Ethical approval was given by the Department of Psychology and Human Development of the UCL Institute of Education. An invitation to take part in this study was sent to all head teachers of schools with prekindergarten in Linares, Chile. Five of them responded affirmatively to this invitation. Head teachers and parents signed a consent form to participate in the study. The researcher also received verbal consent from each child prior to testing.

All children were individually evaluated by the researcher in a suitable room within each school. GAPS administration took between 6 to 10 minutes, and the sentence repetition test was presented first. This test was accompanied by a booklet containing one picture for each sentence that the researcher pronounced. The child repeated each sentence immediately after hearing it. The test started with two practice items in order to check that the children understood the task instructions. Only once the children repeated those sentences correctly did the researcher move on to the trial items. For the non-word repetition test there were again two practice items. For both tests all participants understood the instructions and moved straight on to the trial items. Responses were audio-recorded for later transcription.

Next, the TVIP was administered to measure receptive vocabulary, according to the instructions in the manual. On each trial, children hear a word and have to indicate which picture, from a set of four, matches that word.

Results

The groups' scores on the sentence repetition, non-word repetition and receptive vocabulary tasks are summarized in Table 3.

Table 3. Group scores for repetition and vocabulary tasks.

		Low SES			High SES			Significance tests, with age as a covariate		
Variable	Max. possible score	M	SD	Range	M	SD	Range	*F* (1,123)	*p*	Eta squared
Sentence repetition	11	8.60	1.89	2-11	9.48	1.43	4-11	9.86	.002	.074
Non-word repetition	8	6.74	1.22	4-8	6.90	1.13	4-8	.387	.535	.003
Receptive vocabulary	114	49.20	13	23-78	60.5	11.3	38-82	27.3	<.001	.180

We compared the two groups' performance on the three tasks, using age as a covariate. As shown in Table 3, children from the low SES group repeated sentences less accurately than children from the high SES group (a medium effect size), with, on average, the difference between groups being equivalent to one sentence. For non-word repetition there was no significant group difference (the effect size was very small). Children in the high SES group recognised significantly more words in the receptive vocabulary test that children in the low SES group (large effect size).

Not surprisingly, given that they are both repetition tests, sentence repetition and non-word repetition scores were correlated in the sample as a whole, r_{125}=.27, p=.002. Receptive vocabulary score was correlated with sentence repetition, r_{125}=.52, p<.001, but not with non-word repetition, r_{125}=-.032, p=.722. In order to evaluate the effect of vocabulary on the relationship between SES and sentence repetition, and following Komeili and Marshall (2013), we conducted an analysis of variance with receptive vocabulary as an additional covariate. The results show that the variance in sentence repetition accuracy can be explained by children's vocabulary level, because the significant effect of group disappears when TVIP score is included as a covariate, $F_{1, 123}$=.545; p=.462. We ran the same analysis for non-word repetition, but

as expected we found no significant difference between groups when vocabulary is included as covariate, $F_{1, 123}$=.726; p=.396.

Discussion

Given the well-documented effects of SES on language development, and given the widespread use of sentence and non-word repetition tasks in language assessment batteries, it is important to understand whether repetition accuracy is also affected by SES. If children from low SES backgrounds repeat non-words and sentences less accurately than children from higher SES backgrounds, then this would indicate that repetition tests are potentially less useful at identifying language impairments in children from low SES backgrounds. If such children perform poorly, it would be difficult to disentangle whether this is a consequence of SES background, or a consequence of having a developmental language difficulty.

Previous research investigating the effect of SES on sentence and non-word repetition has produced contradictory results. In our study, we compared repetition performance in two groups of Chilean preschoolers (low SES and high SES), with the expectation that if repetition tasks are affected by SES, this would be readily detectable in Chilean preschoolers, given the sizeable family income disparities at different SES levels and the strong SES effects on academic achievement in Chilean students (Aguirre, 2009). Furthermore, we aimed to add to the currently rather limited literature on the effects of SES on language development in children who are growing up in developing countries.

In our study, children from the high SES group were able to repeat sentences more accurately than their peers from the low SES group. Children from the low SES group repeated one sentence (out of a total of 11 sentences) less accurately than the other group. This difference corresponded to a medium effect size. In contrast, for non-word repetition there was no group difference. Finally, the two groups differed in performance on a receptive vocabulary test, replicating recent findings by Schady et al. (2015), and vocabulary appeared to be driving the group difference in sentence repetition.

The group difference for sentence repetition are consistent with Roy et al. (2014) who with a similar aged sample reported a significant effect of SES. However,

unlike us, Roy et al. (2014) additionally found SES effects for non-word repetition. As discussed in the introduction, this might be at least partly explained by their including real word stimuli alongside the non-words. Our results for non-word repetition are, however, consistent with those of Engel et al. (2008), who, with a much smaller group of children, did not find an effect of SES on non-word repetition accuracy. One limitation of our study is that the test that we adapted to Chilean Spanish, the Grammar and Phonology Screening (GAPS) test has a limited number of items, and indeed was designed to be short so that it would have utility as a screening test for potential language impairments in young children (Gardner et al., 2006). With a smaller number of items we would be less likely to find differences between groups of children. Nevetheless, the fact that we found an effect of SES for sentences in the Spanish adaptation of the GAPS test whereas Gardner et al. (2006) did not could be plausibly be due to sampling differences between the two studies. Unlike us, Gardner et al. (2006) did not directly recruit children to low versus high SES groups, but rather sampled a demographically representative population.

Furthermore, it may be that SES differences are more extreme in the Chilean population. As the information that we collected via parental survey revealed, there were very big differences in family income, parental occupation and parental education in the two groups of children who had been allocated to group on the basis of which type of school they attended, private or public. Of course, how those factors relate to the type of language input and the experiences with language that children have as they grow up is something that our study does not address. SES is a useful proxy measure, but it exerts its influence on language development through the quality of the children's physical and psychological enrivonments (Roy & Chiat, 2013); on its own it does not reveal anything about the background experience and knowledge that children bring to their preschool and school education (Bruer, 2014). As the number of studies investigating language development in children from less developed countries grows, an important area of focus will be how the language-learning experiences of children in low SES groups in developing versus more developed countries differ.

The finding of a relationship between sentence repetition and receptive vocabulary is in line with a study of Engish-speaking monolinguals and Farsi-English

bilinguals by Komeili and Marshall (2013). Those authors also found group differences in sentence repetition between the two participant groups, but those differences disappeared when receptive vocabulary scores were taken into account in the analysis. Thus for children who are arguably likely to experience less input in a particular language – whether as a result of bilingualism (Unsworth, 2015) or low SES (Hart & Risley, 1995; Hoff, 2003) – vocabulary appears to be a mediating factor in the lower repetition scores. Of course, vocabulary is not likely to be the only contributor to sentence repetition ability. Neither our study nor that by Komeili and Marshall (2013) included an independent measure of syntax or morphosyntax alongside vocabulary, but a longitudinal study of over 200 typically developing Norwegian-speaking children by Klem and colleagues did. Klem et al. (2015) found that developmental growth in sentence repetition abilities loaded strongly onto a single factor consisting scores on a receptive vocabulary task and a productive morphosyntactic (sentence completion) task. Whether the lower levels of vocabulary and morphosyntax are independent drivers of poorer sentence repetition accuracy in children from low SES backgrounds is something that remains to be tested.

Finally it is worth considering why we did not find an effect of SES on non-word repetition accuracy in our study. Given that several previous studies have demonstrated a link between non-word repetition accuracy and vocabulary knowledge (reviewed by Coady & Evans, 2008), and given that a large body of research shows reliably lower vocabulary levels in children from low SES backgrounds (Arriaga, et al., 1999; Fernald, et al., 2013; Hart & Risley, 1995; Hoff & Naigles, 2002), one might have expected that non-word repetition would be affected by SES. The finding from this study and others (e.g. Engel et al., 2008; Gardner et al., 2006) that it is *not* affected should be treated with caution. Non-word repetition tests are not all created equal – some include stimuli that are more word-like than others, and repetition of word-like stimuli is supported by lexical knowledge (Gathercole, 1995). Therefore while the non-words in the GAPS test might be less reliant on existing lexical knowledge and might tap more directly aspects of phonological knowledge and processing that are perhaps less strongly influenced by language input, this cannot be taken for granted for all non-word repetition tests.

In summary, our findings indicate that sentence repetition is likely to be more affected by SES than non-word repetition, and therefore that caution should be employed when using it to identify language impairments in children from low SES backgrounds.

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